Province of the
EASTERN CAPE
PUBLIC WORKS & INFRASTRUCTURE

TENDER

ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS, AND UPGRADES TO WATER & WASTEWATER TREATMENT WORK

SCMU5-25/26-0040

NAME OF COMPANY: _____

CSD Nr: _____

CRS Nr (CIDB): _____

CLOSING DATE: 29 JULY 2025 **TIME: 11:00 am**

Department of Public Works and Infrastructure
Independence Avenue
Qhasana Building
Bhisho
5605

EXPANDED PUBLIC WORKS PROGRAMME
CONTRIBUTION TO A NATION AT WORK
2030 NDP

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THE TENDER

PART T1: TENDERING PROCEDURES

T1.1 Tender Notice and Invitation to Tender

The Eastern Cape Department of Public Works and Infrastructure invites contractors with a CIDB Grading of **7CE or higher** in the following Class of works (**CE)** to tender for the **"ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK"** for a **10-month** contract. The contract will be based on the General Conditions of Contract third Edition of 2015 and the Eastern Cape Public Works and Infrastructure will enter a contract with the successful tenderer.

Only tenderers who have suitable experience and suitably qualified personnel in providing similar services to those that are required are eligible to submit tenders.

Bid documents are downloadable free of charge from Department of Public Works and Infrastructure website (www.ecdpw.gov.za/tenders) or from National Treasury's tender portal (http://www.etender.gov.za/content/advertised-tenders). Bid documents will be available on 27 June 2025. No bid documents will be available at departmental offices.

Below is a link containing a Bill of Quantities, Drawings and Construction Health and Safety Specification
SCMU5-25.26-0040

There will be **Compulsory** briefing meeting on **08 July 2025**, at **ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT** Prospective bidders to meet **at the main entrance of the site at 13h00.**

Queries relating to the issue of these documents may be addressed in writing to SCM email: supply.chain@ecdpw.gov.za **Technical enquiries:** may be addressed in writing to **Mr. M. Ngamlana**– email: Mkanyiseli.Ngamlana@ecdpw.gov.za

The closing time for receipt of tenders by the ECDPWI is **11:00am** on **29 July 2025**. Telegraphic, telephonic, telex, facsimile, e-mail, and late tenders will not be accepted. Bids must be submitted in sealed envelopes clearly marked **"SCMU5-25/26-0040: "ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK"** must be deposited in the bid box, **DEPARTMENT OF PUBLIC WORKS, FRONT CORNER OF QHASANA BUILDING ON THE WAY TO CIDB OFFICES LABELLED "TENDERS", BISHO.**

It is the responsibility of the tenderer/s to ensure that bid documents /proposals are submitted on or before closing time and the correct location as the department will not take responsibility of wrong delivery. Tenderers using courier services for delivery of their bid documents must ensure the delivery is at the correct place / location and time as the department will not be held responsible for wrong delivery. Not delivered to Departmental officials. The Department will not accept responsibility if bids received by officials are not timely deposited in the Bid Box.

Tenders may only be submitted on the tender documentation that is issued. Tenderers must be registered on the National Treasury Central Supplier Data Base and proof of registration must be submitted with the proposal (https://secure.csd.gov.za). Requirements for sealing, addressing, delivery, opening and assessment of tenders are stated in the Tender Data.

B. BID EVALUATION:
This bid will be evaluated in Three (3) phases as follows:

Phase One: Compliance, responsiveness to the bid rules and conditions,
Phase Two: Functionality thereafter they will be evaluated on PPPFA.
Phase Three: Bidders passing all stages above will thereafter be evaluated on PPPFA and PPR 2022.
PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT (PPPFA) POINTS WILL BE AWARDED AS FOLLOWS:

Maximum points on price	-	**80 points**
Maximum points for Specific goals	-	**20 points**
Maximum points	-	**100 points**

C. BID SPECIFICATIONS, CONDITIONS AND RULES

1. The minimum specifications, other bid conditions and rules are detailed in the bid document under Tender Data
2. The specifications, rules, special conditions of bid, evaluation criteria, and rules for evaluation for compliance to local content and other bid conditions are detailed in the document.
3. The Department of Public Works and Infrastructure SCM policy applies.
4. Tender validity period is **120 days.**

D. TENDER SUBMISSIONS:

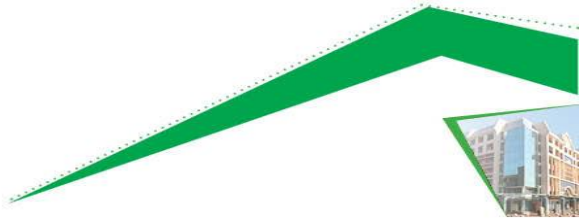
Bids must be submitted in sealed envelopes clearly marked **"SCMU5-25/26-0040": "ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK:"** must be deposited in the bid box, **DEPARTMENT OF PUBLIC WORKS, FRONT CORNER OF QHASANA BUILDING ON THE WAY TO CIDB OFFICES LABELLED "TENDERS", BISHO**.

E. ENQUIRIES WITH REGARD TO THIS ADVERT MAY BE DIRECTED TO:

- **SCM RELATED ENQUIRIES**
  Email Address: supply.chain@ecdpw.gov.za

  TECHNICAL ENQURIES
  Mr. M. Ngamlana
  Tel No: **040 402 4014**
  Cell No**: 071 294 6702**
  Email Address: Mkanyiseli.Ngamlana@ecdpw.gov.za

FOR COMPLAINTS, FRAUD, & TENDER ABUSE:
Call: 0800 701 701



T1.2 Tender Data

The conditions of tender are the latest edition of SANS 10845-3, *Standard conditions of tender*.

SANS 10845-3 makes several references to the Tender Data for details that apply specifically to this tender.

The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the provisions of SANS 10845-3 *and* as contained in **Annexure C** of **Standard for Uniformity in Construction Procurement (Board Notice 423 of 2009 Government Gazette No 42622 of August 2019)**.

Each item of data given below is cross-referenced to the clause in SANS 10845-3 to which it mainly applies.

Clause number	Tender Data
3.1	The Employer is Public Works and Infrastructure
3.2	The tender documents issued by the employer comprise the following documents: **THE TENDER** **Part T1: Tendering procedures** T1.1 - Tender notice and invitation to tender T1.2 - Tender data **Part T2: Returnable documents** T2.1 - List of returnable documents T2.2 - Returnable schedules **THE CONTRACT** **Part C1: Agreements and Contract data** C1.1 - Form of offer and acceptance C1.2 - Contract data C1.3 - Dispute Resolution Mechanism **Part C2: Pricing data** C2.1 - Pricing Instructions C2.2 - Bills of Quantities **Part C3: Scope of works** C3.1 - Standard Specifications C3.2 - Project Specifications C3.3 - Particular Specifications **Part C4: Site information** C4.1 - General C4.2 - Project Location **Part C5: Annexures** Annexure 1 - Mechanical & Electrical Scope of Works Annexure 2 - List of Drawings Annexure 3 - Construction Health & Safety Specification Annexure 4 - EPWP Specification
3.3	The tender documents issued by the employer comprise the documents listed on the contents page
3.4	The employer's agent is: Name: Mr. H. Fuyana FMA ENGINEERS (Pty) Ltd 795 Main Street, Mount Frere Tel No: Head Office **031 764 2763** Email Address: FuyanaH@fmaengineers.co.za
3.5	The language for communications is English
3.6	The competitive negotiation procedure shall be applied.
3.7	Method 3: Three (3) stage procurement procedure shall be applied.
4	**Tender's obligations**
4.1	The following tenderers who are registered with the CIDB, or are capable of being so registered prior to the evaluation of submissions, are eligible to have their tenders evaluated: a) contractors who have a contractor grading designation CIDB **Grade 7CE OR HIGHER** class of construction work; and b) Joint venture are eligible to submit tenders provided that: i) Every member of the joint venture is registered with the CIDB.

	ii) The lead partner has a contractor grading designation in grade 6CE class of construction work; iii) The contractor grading designation is calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) of 25(7A) of Construction Industry Development Regulations. iv) Joint Venture Agreement
4.2	The employer **will not** compensate the tenderer for any costs incurred in attending interviews or making any submissions in the office of the employer.
4.3	It is the responsibility of the tenderer to check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.
4.4	**Confidentiality and copyright of documents** Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the employer only for the purpose of preparing and submitting a tender offer in response to the invitation.
4.5	Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, conditions of contract and other publications, which are incorporated into the tender documents by reference.
4.6	Acknowledge receipt of addenda to the tender documents, which the employer may issue, and, if necessary, apply for an extension to the closing time stated in the tender data, to take the addenda into account.
4.7	The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender. Tenderers must sign the attendance list in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list. **Tender documents will not be made available at the clarification meeting**
4.8	**Seek clarification** *Request clarification of the tender documents, if necessary, by notifying the employer at least* ***7 (Seven) working days*** ***before the closing time stated in the tender data.***
4.9	Tenderers are required to state the rates and currencies in Rands. Include in the rates, prices, and the tendered total of the prices (if any), all duties, taxes which the law requires to be paid [except value added tax (VAT)], and other levies payable by the successful tenderer, that are applicable 14 days before the closing time stated in the tender data. Show the VAT payable by the employer separately as an addition to the tendered total of the prices. Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data. State the rates and prices in monetary value of the contract unless otherwise instructed in the tender data.
4.10	Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the employer or to correct errors made by the tenderer and ensure that all signatories to the tender offer initial all such alterations. Do not make erasures using masking fluid.
4.11	Main tender offers are not required to be submitted together with alternative tenders.
4.12	No alternative tender offers will be considered
4.13.1	Parts of each tender offer communicated on paper shall be submitted as an original. Submit a) the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with a translation of any documentation in a language other than the language of communication established in 3.5, and

	b) The parts communicated electronically by the employer of its agents on paper format with the tender.
4.13.2	Sign the original and all copies of the tender offer where required in terms of the tender data. State in the case of a joint venture which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer. NOTE The employer holds all authorized signatories liable on behalf of the tenderer.
4.13.3	A tender security in the amount of **N/A** is required and shall remain valid for a period not exceeding N/**A** days after the closing date for tender offers. The form of the tender security shall not differ substantially from the sample provided in Annex D of SANS 10845-3.
4.13.4	The employer's details and address for delivery of tender offers and identification details that are to be shown on each tender offer package are: **Location of tender box: DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE, FRONT CORNER OF QHASANA BUILDING ON THE WAY TO CIDB OFFICES LABELLED "TENDERS", BISHO**. **Physical address:** Independence Avenue, Ground Floor, Qhasana Building, Bhisho 5605 **Identification details: SCMU5-25/26-0040: "ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK"** **Closing time and date: 29 July 2025** at **11:00**
4.13.5	The tenderer is required to submit with his tender the following certificates: 1) A copy of the CSD report showing, amongst other things, that tax matters of the service provider are in order in the South African Revenue Services. *In the case of a Joint Venture/Consortium/Sub-contractors each party must submit a separate* CSD report showing, amongst other things, that tax matters of the service provider are in order in the South African Revenue Services. 2) CIDB Grading certificate or CRS number.
4.13.6	A two-envelope procedure will not be required.
4.13.7	Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted. The tenderer accepts that the employer does not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.
4.14	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender. Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Proof of posting shall not be accepted as proof of delivery. Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of the standard conditions of tender in this part of SANS 10845 apply equally to the extended deadline.
4.15.1	The tender offer validity period is **120 days**. Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data. If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period, with or without any conditions attached to such extension. Extend the period of the tender security, if any, to cover any agreed extension requested by the employer.
4.15.2	**Placing of contractors under restrictions / withdrawal of tenders** If any tenderer who has submitted a tender offer or a contractor who has concluded a contract has, as relevant: withdrawn such tender or quotation after the advertised closing date and time for the receipt of submissions; after having been notified of the acceptance of his tender, failed or refused to commence the contract; had their contract terminated for reasons within their control without reasonable cause; offered, promised or given a bribe in relation to the obtaining or the execution of such contract; acted in a fraudulent, collusive or anti-competitive or improper manner or in bad faith towards the Provincial Government; or, made any incorrect statement in any affidavit or declaration with regard to a preference claimed and is unable to prove to the satisfaction of the Provincial Government that the statement was made in good faith or reasonable steps were taken to

	confirm the correctness of the statements, such tenderer/s may be placed under restriction from tendering with the state. Procedures are outlined in the EC SCM Policy for Infrastructure procurement and Delivery Management and also on **CIDB** Inform Practice Note #30. Excerpts of the policy can be availed on request of any interested tenderer.
4.16	Access shall be provided for the following inspections, tests and analysis: **N/A**
4.17	the preferred tenderer will be required to submit an approved insurer undertaking to provide the Performance Bond / Guarantee / Surety / Security to the format and/or standard as per DPWI policy
5	**Employer's undertakings**
5.1	The Employer will respond to requests for clarification received up to **Seven (7)** working days before the tender closing time. If, as a result of the issuing of addenda, it is necessary to extend the closing time stated in the tender data, grant such extension and notify all respondents accordingly.
5.2	The employer shall issue addenda until **Seven (7)** working days before tender closing time.
5.3	Tenders will be opened immediately after the closing time for tenders at **11:00am hours.**
5.4	Do not disclose to tenderers, or to any person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.
5.5	Determine, after opening and before detailed evaluation, whether each tender offer that was properly received a) complies with the requirements of the standard conditions of tender in this part of SANS 10845, b) has been properly and fully completed and signed, and c) is responsive to the other requirements of the tender documents. A responsive tender is one that conforms to all the terms, conditions, and scope of work of the tender documents, without material deviation or qualification. A material deviation or qualification is one which, in the employer's opinion, would d) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the scope of work, e) significantly change the employer's or the tenderer's risks and responsibilities under the contract, or f) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified. Reject a non-responsive tender offer, and do not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

5.6	**Arithmetical errors, omission, and discrepancies**
	Check responsive tenders for discrepancies between amounts in words and amounts in figures. Where there is a discrepancy between the amounts in figures and the amount in words, the amount in words shall govern.
	
	Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with preference scoring for:
	• the gross misplacement of the decimal point in any unit rate;
	• omissions made in completing the pricing schedule or bills of quantities; or
	• arithmetic errors in:
	  ○ line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or
	  ○ the summation of the prices.
	
	Notify the tenderer of all errors or omissions that are identified in the tender offer and invite the tenderer to either confirm the tender offer as tendered or accept the corrected total of prices. Where the tenderer elects to confirm the tender offer as tendered, correct the errors as follows:
	• If bills of quantities or pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall

<table>
<tr><td></td><td>be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as quoted shall govern, and the unit rate shall be corrected.
• Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the tenderer will be asked to revise selected item prices (and their rates if bills of quantities apply) to achieve the tendered total of the prices.

For Vat related discrepancies, National and Provincial Treasury prescripts in relation to VAT procedures apply.</td></tr>
<tr><td>5.7.1</td><td>The financial offer will be reduced to a comparative basis using the Tender Assessment Schedule.
Table F.1: Formulae for calculating the value of A
<table>
<tr><th>Formula</th><th>Comparison aimed at achieving</th><th>Option 1[a]</th><th>Option 2[a]</th></tr>
<tr><td>1</td><td>Highest price or discount</td><td>$A = \left(1 + \frac{(P - P_m)}{P_m}\right)$</td><td>$A = P/P_m$</td></tr>
<tr><td>2</td><td>Lowest price or percentage commission / fee</td><td>$A = \left(1 - \frac{(P - P_m)}{P_m}\right)$</td><td>$A = P_m/P$</td></tr>
<tr><td>a</td><td colspan="3">P_m is the comparative offer of the most favourable comparative offer.
P is the comparative offer of the tender offer under consideration.</td></tr>
</table></td></tr>
<tr><td>5.7.2</td><td>The procedure for the evaluation of responsive tenders is Method 3: Administrative, Functionality, Price and Preference.

Phase 1: Administrative requirements and Mandatory requirements.
Phase 2: Functionality.
Phase 3: Price and preference (80/20 system).</td></tr>
<tr><td></td><td>1. <u>PHASE ONE: RESPONSIVENESS TO THE BID REQUIREMENTS</u>

Bidders' proposals must meet the following minimum requirements and supporting documents must be submitted with the completed bid document in a sealed envelope in the bid box at the closing date and time. Failure to comply will automatically eliminate the bid for further consideration:

1.1. Bid Document (This Document must be submitted in its original format).
1.2. Bids which are late, incomplete, unsigned or submitted by facsimile or electronically, will not be accepted.
1.3. Bidder must be registered with CIDB in the correct grading and class of works as per the tender notice and requirements. The status on CIDB must be active. It is the responsibility of the bidder to keep the status on CIDB active throughout bidding process (advert till award stage).
1.4. Bidders must be a legal entity or partnership or consortia.
1.5. Form of offer and Acceptance (fully completed and signed).
1.6. SBD 4- Declaration of Interest (fully completed and signed). SBD4 must be duly completed and signed. Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract, such interest must be disclosed on question 2.3.1.
1.7. Incomplete or unsigned or poorly completed forms SBD 4 will lead to a bidder being declared non-responsive.
1.8. Compulsory Enterprise Questionnaire (Completed and signed) (JV partners must complete separate Questionnaire forms and submit).
1.9. If the offer is "Vat Inclusive", the VAT registration number of service provider must be indicated and if a service provider is not a VAT Vendor but include VAT in its prices, the successful service provider will be given 21 days to register as a VAT Vendor with SARS, after the issuing of an appointment letter. If a bidder is a VAT vendor/registered, the bidder</td></tr>
</table>

is required to explicitly state the VAT amount. VAT vendors must include VAT at 15% in the bid offer(s).

1.10. If the Bid Sum (amount in words) differ from the Bid Sum (amount in figures), the Bid Sum (amount in words) will govern.

1.11. Tenderers shall include in their final tender offer all provisionally stated sums as listed in the Bills of Quantities. Omission of any such sums shall render the tender non-responsive and subject to disqualification.

1.12. Resolution to Sign (must be completed, if applicable).

1.13. Declaration of Employees of the State or other State Institutions.

1.14. Only one offer per bidder is allowed and alternative offers will not be considered. If more than one offer is received, none of the offers will be considered.

1.15. Attendance of compulsory briefing meeting (if applicable).

2. PHASE TWO: FUNCTIONALITY

2.1. Tenderers will be assessed for quality based on a functionality criterion and are required to score a minimum 60 out of a maximum of 100 points. The specified minimum to be achieved for each Criterion 1 ,2, 3 and 4 below:

2.2. **Criterion 1**: Similar Project Completed and Track record (Appointment Letter and Completion Certificate) – maximum 50 points.

2.3. **Criterion 2**: Capacity of Bidder: - maximum 20 points

2.4. Contracts Manager

2.5. Treatment Plant Designer

2.6. Construction Manager

2.7. Foreman

2.8. **Criterion 3**: Water Treatment Plant – maximum 20 points

2.9. **Criterion 4**: Implementation Programme - maximum 10 points

Scoring for Quality is done on a graded basis, the principles according to SANS 10845-3:2015 Clause A.5.11.9 on a pro-rata basis will be followed. The minimum score for any single component will be 50%, unless stated otherwise in the Scoring Schedule below.

The score awarded for quality will be assessed using the criteria set out below and each criterion will be scored individually up to the maximum number of points indicated.

The Tenderer is required to submit information in the relevant returnable schedules contained in T2.2 in support of the points claimed against each criterion. Failure to submit the relevant information will result in zero points being scored. The three criteria to be used in the functionality scoring are:

- Criterion 1: Similar project Completed and Track record (Customer Satisfaction).
- Criterion 2: Capacity of Bidders
- Criterion 3: Water Treatment Plant
- Criterion 4: Implementation Programme

1. Criterion 1: Similar Projects Completed.

Tenderers are required to demonstrate relevant experience and competency in the past 10 years prior to the tender closing date of similar projects. The following will be considered as similar projects:

- Civil or Mechanical Engineering projects where the tenderer was the principal contractor or a subcontractor to the principal contractor that was awarded the subcontract via a procurement process under the control of the Employer/ Client, and works entailed:
  - the construction or major upgrade of either water purification plant, or wastewater treatment plants' earthworks, structural steel, concrete and, brickwork, and a component of process engineering, mechanical and electrical equipment with a minimum value of R10M, or

- the construction or major upgrade of water retaining structures including reservoirs and storage tanks' earthworks, structural steel, concrete, and brickwork for chambers with a minimum value of R10M., or
- the construction or major upgrade of pump station buildings' earthworks, structural steel, concrete, brickwork, and mechanical and electrical equipment with a minimum of R10M.

Please note that projects that only consist of civils works such as gravel roads, pipeline only contracts, community sanitation projects (VIPs) do NOT qualify.

2. Criterion 2: Capacity of Bidder.

The experience and qualifications of key staff are linked to the success of projects and the success or failure of contractors. To this end the Tenderer must commit staff to the project with sufficient capacity to fulfil their various functions.

To evaluate the staff assigned to the project, the tenderer must complete the relevant forms and attach the Curriculum Vitae for each person and clearly mark on each CV to which category he/they will be assigned.

Note that if the Tenderer fails to assign the staff proposed at tender stage for the implementation stage, he must propose alternative staff for approval by the Employer. The alternative must match or exceed the capacity, experience, and qualifications of the original nominee as tendered. If the alternative assigned staff do not perform their functions adequately, the Employer will exercise his rights as stated in the Conditions of Contract. Awarding of the Contract must not be construed as automatic acceptance of the proposed persons.

i. Contracts manager

The experience and qualifications of the assigned Contracts Manager will be scored in accordance with Scoring Schedule below.

The definition of a Contracts Director is the person in a senior management position, who will attend all fortnightly site meetings, report to the board of directors or owners and be solely responsible for the project on a day-to-day basis within the management structures and co-ordination with the site agent, suppliers and specialist subcontractors. This may also include a Director, if he fulfils the functions as described above.

The Contracts Director will have experience in the civil or mechanical engineering construction industry of at least 10 years of which he has held the position of a contract's director for the past 5 years. He must have held the position of at least site agent on projects before it can be considered as experience.

It is an express condition of this tender that the person stated will function as Contracts Director after award of the contract. The tenderer must therefore ensure that he will be available for the purposes of the contract contemplated in this document and for the full duration thereof. Should it become necessary that a different person be re-assigned for good reason, the Tenderer must advise the Employer in advance and seek advance approval for the assignment of a new Contracts Director which will achieve the same point scoring as before. No relaxation in this will be permissible as it has direct effect on the fairness/ compliance of the tender award process.

To evaluate the point scoring of the Contracts Director, a CV of the assigned person containing the following minimum information must be submitted:

- Full names with certified copy of ID document.
- Qualifications.
- Employment History.
- Type of experience gained and at what level of employment, e.g. site agent.
- List and type of projects completed under his control.
- Educational Institutional attended and qualifications attained.
- The CV must be signed by the assigned person.

Please note that NQF qualification relevant to the built environment will be considered for point scoring. For instance, a BCom will not score points.

ii. Construction Manager

The experience and qualifications of the assigned Site Agent will be scored in accordance with Scoring Schedule below.

The definition of a Site Agent is that he will fulfil the requirements of Clause 4.12 of GCC 2015 and will be the assigned person that will be on site full time during working hours and will have overall control over site activities, quality management systems, staff, contract administration, overseeing implementation of OHS requirements etc. He will be familiar with best practice in engineering construction, specifications and codes, conditions of contract etc.

He will have a minimum 5 years of experience as a site agent on engineering construction projects. As a minimum, he must also be in possessions of a NQF5 qualification in the built environment.

In order to evaluate the point scoring of the Site Agent, a CV of the assigned person containing the following minimum information must be submitted:

- Full names with certified copy of ID document.
- Qualifications
- Employment History
- Type of experience gained and at what level of employment, e.g. site agent.
- Abbreviated list and type of projects completed under his control.
- Educational Institutional attended and qualifications attained.
- The CV must be signed by the assigned person.

Please note that NQF qualification relevant to the built environment will be considered for point scoring. For instance, a BCom will not score points.

iii. Treatment Plant Designer

The Treatment Plant Designer must be an established practitioner and the project manager that will be involved with the design and assembly and commissioning of the specialist plants throughout the Contract and the Maintenance and Operations Period and must be one of the following:

- a registered Professional Process Controller with a track record in design
- or Professional Engineer with a track record in process/plant design
- or Scientist with and NQF 6 or higher education with a track record in process design in the field that encompasses the design and configuring of processes required under this contract and overseeing ordering, assembly and commissioning of the equipment or plants.

iv. Foreman

The experience and qualifications of the assigned Contracts Manager will be scored in accordance with Scoring Schedule below.

He will have a minimum 10 years of experience as a Foreman on engineering construction projects. As a minimum, he must also have been involved in 5 or more water and wastewater projects.

To evaluate the point scoring of the Foreman, a CV of the assigned person containing the following minimum information must be submitted:

- Full names with certified copy of ID document.
- Qualifications
- Employment History
- Type of experience gained and at what level of employment, e.g. Foreman.
- Abbreviated list and type of projects completed in his involvement.

- Educational Institutional attended and qualifications attained.
- The CV must be signed by the assigned person.

Please note that NQF qualification relevant to the built environment will be considered for point scoring. For instance, a BCom will not score points.

3. Criterion 3: Water Treatment Plant

The tenderer must submit the design of the proposed potable water purification plant and appurtenances like pumps, control panels, sensors etc.

It must be noted that the system proposed must be robust and suitable for a rural environment where operators lack skill and experience. The system must be simple and be able to be operated on any of an automatic or manual mode. Monitoring of processes must be simple.

The system must be designed under the auspices of the person assigned as Process/Plant Designer contemplated under Criterion 2.

The process design must consider the chemical analyses of the raw water as contained in the Project Specifications.

Required content of submission:

- Process diagrams, with design and calculations where applicable.
- Brief explanation of system configurations and technologies to be used.
- Technologies proposed to be used.
- Critical analyses of the advantages of the technologies proposed to be used.
- Critical analyses of the disadvantages of the technologies proposed to be used.
- Any proposed deviations from the Project Specifications or Particular Specifications with motivations.
- The requirements for civil works other than those provided by the Employer as specified in the Project Specifications.
- The technical data sheets and brochures of each process stage or component.
- Submit evidence and locations of the success of similar systems installed and that are operational to date.

The Employer and Engineer may elect to visit one of the plants presented in the body of evidence to verify if the system is appropriate for this Contract before acceptance and approval for installation.

4. Criterion 4: Implementation Programme

Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice and is in line with time of achieving Practical Completion. The programme also includes the following:

- Shows critical path,
- Float shown and sufficiently flexible to accommodate any changes that may be required.
- Detailed breakdown of activities which include mobilization, WTW plant design, Sewer and Water lines, CPG engagement, earthworks, concrete, M&E equipment lead times, etc.

The programme must also be:

- Submitted as a GANTT Chart clearly describing each activity, the commencement and completion of works and the critical path.
- Integrated with a summarised Construction Methodology for the refurbishment of the wastewater treatment ponds GCL liners.

5. Quality Scoring Schedule

To qualify to be assessed for price and preference, Tenderers will be required to score a minimum 60 out of a maximum of 100 points. Also refer to Clause 5.72 of T1.2 Tender Data.

Details	Max Points	Points Allocated
CRITERION 1: SIMILAR PROJECT COMPLETED Tenderers are required to demonstrate relevant experience and competency in the past 10 years prior to the tender closing date of similar projects valued at R10M or more (water and wastewater treatment plants, water retaining structures, pumpstations, including M&E components). • **3** Or more projects completed in the past 10 years. • **2** projects completed in the past 10 years. • **1** Completed projects in the past 10 years. • **0** Completed projects in the past 10 years. **AS A VERIFICATION METHOD ATTACH THE FOLLOWING TO FORM A (T2.2)** • Letter of Appointment, and • Certificate of Completion **NOTE: POINTS WILL ONLY BE ALLOCATED FOR EACH PROJECT WHERE THE TENDERER HAS SUBMITTED ALL THE REQUIRED DOCUMENTS, i.e., LETTER OF APPOINTMENT AND SIGNED CERTIFICATE OF COMPLETION**	**50** 50 40 30 0	
CRITERION 2: CAPACITY OF BIDDER To evaluate the staff assigned to the project, the tenderer must complete the relevant forms and attach the Curriculum Vitae for each person and clearly mark on each CV to which category he/they will be assigned. ***CONTRACTS MANAGER*** • NQF Level 7 (civil engineering), with 10 or more years' experience and involved in five (05) or more water, wastewater, reservoir, pumpstation projects. • NQF Level 6 (civil engineering), with 10 or more years' experience and involved in five (05) or more water, wastewater, reservoir, pumpstation projects.	**20** 5 3	
TREATMENT PLANT DESIGNER • NQF Level 7 (mechanical/chemical engineering), with 10 or more years' experience and involved in five (05) or more water and wastewater treatment plant design projects. • NQF Level 6 (mechanical/chemical engineering), with 10 or more years' experience and involved in five (05) or more water and wastewater treatment plant design projects.	5 3	
CONSTRUCTION MANAGER/SITE AGENT	5	

	• NQF Level 7 (civil engineering), with 10 or more years post qualification experience and involved in five (05) or more water, wastewater, reservoir, pumpstation projects. • NQF Level 6 (civil engineering), with 10 or more years post qualification experience and involved in five (05) or more water, wastewater, reservoir, pumpstation projects.5 or more years post qualification.	3	
	FOREMAN • With 10 or more years' experience and involved in ten (10) or more water, wastewater, reservoir, pumpstation projects. • With 10 or more years' experience and involved in five (05) or more water, wastewater, reservoir, pumpstation projects. **AS A VERIFICATION METHOD ATTACH THE FOLLOWING TO FORM E (T2.2)** • Certified Copies of academic qualification certificates. • Detailed CV clearly indicates all similar experience with the year of commencement and completion indicated. **CERTIFICATION ON DOCUMENTS MUST NOT BE OLDER THAN 6 MONTHS.** **CERTIFICATION OF PREVIOUSLY CERTIFIED DOCUMENTS WILL NOT BE ACCEPTED. FAILURE TO ADHERE TO THE ABOVE REQUIREMENTS WILL RESULT IN NO POINTS BEING AWARDED.**	5 3	
	CRITERION 3: WATER TREATMENT PLANT The tenderer must submit the design of the proposed potable water purification plant and appurtenances like pumps, control panels, sensors etc. Points will be allocated based on completeness, technical quality, and compliance with specifications. The water treatment plant proposal must include: 1. Process diagrams, with design and calculations where applicable. 2. Brief explanation of system configurations and technologies to be used. 3. Technologies proposed to be used. 4. Critical analysis of the advantages of the technologies proposed to be used. 5. Critical analysis of the disadvantages of the technologies proposed to be used. 6. Any proposed deviations from the Project Specifications or Particular Specifications with motivations. 7. The requirements for civil work other than those provided by the Employer as specified in the Project Specifications. 8. The technical data sheets and brochures of each process stage or component. 9. Submit evidence and locations of the success of similar systems installed and that is operational to date. • The water treatment plant proposal includes all the above nine (09) requirements. • The water treatment plant proposal includes all below nine (09) not less than five (05) of the requirements stated above.	**20** 20 15	

	• The water treatment plant proposal includes all below five (05) but not less than three (03) of the requirements stated above. • The water treatment plant proposal that less than three (03) of the requirements stated above **ATTACH THE COMPLETED PROPOSAL TO FORM D (T2.2)**	10 0	
	CRITERION 4: IMPLEMENTATION PROGRAMME Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice and is in line with time of achieving Practical Completion. The programme also includes the following: 1. A clear logical critical path, 2. Float is shown and sufficiently flexible to accommodate any changes that may be required. 3. Detailed breakdown of activities which include mobilization, WTW plant design, CPG engagement, earthworks, concrete, M&E equipment lead times, etc. 4. Submitted as a GANTT Chart clearly describing each activity, the commencement and completion of works and the critical path. 5. Integrated with a summarised Construction Methodology for the refurbishment of the wastewater treatment ponds, GCL liners. • The Implementation Programme includes all the above five (05) requirements. • The water treatment plant proposal below five (05) not less than three (3) of the requirements stated above. • The water treatment plant proposal less than three (03) of the requirements stated above. **NO POINTS WILL BE ALLOCATED FOR A PROGRAMME THAT EXTENDS BEYOND THE TIME FOR ACHIEVING A PRACTICAL COMPLETION STATED IN WHICH IS TEN MONTHS.** **ATTACH THE COMPLETED PROGRAMME TO FORM F (T2.2)**	**10** 10 5 0	
	TOTAL POINTS	**100**	
	SUMMARY OF FUNCTIONALITY SCORING		
	TENDERERS WITH A SCORE OF LESS THAN 60% WILL BE REGARDED AS NON-RESPONSIVE AND WILL NOT BE EVALUATED FURTHER.		

Other Conditions of bid (non-eliminating unless expressly mentioned in the document):

1. The bidder must be registered on the Central Supplier Database (CSD) prior the award.
2. All bidders' tax matters must be in order prior award. Bidders' tax matters will be verified through CSD. In cases where bidder's status found non-compliant the bidder will be granted 7 working days to correct status. **A bidder that fails to rectify its tax matters with SARS will be declared non-responsive**.
3. The bidder has duly completed and signed the **SBD 1**, and **SBD 6.1**.
4. Bidders need to complete and sign **SBD 6.1** to claim points for specific goals. **Failure will lead in non-awarding of points for specific goals.**
5. Bidders must submit a minimum of three (3) written contactable references for projects successfully completed in the past (clearly indicating client name, contract value, contract term, contact person, contact details). Refer to Annexure I and Annexure M. This is not an elimination factor, but important for the department to make a decision. Unless it is used for Quality/functionality Points.
6. Bidders must submit a list of projects where he or she has submitted tender offers but tender results have not been confirmed by the client. Refer to Annexure L. This is not

an elimination factor, but important for the department to make a decision. Unless it is used for Quality/functionality Points.

7. Bidders must submit their company profiles, list of available resources, plant and machinery and any other additional capacity with the bid. Refer to Annexure K and H. This is not an elimination factor, but important for the department to make a decision. Unless it is used for Quality/functionality Points.
8. The bidder must also list all projects where there are pending litigations or litigations have been concluded. The form for this is also attached after Annexure J.
9. The Department will contract with the successful bidder by signing a formal contract.
10. This tender will be awarded as a whole. All trades listed in the Bills of Quantities or Pricing schedule must be priced for (except provisional sums and allowances which also need to be added to the total), failure to do so will increase commercial risk of the bid and may lead to elimination or passing over of the bidder.
11. Wherever a brand name is specified in this document (i.e., specifications, pricing schedule, bill of quantities or anywhere), the department requires an item similar/equivalent or better.
12. DPWI Policy applies.
13. Protection of personal information: Consent (POPIA).
14. The successful tenderer (after being informed) will be required to bring along an unsigned copy of the form of contract to be signed by parties (e.g. JBCC Edition 6.2 of 2018)
15. EPWP policy will be applicable.
16. Contractor has committed to support local SMMEs (EME /QSEs which are at least 100% owed by Black people). The work to be implemented by the local should amount to 15% of the total work. The work packages to be implemented by the local SMMEs are already set or allocated in the Bills of Quantities of the project as provisional sum that a contractor will price only Profit and Attendance for. The responsibility to sub-contract with competent and capable sub-contractor's rests with the main contractor/supplier. Once awarded; to bring harmony on site, the department reserves the right to intervene in the selection of local sub-contractors or SMMEs on site. Additional 5% will be allocated to ICDP contractors.

3. PHASE THREE: EVALUATION POINTS ON PRICE AND SPECIFIC GOALS/PPPFA OF 2022

The **80/20 preference point system** shall be applied for the purposes of this bid as per the requirements of the *Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000)* and Specific goals/ PPPFA Regulations *of 2022*

Criteria	Points
POINTS ON PRICE	**80**
SPECIFIC GOALS	**20**
TOTAL	**100**

Please note:

1. **Bidders need to complete and sign SBD 6.1 to claim points for specific goals. Failure will lead in non-awarding of points for specific goals.**
2. **The Department intends to award this to the highest point scorer as whole, unless circumstances justify otherwise.**
3. **All information will be verified through CSD.**
4. **SBD 6.1 is attached.**

The 90/10 preference point system for acquisition of services, works or goods exceeding Rand value of R50 million:

(a) The following formula must be used to calculate the points for price in respect of tenders (including price quotation) with a Rand value equal to, or above R 30 000 and up to Rand value of R 50 000 000 (all applicable taxes included):

The financial offer will be scored using the following formula:

$$A = (1 - (\underline{P - Pm}))$$
$$Pm$$

	The value of W_1 is: 1) **90** where the financial value inclusive of VAT of all responsive tenders received have a value in **excess of R50 000 000** or 2) **80** where the financial value inclusive of VAT of one or more responsive tender offers have a value that **equals or is less than R 50 000 000**.
5.7.3	The procedure for the evaluation of responsive tenders is **Method 3** (Administrative, Functionality, Price and Preference)
5.7.4	The quality criteria and maximum score in respect of each of the criteria are as follows:
5.7.5	Each evaluation criteria will be assessed in terms of five indicators – **N/A**
5.7.6	The prompts for judgment and the associated scores used in the evaluation of quality shall be as follows: **N/A**
5.8	**Tender offers will only be accepted if:** a) the tenderer is registered on the Central Supplier Database (CSD) for the South African government (see https://secure.csd.gov.za/) unless it is a foreign supplier with no local registered entity b) the tenderer is in good standing with SARS according to the Central Supplier Database. Bidders must submit a CSD no. or tax status compliance pin. c) the preferred tenderer will be required to submit an approved insurer undertaking to provide the Performance Bond / Guarantee / Surety / Security to the format and/or standard as per DPWI policy. d) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation. e) the tenderer or any of its directors/shareholders is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector. f) the tenderer has not: i) abused the Employer's Supply Chain Management System; or ii) failed to perform on any previous contract and has been given a written notice to this effect. g) the tenderer has completed the Compulsory Declaration and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process.

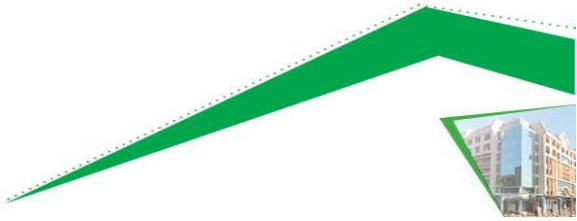
	h) the tenderer has completed the Compulsory Enterprise Questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract. i) Bids which are late, incomplete, unsigned or submitted by facsimile or electronically will not be accepted. j) the tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer. k) The tenderer undertakes to maximize the sourcing of building material or infrastructure input material from Eastern Cape based suppliers or manufacturers. l) the employer is reasonably satisfied that the tenderer has in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely. m) The tender has offered a market related offer. If the offer is believed not to be market related, the department through its Supply Chain Management bid committees will attempt to negotiate the offer with identified bidder/s to a reasonable amount. Bidders are not allowed to increase their tender offers during this process. n) A Resolution of signatory form has been completed and signed by director/s or a letter bearing a letterhead of the tenderer has been attached (specific to this bid) to the bid submission; it must be duly signed by all directors and submitted the bid. Only a duly authorized official can sign the bid. o) Prospective bidders must register on CSD prior submitting bids (open tenders). Any prospective bidder found to have Tax matters not in order with SARS (verified through CSD) during the evaluation process (after being given an opportunity to rectify tax matters) will be eliminated and not be considered further in the process. Preferred bidder/s will be afforded an opportunity to rectify their tax affairs within 7 days. A bidder that fails to rectify its tax matters with SARS will be eliminated. p) **NOTE:** The amount reflected on the Form of Offer and Acceptance takes precedence over any other total amount indicated elsewhere in bidder's tender submission. If the Form of Offer and Acceptance has no value or figure, the bidder will be regarded as having made no offer. q) The department reserves the right not to award the bid to the most favourable tenderer, if any of the situations occur: if it is not assisting in the advancement of designated groups; risk profile of the favourable firm is too high; the bidder has been awarded a considerable number of projects by the department or provincial government; has performed unsatisfactorily in the past, etc. r) Contractor must have a CIBD grading of as stated in the Tender Notice.
5.9	The number of paper copies of the signed contract to be provided by the employer is 1.
	The additional conditions of tender are: • Wherever a brand name is specified in this document (i.e., specifications, pricing schedule, bill of quantities or anywhere), the department requires an item similar/equivalent or better.
T.2.1	**List of returnable documents**
1	**Documentation to demonstrate eligibility to have tenders evaluated i.e.,** *List all documentation to demonstrate eligibility to have a submission evaluated.* • Appropriate CIDB grading suitable for the works (as stated in 4.1).
2	**Returnable Schedules required for tender evaluation purposes.** The tenderer must fully and appropriately complete and sign the following returnable schedules as relevant: • Record of Addenda to Tender Documents

	• Proposed amendments and qualifications • Compulsory Enterprise Questionnaire (In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted). • Certificate of authority for joint ventures (Only where the tender/ quotation is submitted by a joint venture) • SBD 1, 4, 6.1, • Protection of personal content: Consent • Form of Offer and Acceptance • Complete priced Bills of Quantities, including Final Summary
3	**Other documents required for tender evaluation purposes.** The tenderer must provide the following returnable documents: • A CSD Report for a contractor with valid and correct information. • A letter if good standing from the Compensation Fund or a licensed insurer as contemplated in the Compensation for Occupational Injuries and Diseases Act 1993 (Act No. 130 of 1993)
4	**Returnable Schedules that will be used for tender evaluation purposes and be incorporated into the contract.** The tenderer must complete the following returnable documents: • A duly completed form of Offer and Acceptance (and any revision of prices if there are any). • Complete Priced Bills of Quantities & Final Summary • Details of the Project Team, CV, Qualifications and Proof of Registration to be completed for each individual of the proposed Project Team. • Record of projects: current, past and on tender. • Project References – at least 5. • Protection of personal content: Consent
5	**Only authorized signatories may sign the original and all copies of the tender offer where required.** • In the case of a **ONE-PERSON CONCERN** submitting a tender, this shall be clearly stated. • In the case of a **COMPANY** submitting a tender, include a copy of a **resolution by its board of directors** authorizing a director or other official of the company to sign the documents on behalf of the company. • In the case of a **CLOSE CORPORATION** submitting a tender, include a copy of a **resolution by its members** authorizing a member or other official of the corporation to sign the documents on each member's behalf. • In the case of a **PARTNERSHIP** submitting a tender, **all the partners** shall sign the documents, unless one partner or a group of partners has been authorized to sign on behalf of each partner, in which case **proof of such authorization** shall be included in the Tender. • **Accept that failure to submit proof of authorization to sign the tender shall result in the tender offer being regarded as non-responsive.**
6	**Information and data to be completed in all respects.** Accept that tender offers, which do not provide all the data or information requested completely and, in the form, required, may be regarded by the employer as nonresponsive.
7	**Canvassing and obtaining of additional information by tenderers.** The Tenderer shall not make any attempt either directly or indirectly to canvass any of the Employer's officials or the Employer's agent in respect of his tender, after the opening of the tenders but prior to the Employer arriving at a decision thereon. The Tenderer shall not make any attempt to obtain particulars of any relevant information, other than that disclosed at the opening of tenders.
8	**Prohibitions on awards to persons in service of the state** The Employer is prohibited to award a tender to a person -

	a) who is in the service of the state; or *b)* if that person is not a natural person, of which any director, manager, principal shareholder, or stakeholder is a person in the service of the state; or *c)* a person who is an advisor or consultant contracted with the Department or municipal entity. **In the service of the state** means to be - a) a member of:- *a* any municipal council. *b* any provincial legislature; or *c* the National Assembly or the National Council of Provinces. *d)* a member of the board of directors of any municipal entity. *e)* an official of any Department or municipal entity. *f)* an employee of any national or provincial department. *g)* provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999). *h)* a member of the accounting authority of any national or provincial public entity; or *i)* an employee of Parliament or a provincial legislature. In order to give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in part T2 of this procurement document must be completed.
9	**Awards to close family members of persons in the service of the state** Accept that the notes to the Employer's annual financial statements must disclose particulars of any award of more than R2000 to a person who is a spouse, child, or parent of a person in the service of the state (defined in clause 8 above), or has been in the service of the state in the previous twelve months, including - *a)* the name of that person; *b)* the capacity in which that person is in the service of the state; and *c)* the amount of the award. To give effect to the above, the questionnaire for the declaration of interests in the tender of persons in service of state in part T2 of this procurement document must be completed.
10	**Respond to requests from the tenderer** The employer will respond to requests for clarification up to **7 (seven) working days** before the tender closing time.
11	**Opening of tender submissions** Tenders will be opened immediately after the closing time for tenders
12	**Scoring quality / functionality:** The procedure for the evaluation of responsive tenders is Method 4: Administrative, Functionality, Price and Preference. Quality (functionality) will be used as a prequalifying criterion, with tenderers required to meet a minimum quality score of 60% to qualify for further evaluation.
13	**Scoring Functionality**
	The functionality will be applied as a part of Phase 2 Evaluation to determine the tenderers that qualify for further Phase 3 Evaluation. Points will be allocated only where the required supporting documentation has been submitted by tenderer.
14	**Cancellation and re-invitation of tenders**

	An organ of state may, prior to the award of the tender, cancel the tender if- (a) due to changed circumstances, there is no longer a need for the services, works or goods requested; or (b) funds are no longer available to cover the total envisaged expenditure; or (c) no acceptable tenders are received. (d) Tender validity period has expired. (e) Gross irregularities in the tender processes and/or tender documents. (f) No market related offer received (after attempts of negotiation processes) Where applicable, the decision to cancel the tender will be published in the CIDB website and in the Tender Bulletin or the media in which the original tender invitation as advertised.
15	Dispute resolution mechanism will be done through the **Adjudication** route**.**
16	The department must when be acting against the tenderer or person awarded the contract on a fraudulent basis, considers the provisions of Regulation 22: The remedies provided for in Preferential Procurement Regulations 2022 do not prevent an institution from instituting remedies arising from any other prescripts or contract.
17	Where the employer terminates the contract due to default of the contractor in whole or in part, the employer may decide to: a) Refer the breach in contract to the **CIDB** for investigation as a breach of the **CIDB Code of Conduct** in terms of the **CIDB Regulations**; or b) may impose a restriction penalty on the contractor in terms of Section 14 of the Preferential Procurement Regulations. The outcomes of such investigations in terms of both the CIDB Regulations and the Preferential Procurement Regulations may prohibit the contractor from doing business with the public sector for a period not exceeding 10 years.

PART T2: RETURNABLE DOCUMENTS



The tenderer must complete the following returnable documents:

1 Returnable Schedules required for quotation evaluation purposes.

- Compulsory enterprise questionnaire (In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted).
- Record of addenda issued (Only if addenda is issued)
- Certificate of authority for joint ventures (Only where the tender/ quotation is submitted by a joint venture)

2 Other documents required for quotation evaluation purposes.

- Form of Offer and Acceptance
- Complete Priced Bills of Quantities & Final Summary.
- A CSD Report for a contractor with valid and correct information.

3 Returnable Schedules that will be incorporated into the contract

- Details of the Project Team, CV, Qualifications and Proof of Registration to be completed for each individual of the proposed Project Team.
- Schedule of Plant and Equipment.
- Record of projects: current, past and on tender.
- Project References – at least 5
- SBD 1, 4, 6.1,
- Protection of personal content: Consent

T2.1 LIST OF RETURNABLE DOCUMENTS - COMPLIANCE

SBD 1 - INVITATION TO BID

PART A

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF THE DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE					
BID NUMBER:	**SCMU5-25/26-0040**	CLOSING DATE:	**29 JULY 2025**	CLOSING TIME:	**11:00**
DESCRIPTION:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**				
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT					
DEPARTMENT OF PUBLIC WORKS, FRONT CORNER OF QHASANA BUILDING ON THE WAY TO CIDB OFFICES LABELLED **"TENDERS"**, BHISHO.					

BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO		**TECHNICAL ENQUIRIES MAY BE DIRECTED TO:**	
CONTACT PERSON		CONTACT PERSON	**Mkanyiseli Ngamlana**
TELEPHONE NUMBER		TELEPHONE NUMBER	**040 602 4014**
FACSIMILE NUMBER		FACSIMILE NUMBER	
E-MAIL ADDRESS	supply.chain@ecdpw.gov.za	E-MAIL ADDRESS	Mkanyiseli.Ngamlana@ecdpw.gov.za

SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT REGISTRATION NUMBER					
SUPPLIER COMPLIANCE STATUS	TAX COMPLIANCE SYSTEM PIN:		**OR**	CENTRAL SUPPLIER DATABASE No:	MAAA
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	☐Yes ☐No [IF YES ENCLOSE PROOF]	ARE YOU A FOREIGN BASED SUPPLIER FOR **THE GOODS /SERVICES /WORKS OFFERED?**		☐Yes ☐No [IF YES, COMPLETE QUESTIONNAIRE BELOW]	

QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)?	☐ YES ☐ NO
DOES THE ENTITY HAVE A BRANCH IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA?	☐ YES ☐ NO
DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA?	☐ YES ☐ NO
IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION?	☐ YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 BELOW.

PART B
TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:
1.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
1.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED – (NOT TO BE RE-TYPED) OR IN THE MANNER PRESCRIBED IN THE BID DOCUMENT.**
1.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT, 2000 AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2022, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.
1.4. **THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (SBD7).**
2. TAX COMPLIANCE REQUIREMENTS
2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VERIFY THE TAXPAYER'S PROFILE AND TAX STATUS.
2.3 APPLICATION FOR TAX COMPLIANCE STATUS (TCS) PIN MAY BE MADE VIA E-FILING THROUGH THE SARS WEBSITE WWW.SARS.GOV.ZA.
2.4 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
2.5 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED; EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
2.6 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.
2.7 NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE, COMPANIES WITH DIRECTORS WHO ARE PERSONS IN THE SERVICE OF THE STATE, OR CLOSE CORPORATIONS WITH MEMBERS PERSONS IN THE SERVICE OF THE STATE."

NAME OF BIDDER REPRSENTATIVE ……

SIGNATURE: ……

CAPACITY UNDER WHICH THIS BID IS SIGNED: ……
(Proof of authority must be submitted e.g., company resolution)

DATE: ……..……...

DECLARATION OF INTEREST **SBD 4**

BIDDER'S DISCLOSURE

1. PURPOSE OF THE FORM

Any person (natural or juristic) may make an offer or offers in terms of this invitation to bid. In line with the principles of transparency, accountability, impartiality, and ethics as enshrined in the Constitution of the Republic of South Africa and further expressed in various pieces of legislation, it is required for the bidder to make this declaration in respect of the details required hereunder.

Where a person/s are listed in the Register for Tender Defaulters and / or the List of Restricted Suppliers, that person will automatically be disqualified from the bid process.

2. BIDDER'S DECLARATION

2.1 Is the bidder, or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest[1] in the enterprise, employed by the state? **YES/NO**

2.1.1 If so, furnish particulars of the names, individual identity numbers, and, if applicable, state employee numbers of sole proprietor/ directors / trustees / shareholders / members/ partners or any person having a controlling interest in the enterprise, in table below.

Full Name	Identity Number	Name of State institution

2.2 Do you, or any person connected with the bidder, have a relationship with any person who is employed by the procuring institution?
YES/NO

2.2.1 If so, furnish particulars:
……
……

2.3 Does the bidder or any of its directors / trustees / shareholders / members / partners or any person having a controlling interest in the enterprise have any interest in any other related enterprise whether or not they are bidding for this contract? **YES/NO**

2.3.1 If so, furnish particulars:
……
……

[1] ***the power, by one person or a group of persons holding the majority of the equity of an enterprise, alternatively, the person/s having the deciding vote or power to influence or to direct the course and decisions of the enterprise.***

3 DECLARATION

I, the undersigned, (name)…… in submitting the accompanying bid, do hereby make the following statements that I certify to be true and complete in every respect:

3.1 I have read and I understand the contents of this disclosure;

3.2 I understand that the accompanying bid will be disqualified if this disclosure is found not to be true and complete in every respect;

3.3 The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium[2] will not be construed as collusive bidding.

3.4 In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications, prices, including methods, factors or formulas used to calculate prices, market allocation, the intention or decision to submit or not to submit the bid, bidding with the intention not to win the bid and conditions or delivery particulars of the products or services to which this bid invitation relates.

3.5 The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

3.6 There have been no consultations, communications, agreements or arrangements made by the bidder with any official of the procuring institution in relation to this procurement process prior to and during the bidding process except to provide clarification on the bid submitted where so required by the institution; and the bidder was not involved in the drafting of the specifications or terms of reference for this bid.

3.7 I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act No 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

I CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 1, 2 and 3 ABOVE IS CORRECT.

I ACCEPT THAT THE STATE MAY REJECT THE BID OR ACT AGAINST ME IN TERMS OF PARAGRAPH 6 OF PFMA SCM INSTRUCTION 03 OF 2021/22 ON PREVENTING AND COMBATING ABUSE IN THE SUPPLY CHAIN MANAGEMENT SYSTEM SHOULD THIS DECLARATION PROVE TO BE FALSE.

……	……
Signature	Date
……	……
Position	Name of bidder

[2] ***Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.***

SBD 6.1 -

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2022

This preference form must form part of all tenders invited. It contains general information and serves as a claim form for **preference** points for specific goals.

NB: BEFORE COMPLETING THIS FORM, TENDERERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF THE TENDER AND PREFERENTIAL PROCUREMENT REGULATIONS, 2022

---

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to invitations to tender:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2 To be completed by the organ of state

a) The applicable preference point system for this tender is the 80/20 preference point system.

b) The lowest acceptable tender will be used to determine the accurate system once tenders are received.

1.3 Points for this tender (even in the case of a tender for income-generating contracts) shall be awarded for:

(a) Price; and

(b) Specific Goals.

1.4 To be completed by the organ of state:

The maximum points for this tender are allocated as follows:

	POINTS
PRICE	80
SPECIFIC GOALS	20
Total points for Price and SPECIFIC GOALS	**100**

1.5 Failure on the part of a tenderer to submit proof or documentation required in terms of this tender to claim points for specific goals with the tender, will be interpreted to mean that preference points for specific goals are not claimed.

1.6 The organ of state reserves the right to require of a tenderer, either before a tender is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the organ of state.

2. DEFINITIONS

- **"tender"** means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- **"price"** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- **"Rand value"** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- **"tender for income-generating contracts"** means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- **"The Act"** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULA FOR PROCUREMENT OF GOODS AND SERVICES

3.1. POINTS AWARDED FOR PRICE

3.1.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 or 90/10

$$Ps = 80\left(1 - \frac{Pt - P\,min}{P\,min}\right) \quad \text{or} \quad Ps = 90\left(1 - \frac{Pt - P\,min}{P\,min}\right)$$

Where:

Ps	=	Points scored for price of tender under consideration
Pt	=	Price of tender under consideration
Pmin	=	Price of lowest acceptable tender

3.2. FORMULA FOR DISPOSAL OR LEASING OF STATE ASSETS AND INCOME GENERATING PROCUREMENT

3.2.1. POINTS AWARDED FOR PRICE

A maximum of 80 or 90 points is allocated for price on the following basis:

80/20 or 90/10

$$Ps = 80\left(1 + \frac{Pt - P\,max}{P\,max}\right) \quad \text{or} \quad Ps = 90\left(1 + \frac{Pt - P\,max}{Pmax}\right)$$

Where:

Ps	=	Points scored for price of tender under consideration
Pt	=	Price of tender under consideration
Pmax	=	Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:

4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—

(a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10

preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or

(b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system, then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.
(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.
Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (80/20 system) (To be completed by the tenderer)
Historically Disadvantaged Individual: -		
(a) 100% black ownership	**6**	
(b) 51% to 99% black ownership	**4**	
(c) Less than 51% black ownership	**0**	
Black women ownership: -		
(a) 100% black women ownership	**4**	
(b) 30% to 99% black women ownership	**2**	
(c) Less than 30% black women ownership	**0**	
Black youth ownership: -		
(a) 100% black youth ownership	**4**	
(b) 30% to 99% black youth ownership	**2**	
(c) Less than 30% black youth ownership	**0**	
People with disability: -		
(a) 20% or more disabled people ownership	**2**	
(b) Less than 20% disabled people ownership	**0**	
Locality: -		
(a) Within the Eastern Cape	**4**	
(b) Outside the Eastern Cape	**2**	

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm……

4.4. Company registration number: ……...

4.5. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited
- ☐ Non-Profit Company
- ☐ State Owned Company

[TICK APPLICABLE BOX]

4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/ firm for the preference(s) shown and I acknowledge that:

i) The information furnished is true and correct;

ii) The preference points claimed are in accordance with the General Conditions as indicated in

paragraph 1 of this form;

iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;

iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –

(a) disqualify the person from the tendering process;
(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
(d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the *audi alteram partem* (hear the other side) rule has been applied; and
(e) forward the matter for criminal prosecution, if deemed necessary.

.....
SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME: .....
DATE: .....

ADDRESS: .....

.....

.....

.....

COMPULSORY ENTERPRISE QUESTIONNARE

A

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: Name of enterprise: . . . . . .

Section 2: VAT registration number, if any: . . . . . .

Section 3: CIDB registration number, if any: . . . . . .

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	**Identity number***	**Personal income tax number***

** Complete only if sole proprietor or partnership and attach separate page if more than 3 partners*

Section 5: Particulars of companies and close corporations

Company registration number . . . . . .

Close corporation number . . . . . Tax reference number . . . . . .

Section 6: The attached SBD 4 must be completed for each tender and be attached as a tender requirement.

Section 7: The attached SBD 6.1 must be completed for each tender and be attached as a requirement.

The undersigned, who warrants that he / she is duly authorized to do so on behalf of the enterprise:

i) authorizes the Employer to obtain a tax clearance certificate from the South African Revenue Services that my / our tax matters are in order;

ii) confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004; iii) confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;

iv) confirms that I / we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and

iv) confirms that the contents of this questionnaire are within my personal knowledge and are to the best of my belief both true and correct.

Signed ..... Date .....

Name ..... Position .....

PROOF OF REGISTRATION ON THE NATIONAL TREASURY CENTRAL SUPPLIER DATABASE (CSD REPORT)

(ATTACH HERE)

VALID CIDB CERTIFICATE OF A TENDERER

(ATTACH HERE)

PROTECTION OF PERSONAL INFORMATION: (POPIA)

CONSENT

The introduction of The Protection of Personal Information Act (POPIA) ensures the regulation of personal information through its entire life cycle of collection, transfer, storing and deletion.
As part of its business activities, the Department of Public Works and Infrastructure obtains and requires access to personal data from a wide range of internal and external parties, including without limitation bidders who respond to requests for proposals that are published by the Department of Public Works and Infrastructure from time to time. The Department of Public Works and Infrastructure confirms that it shall process the information disclosed by Bidders for the purpose of evaluating and subsequently awarding/appointing a successful Bidder.

The Department of Public Works and Infrastructure hereby states that it does not and will never modify, amend, or alter any personal information submitted to it by a Bidder. Not unless directed to do so by an order of court, the Department of Public Works and Infrastructure does not disclose or permit the disclosure of any personal information to any Third Party without the prior written consent of the owner of the information.

Similarly, Bidders will from time-to-time access and be seized with information of a personal nature pertaining to the Department of Public Works and Infrastructure. Some of the information may because of legislative compliances be available in the public domain, whilst some is uniquely provided to bidders in pursuit of procurement or other business-related activities. In this regard, the Department of Public Works and Infrastructure requires that Bidders which receive or have access to its personal information, process any such information in a manner compliant with the requirements of the POPIA.

AGREEMENT

1. The Department of Public Works and Infrastructure and the Bidder (the Parties) agree and undertake that upon obtaining and
   having access to personal information relating to either of them, they shall always ensure
   that:
   a) They process the information only for the express purpose for which it was obtained.
   b) Information is provided only to designated and authorized personnel who require the personal information to carry out the Parties' respective obligations in terms of the Procurement processes.
   c) They will introduce, and implement all reasonable measures ensure the protection of all personal information from unauthorized access and/or use.
   d) They have taken appropriate measures to safeguard the security, integrity, and authenticity of all personal information in its possession or under its control.
   e) The Parties agree that if personal information will be processed for any other purpose other than the one for which the accessing of the information was intended, explicit written consent will be obtained prior to the execution of such reason.
   f) The Parties shall carry out regular assessments to identify all reasonably foreseeable internal and external risks to the interception of personal information in its possession or under its control and shall implement and maintain appropriate controls in mitigation of such risks.

2. The Parties agree that they will promptly return or destroy any personal data in their possession or control which belongs to the other Party once it no longer serves the purpose for which it was collected, subject to any legal retention requirements. The information will be destroyed in such a manner that it cannot be reconstructed to its original form, linking it to any individual or organization.

3. Bidder's Obligations

a) The Bidder is required to notify the Information Officer of Department of Public Works and Infrastructure, in writing as soon as possible after it becomes aware of or suspects any loss, unauthorized access or unlawful use of any of the Department of Public Works and Infrastructure's personal information.
b) The Bidder shall, at its own cost, promptly and without delay take all necessary steps to mitigate the extent of the loss or compromise of personal data.
c) The Bidder shall be required to provide the Department of Public Works and Infrastructure with details of the persons affected by the compromise and the nature and extent of the compromise, including details of the identity (if known) of the unauthorized person who may have accessed or acquired the personal data.
d) The Bidder undertakes to co-operate with any investigation relating to security breach which is carried out by or on behalf of Department of Public Works and Infrastructure.

On behalf of the Bidder:

…….. ……
Signature Date

…….. ……
Position Name of the Bidder

On behalf of the Client:

…….. ……
Signature Date

…….. ……
Position Name of Client Representative

RECORD OF ADDENDA ISSUED

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**

I / We confirm that the following communications received from the Department of Public Works before the submission of this tender offer, amending the tender documents, have been considered in this bid offer: (Attach additional pages if more space is required)

Item	Date	Title or Details	No. of Pages
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Attach additional pages if more space is required.

Signed ..... Date .....

Name ..... Position .....

Tenderer .....

T2.2 List of Returnable Documents - Functionality

FORM A RELEVANT PROJECT EXPERIENCE

Tenderers must submit a max one-page description of at least five projects successfully completed.

Attach a Completion Certificate for each of the project provided.

The description of each project must include the following information:

1. Essential introductory information:
   - 1.1. Name of project.
   - 1.2. Name of client.
   - 1.3. Contact details of client.
   - 1.4. Contact details (including telephone numbers and email addresses) of currently contactable references.
   - 1.5. The period during which the project was performed, and, if this is different, the period during which the tenderer's team members were contracted.
   - 1.6. Cost of works and/or contract value (making it clear in broad terms what this cost/value purchased, and to what extent (if any) this cost/value was part of a larger project budget or programme budget).

NO.	NAME OF PROJECT.	NAME OF CLIENT.	CONTACT DETAILS OF CLIENT.	PROJECT VALUE	DATE COMPLETED
1					
2					
3					
4					
5					

If there are more projects, attach a separate page to address this issue (the above table is just for reference purposes).

The undersigned, who warrants that she/ he is duly authorised to do so on behalf of the enterprise, confirms that the content of this schedule that presented by the tenderer are within my personal knowledge and are to the best of my knowledge both true and correct.

Signed…….. Date……..

Name……. Position……..

Enterprise name…… ……

FORM B PROJECT REFERENCE FORMS

Project Reference Form – 1

Project title:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
Project Number:	**SCMU5-25/26-0040**

NOTE: This returnable document must be completed by the person who was the Engineer/Project Manager on a project of similar value and complexity that was completed successfully by the tenderer.

I, _____ (name and surname) of _____ (company name) declare that I was the Project Manager on the following building construction project successfully executed by _____ (name of tenderer):
Project name: _____
Project location: _____
Construction period: _____ Completion date: _____
Contract value: _____
A. Please evaluate the performance of the Tenderer on the abovementioned project, on which you were the principal agent, by inserting "Yes" in the relevant box below:

Key Performance Indicators	Very Poor 1	Poor 2	Fair 3	Good 4	Excellent 5	Total
1. Project performance / time management / programming						
2. Quality of workmanship						
3. Resources: Personnel						
4. Resources: Plant						
5. Financial management / payment of subcontractors / cash flow, etc						
TOTAL						

B. Would you consider / recommend this tenderer again:

YES	NO

C. Any other comments: _____

_____

D. My contact details are:

Telephone: _____ Cell phone: _____ Fax: _____

E-mail: _____

Thus, signed at _____ on this _____ day of _____ 2025.

_____

COMPANY STAMP

Signature of principal agent

NOTE:

If reference cannot be verified due to the inability to get hold of the referee or failure on his/her part to respond to a written request to do so, that reference will not score any points. It is the responsibility of the tenderer to put referees who are reachable.

_____
Name of Tenderer

_____ _____
Signature of Tenderer Date

Project Reference Form – 2

'NOTE: This returnable document must be completed by the person who was the Engineer/Project

Project title:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
Project Number:	**SCMU-25/26-0040**

NOTE: This returnable document must be completed by the person who was the Engineer/Project Manager on a project of similar value and complexity that was completed successfully by the tenderer.

I, _____ (name and surname) of _____ (company name) declare that I was the Project Manager on the following building construction project successfully executed by _____ (name of tenderer):

Project name: _____

Project location: _____

Construction period: _____ Completion date: _____

Contract value: _____

A. Please evaluate the performance of the Tenderer on the abovementioned project, on which you were the principal agent, by inserting "Yes" in the relevant box below:

Key Performance Indicators	Very Poor 1	Poor 2	Fair 3	Good 4	Excellent 5	Total
1. Project performance / time management / programming						
2. Quality of workmanship						
3. Resources: Personnel						
4. Resources: Plant						
5. Financial management / payment of subcontractors / cash flow, etc.						
TOTAL						

B. Would you consider / recommend this tenderer again:

YES	NO

C. Any other comments: _____

_____

D. My contact details are:

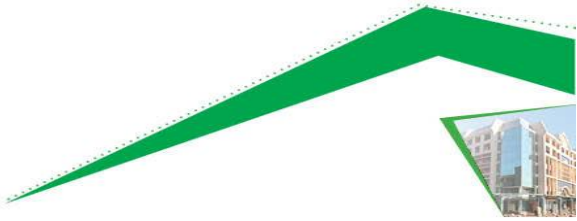
Telephone: _____ Cell phone: _____ Fax: _____

E-mail: _____

Thus, signed at _____ on this _____ day of _____ 2025.

_____
Signature of principal agent

COMPANY STAMP



NOTE:

If reference cannot be verified due to the inability to get hold of the referee or failure on his/her part to respond to a written request to do so, that reference will not score any points. It is the responsibility of the tenderer to put referees who are reachable.

_____
Name of Tenderer

_____ _____
Signature of Tenderer Date

Project Reference Form – 3

Project title:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
Project Number:	**SCMU5-25/26-0040**

NOTE: This returnable document must be completed by the person who was the Engineer/Project Manager on a project of similar value and complexity that was completed successfully by the tenderer.

I, _____ (name and surname) of _____ (company name) declare that I was the Project Manager on the following building construction project successfully executed by _____ (name of tenderer):

Project name: _____

Project location: _____

Construction period: _____ Completion date: _____

Contract value: _____

A. Please evaluate the performance of the Tenderer on the abovementioned project, on which you were the principal agent, by inserting "Yes" in the relevant box below:

Key Performance Indicators	Very Poor 1	Poor 2	Fair 3	Good 4	Excellent 5	Total
1. Project performance / time management / programming						
2. Quality of workmanship						
3. Resources: Personnel						
4. Resources: Plant						
5. Financial management / payment of subcontractors / cash flow, etc.						
TOTAL						

B. Would you consider / recommend this tenderer again:

YES	NO

C. Any other comments: _____

_____

D. My contact details are:

Telephone: _____ Cell phone: _____ Fax: _____

E-mail: _____

Thus, signed at _____ on this _____ day of _____ 2025.

COMPANY STAMP

_____
Signature of principal agent

NOTE:

If reference cannot be verified due to the inability to get hold of the referee or failure on his/her part to respond to a written request to do so, that reference will not score any points. It is the responsibility of the tenderer to put referees who are reachable.

_____
Name of Tenderer

_____ _____
Signature of Tenderer Date

Project Reference Form – 4

Project title:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
Project Number:	**SCMU5-25/26-0040**

NOTE: This returnable document must be completed by the person who was the Engineer/Project Manager on a project of similar value and complexity that was completed successfully by the tenderer.

I, _____ (name and surname) of _____ (company name) declare that I was the Project Manager on the following building construction project successfully executed by _____ (name of tenderer):

Project name: _____

Project location: _____

Construction period: _____ Completion date: _____

Contract value: _____

A. Please evaluate the performance of the Tenderer on the abovementioned project, on which you were the principal agent, by inserting "Yes" in the relevant box below:

Key Performance Indicators	Very Poor 1	Poor 2	Fair 3	Good 4	Excellent 5	Total
1. Project performance / time management / programming						
2. Quality of workmanship						
3. Resources: Personnel						
4. Resources: Plant						
5. Financial management / payment of subcontractors / cash flow, etc.						
TOTAL						

B. Would you consider / recommend this tenderer again:

YES	NO

C. Any other comments: _____

_____

D. My contact details are:

Telephone: _____ Cell phone: _____ Fax: _____

E-mail: _____

Thus, signed at _____ on this _____ day of _____ 2025.

COMPANY STAMP

_____
Signature of principal agent

NOTE:

If reference cannot be verified due to the inability to get hold of the referee or failure on his/her part to respond to a written request to do so, that reference will not score any points. It is the responsibility of the tenderer to put referees who are reachable.

_____
Name of Tenderer

_____ _____
Signature of Tenderer Date

Project Reference Form – 5

Project title:	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
Project Number:	**SCMU5-25/26-0040**

NOTE: This returnable document must be completed by the person who was the Engineer/Project Manager on a project of similar value and complexity that was completed successfully by the tenderer.

I, _____ (name and surname) of _____ (company name) declare that I was the Project Manager on the following building construction project successfully executed by _____ (name of tenderer):

Project name: _____

Project location: _____

Construction period: _____ Completion date: _____

Contract value: _____

A. Please evaluate the performance of the Tenderer on the abovementioned project, on which you were the principal agent, by inserting "Yes" in the relevant box below:

Key Performance Indicators	Very Poor 1	Poor 2	Fair 3	Good 4	Excellent 5	Total
1. Project performance / time management / programming						
2. Quality of workmanship						
3. Resources: Personnel						
4. Resources: Plant						
5. Financial management / payment of subcontractors / cash flow, etc.						
TOTAL						

B. Would you consider / recommend this tenderer again:

YES	NO

C. Any other comments: _____

_____

D. My contact details are:

Telephone: _____ Cell phone: _____ Fax: _____

E-mail: _____

Thus, signed at _____ on this _____ day of _____ 2025.

COMPANY STAMP

_____
Signature of principal agent

NOTE:

If reference cannot be verified due to the inability to get hold of the referee or failure on his/her part to respond to a written request to do so, that reference will not score any points. It is the responsibility of the tenderer to put referees who are reachable.

_____
Name of Tenderer

_____ _____
Signature of Tenderer Date

FORM C TREATMENT PLANT DESIGNER

With reference to the Quality Point Scoring for **Criteria 2** the following is required:

The tenderer must attach the Curriculum Vitae of the person designated as the Treatment Plant Designer on the Contract and that is involved with this Tender that is in his employment or from the organisation that is being subcontracted for the purposes of designs of processes and equipment, technical knowledge of process chemistry, equipment design etc.

The tenderer must also attach a **Memorandum of Understanding** where both parties have given their undertakings to have entered a business relationship to secure the knowledge and services required for process designs, technical input, design and manufacturing of specialist components and processors and overseeing of the commissioning, operation, and maintenance of the new systems.

The CV's must contain the following:

- Full names and ID No (attach certified copy of ID)
- Contact details, including e-mail, tel. no, cell, postal address.
- Tertiary education (attach certified copies of Diploma or Degree)
- Professional registration if any (Attach certifies certificate)
- Employment history. Describe the relationship with the company of the tenderer, e.g. permanent, employment and start date, subcontracting since start date etc.
- List of some of the most recent water or wastewater treatment plant design project involved with.
- Description of the technical knowledge and contribution that the person has made to the company, e.g., process design of plants etc.
- CV of the company which will render the services.
- Qualifications towards process design knowledge.
- Memorandum of Understanding signed by the Tenderer and the Treatment Plant Designer.

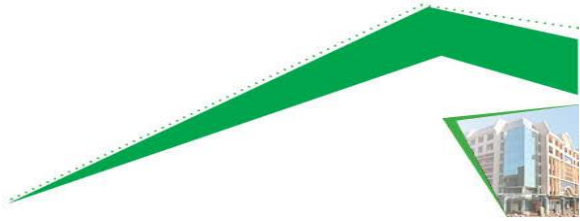
Insert the details of the person for which information is attached and for which points are claimed.

Name	ID No	Education	Qualification/Registration

(The CV must be signed be the person and attested by a Commissioner of Oaths.)

Name of Tenderer: ……..

Signature: ……



FORM D WATER TREATMENT PLANT INFORMATION

The tenderer must submit the design of the proposed potable water purification plant and appurtenances like pumps, control panels, sensors etc. Points will be allocated based on the completeness, technical quality, and compliance with specifications.

The water treatment plant proposal must include:

1. Process diagrams, with design and calculations where applicable.
2. Brief explanation of system configurations and technologies to be used.
3. Technologies proposed to be used.
4. Critical analyses of the advantages of the technologies proposed to be used.
5. Critical analyses of the disadvantages of the technologies proposed to be used.
6. Any proposed deviations from the Project Specifications or Particular Specifications with motivations.
7. The requirements for civil works other than those provided by the Employer as specified in the Project Specifications.
8. The technical data sheets and brochures of each process stage or component.
9. Submit evidence and locations of the success of similar systems installed and that is operational to date.

ATTACH WATER TREATMENT PLANT INFORMATION HERE

Name of Treatment Plant Designer: …….

Date: ……

Signature: ……

Name of Tenderer: …….

FORM E CAPACITY OF BIDDER

To evaluate the staff assigned to the project, the tenderer must complete the form below and attach the Curriculum Vitae for each person listed below. The submitted CV must be clearly marked to which category the personnel will be assigned.

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**

WORK CAPACITY: (The Bidder is requested to furnish the following capacity particulars and to attach additional pages if more space is required. Failure to furnish the particulars may result in the Bid being disregarded.)

Artisans and Employees: (Artisans and Employees to be, or are, employed for this project)

Quantity / No. of Resources	**Categories of Employee - Key Personnel (part of Business Enterprise)**	**Professional Registration No.**	**Date of Employment**
	Contracts manager		
	Construction Manager (Site Agent)		
	Foreman		
	Quality Control & Safety Officer- Construction Supervisor		
	Artisans		
	Unskilled employees		
	Others		

NOTE: CVs must be attached to this page and must include the following:

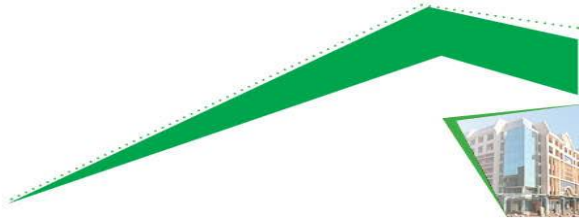
The CV's must contain the following:

- Full names and ID No (attach certified copy of ID)
- Contact details, including e-mail, tel. no, cell, postal address.
- Tertiary education (attach certified copies of Diploma or Degree)
- Professional registration if any (Attach certifies certificate)
- Employment history. Describe the relationship with the company of the tenderer, e.g. permanent, employment and start date, subcontracting since start date etc.
- List of some of the most recent similar projects involved with.
- CV of the company which will render the services.

The undersigned, who warrants that she/ he is duly authorised to do so on behalf of the enterprise, confirms that the content of this schedule that presented by the tenderer are within my personal knowledge and are to the best of my knowledge both true and correct.

Signed:	……	**Date**	……
Name:	……	**Position**	……

Enterprise Name: ……

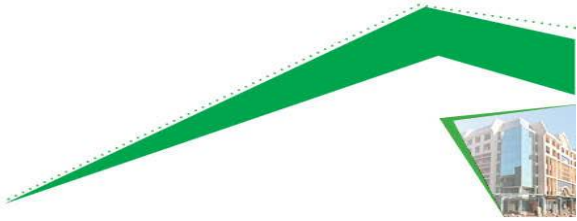


FORM F PROGRAMME

Programme covering all the applicable individual activities which are in an acceptable sequence, with appropriate durations, and is in accordance with generally accepted construction practice and is in line with time of achieving Practical Completion. The programme also includes the following:

- A clear logical critical path.
- Float is shown and sufficiently flexible to accommodate any changes that may be required.
- Detailed breakdown of activities which include mobilization, WTW plant design, CPG engagement, earthworks, concrete, M&E equipment lead times, etc.
- Submitted as a GANTT Chart clearly describing each activity, the commencement and completion of works and the critical path.
- Integrated with a summarised Construction Methodology for the refurbishment of the wastewater treatment ponds GCL liners.

ATTACH PROGRAMME OF WORKS HERE



THE CONTRACT

PART C1: AGREEMENTS AND CONTRACT DATA

C1.1: FORM OF OFFER AND ACCEPTANCE

Annex C
(normative)
FORM OF OFFER AND ACCEPTANCE

Project title	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU number	**SCMU5-25/26-0040**

OFFER
The employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

……
The tenderer, identified in the offer signature block, has examined the documents listed in the tender data and addenda thereto as listed in the returnable schedules, and by submitting this offer has accepted the conditions of tender.

By the representative of the tenderer, deemed to be duly authorized, signing this part of this form of offer and acceptance, the tenderer offers to perform all of the obligations and liabilities of the contractor under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the contract data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS
…… Rand (in words) ;

R ……(in figures) (or other

suitable wording)

This offer may be accepted by the employer by signing the acceptance part of this form of offer and acceptance and returning one copy of this document to the tenderer before the end of the period of validity stated in the tender data, whereupon the tenderer becomes the party named as the contractor in the conditions of contract identified in the contract data.

Signature ……
Name ……
Capacity ……
for the tenderer
……
(Name and address of organization)
Name and signature
of witness …… Date ……

ACCEPTANCE

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the contractor the amount due in accordance with the conditions of contract identified in the contract data. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.
The terms of the contract, are contained in:

Part C1 Agreements and contract data, (which includes this agreement)
Part C2 Pricing data
Part C3 Scope of work.
Part C4 Site information and drawings and documents or parts thereof, which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the returnable schedules as well as any changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this form of offer and acceptance. No amendments to or deviations from said documents are valid unless contained in this schedule.
The tenderer shall within 3 weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer's agent (whose details are given in the contract data) to arrange the

delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the contract data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.
Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the schedule of deviations (if any). Unless the tenderer (now contractor**)** within five working days of the date of such receipt notifies the employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties.[1]

Signature ……
Name ……
Capacity ……
for the Employer
……
(Name and address of organization)
Name and signature
of witness …….. Date ……..

Schedule of Deviations

1 Subject _____
Details
_____

2 Subject _____
Details
_____

3 Subject _____
Details
_____

4 Subject _____
Details
_____

By the duly authorized representatives signing this agreement, the employer and the tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to the documents listed in the tender data and addenda thereto as listed in the tender schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender/ quotation documents and the receipt by the tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

[1] *As an alternative, the following wording may be used:*

Notwithstanding anything contained herein, this agreement comes into effect two working days after the submission by the employer of one fully completed original copy of this document including the schedule of deviations (if any), to a courier-to-counter delivery / counter-to-counter delivery / door-to counter delivery /door-to-door delivery /courier service (delete that which is not applicable), provided that the employer notifies the tenderer of the tracking number within 24 hours of such submission. Unless the tenderer (now contractor) within seven working days of the date of such submission notifies the employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the parties

PROPOSED DEVIATIONS OR QUALIFICATION

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter to his tender and reference such letter in this schedule.

The Tenderer's attention is drawn to clause 5.8 of SANS 10845-3 regarding the employer's handling of material deviations and qualifications.

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**

Page	Clause /Item	Proposal

The undersigned, who warrants that she/ he is duly authorised to do so on behalf of the enterprise, confirms that the content of this schedule that presented by the tenderer are within my personal knowledge and are to the best of my knowledge both true and correct

Signed ---------- Date ----------

Name ---------- Position ----------

Enterprise name

A: CERTIFICATE OF AUTHORITY FOR SIGNATORY

Signatory for companies shall confirm their authority hereto by attaching a duly signed and dated copy of the relevant resolution of the board of directors to this form or on company letter head.

An example is given below:

"By resolution of the board of directors passed at a meeting held on _____

Mr/Ms_____, whose signature appears below, has been duly authorised to

sign all documents in connection with the tender for Contract No. _____

and any Contract which may arise there from on behalf of (Block Capitals) _____

_____

_____

SIGNED ON BEHALF OF THE COMPANY: _____

IN HIS/HER CAPACITY AS: _____

DATE:_____

SIGNATURE OF SIGNATORY: _____

WITNESSES:

DIRECTOR (NAMES)		SIGNATURE	
DIRECTOR (NAMES)		SIGNATURE	
DIRECTOR (NAMES)		SIGNATURE	
DIRECTOR (NAMES)		SIGNATURE	
DIRECTOR (NAMES)		SIGNATURE	
DIRECTOR (NAMES)		SIGNATURE	

If you cannot complete this form, attach a separate sheet (in a company letter head, project specific and signed by all directors):

B CERTIFICATE OF AUTHORITY FOR JOINT VENTURES

This Returnable Schedule is to be completed by joint ventures.

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorize Mr/Ms . . . . , authorized signatory of the company . . . . , acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**

NAME OF FIRM	**ADDRESS**	**DULY AUTHORISED SIGNATORY**
Lead partner: …… .		Signature. . ……... . . . . . . Name …….... Designation……
…… .		Signature. . ……... . . . . . . Name …….... Designation……
…… .		Signature. . ……... . . . . . . Name …….... Designation……
…… .		Signature. . ……... . . . . . . Name …….... Designation……

C SCHEDULE OF PROPOSED SUBCONTRACTORS

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**

We notify you that it is our intention to employ the following Subcontractors for work in this contract. The Subcontractors will all be CIDB registered and their CIDB Registration number shall be submitted below. This should also be declared on **SBD 6.1 form.**

If we are awarded a contract, we agree that this notification does not change the requirement for us to submit the names of proposed subcontractors in accordance with requirements in the contract for such appointments. If there are no such requirements in the contract, then your written acceptance of this list shall be binding between us.

We confirm that all subcontractors who are or to be contracted are registered on Central Supplier Database (CSD).

No.	Name and address of proposed Subcontractor	Nature and extent of work	Year completed	Value	Contact details
1					
2					
3					

4					
5					

The undersigned, who warrants that she/ he is duly authorised to do so on behalf of the enterprise, confirms that the content of this schedule that presented by the tenderer are within my personal knowledge and are to the best of my knowledge both true and correct

Signed ---------- Date ----------

Name ---------- Position ----------

Enterprise name ----------

E SCHEDULE OF TENDERER'S LITIGATION HISTORY

The tenderer shall list below details of any litigation with which the tenderer (including its directors, shareholders or other senior members in previous companies) has been involved with any organ of state or state department within the last ten years. The details must include the year, the litigating parties, the subject matter of the dispute, the value of any award or estimated award if the litigation is current and in whose favour the award, if any, was made.

NO.	NAME OF CLIENT.	OTHER LITIGATING PARTY	BRIEF DETAILS OF DISPUTE	PROJECT VALUE	DATE RESOLVED OR STATUS OF LITIGATION
1					
2					
3					
4					

Signed Date

---------- ----------

Name Position

---------- ----------

Enterprise name

F BASELINE RISK ASSESSMENT

PROJECT TITLE	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**
PLEASE NOTE THAT THIS IS A BASELINE RISK ASSESSMENT AND NOT A DETAILED RISK ASSESSMENT OF ALL ANTICIPATED ACTIVITIES ON SITE	

Activity	Risk to Safety	Risk to Health	Risk to Environmental	Risk to Public Safety	Control Measures
Brickwork	Physical injury, Fatality				PPE, Use of Scaffolding
Roofing	Physical injury, Fatality				PPE, Use of Scaffolding
Plastering	Skin irritation, temporary blindness	Long term breathing problems	Ground contamination	Dust inhalation	Use of PPE, guarding off site on work areas
Paintwork	Skin irritation, temporary blindness	Long term breathing problems	Ground contamination	Air pollution	Use of PPE, guarding off site on work areas
Construction activities / demolition	Temporary deafness	Permanent deafness	Noise pollution	Noise pollution	Guarding / barricading of site
Moving machines	Driven over by machines	Injury to workers	Fuel spillage	Driven over by machines	Signage and slow driving

You can list all activities on a separate page to address this issue (the above table is just for reference purposes).

G EASTERN CAPE INFRASTRUCTURE INPUT MATERIAL

PROJECT NAME	**ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
PROJECT DESCRIPTION (SCOPE)	**REFURBISHMENT, REPAIRS AND UPGRADES TO WATER AND WASTEWATER TREATMENT WORK**
SCMU NUMBER	**SCMU5-25/26-0040**
CONTRACTOR NAME:	

1. Below is the list of building material which must be sourced from Eastern Cape based suppliers, manufacturers or accredited agents.
2. On monthly basis, the contractor will report the purchasing of any of this material.
3. The report will then be communicated to PT & OTP on quarterly basis or in whichever intervals, as prescribed by PT & OTP.

A. BUILDING MATERIAL LISTS– BUILDING RELATED STRUCTURES (NEW, REFURBISHMENTS & RENOVATIONS)

ITEM	BUILDING MATERIAL (TYPE)	ESTIMATE AMOUNT (Rands)
1	**Foundations:**	
1.1	Concrete	
1.2	Reinforcement	
1.3	Brickwork	
2	**Superstructure:**	
2.1	Brickwork	
2.2	Brickwork Sundries	
2.3	Lintels (precast concrete)	
2.4	Roof Structure (Steel Structures)	
2.5	Roof Covering (Steel)	
2.6	Rainwater Goods	
2.7	Doors (Timber)	
2.8	Doors Frames (Steel)	
2.9	Aluminium windows	
2.10	Aluminium doors	
3	**Internal Finishes:**	
3.1	Floor Finishes (Tiling and screeds)	
3.2	Tile Skirtings	
3.3	Floor finishes and skirtings (Vinyl and screeds)	
3.4	Internal Plaster	
3.5	Internal Wall Finishes	
3.6	Ceilings	
3.7	Ceiling Finishes (Painting)	
3.8	Cornices	
3.9	Waterproofing products	
4	**External Finishes:**	
4.1	Bricks (all kinds)	
4.2	External Plaster	
4.3	External Wall Finishes (Painting)	
5	**Fittings and Furniture:**	
5.1	Ironmongery	

5.2	Sanitaryware	
5.3	Stainless Steel Fittings	
5.4	Blinds	
6	**Services:**	
6.1	Plumbing Pipes	
6.2	Plumbing Fittings	
7	**External Works:**	
7.1	Paving	
7.2	Kerbing	
7.3	Fencing	
7.4	Stormwater pipes	
7.5	Stormwater channels	
7.6	Water pipes	
7.7	Sewer Pipes	
	TOTAL	

B. CONFIRMATION

1. I……(***Contractor name***) acknowledge and confirm the above mentioned material will be sourced in the Eastern Cape Province, from Eastern Cape based material suppliers and manufacturers.
2. I confirm that on monthly basis I will produce a proof of purchase of this material used or to be used, either in the form of delivery notes, tax invoices or any formal document which verifies that the material or goods were sourced from an Eastern Cape based supplier or manufacturer.

---------- ---------- ----------

Representative of the Contractor (Name) Signature Date

C1.2: CONTRACT DATA

PART 1: DATA PROVIDED BY THE EMPLOYER
GENERAL CONDITIONS OF CONTRACT

The *General Conditions of Contract for Construction Works,* Third Edition, 2015, published by the South African Institution of Civil Engineering, is applicable to this Contract. (Short title: "General Conditions of Contract 2015).

The document is available from the South African Institution of Civil Engineering, Tel: 011 805 5947, web page: www.saice.org.za.

It is agreed that the only variations from the General Conditions of Contract 2015 are those set out hereafter under "Special Conditions of Contract"

SPECIAL CONDITIONS OF CONTRACT

The Special Conditions of Contract (SCC) in the table below shall amplify, modify, or supersede, as the case may be, the General Conditions of Contract.

The clauses of the Special Conditions hereafter are numbered "SCC" followed in each case by the number of the applicable clause or sub clause in the GCC 2015.

Special Conditions of Contract

Clause	Amendments
SCC2.4.1	*Add at the beginning of the sub-clause*: "The documents forming the Contract are to be taken as mutually explanatory of one another. For the purposes of interpretation, the priority of the documents shall be in accordance with the following sequence: (a) The Form of Offer and Acceptance (b) The Contract Data (c) The Special Conditions of Contact (d) The General Conditions of Contract (e) The Particular Specifications (f) The Variations and Additions to the Standardized Specifications (g) The Standardized Specifications (h) The Drawings (i) The Schedules and any other documents forming part of the Contract" *At the end of the sub-clause replace the full stop by a comma and add:* "using the above order of priority as reference."
SCC4.4.2	Liability for subcontractors *Add the following to Clause 4.4.2 after the last sentence:* "The Contractor shall not subcontract any part of the Contract without the prior written consent of the Employer's Agent, which consent shall not be unreasonably withheld."
SCC5.6.4	*Add to the sentence after "Contractor" and before the colon:* "within 7 days after receiving the instruction from the Employer's Agent"
SCC5.7.1	*Add to the end of the clause:* "Failure to comply with the requirements of presenting a programme and any adjustments thereto as instructed by the Employer's Agent, shall entitle the Employer's Agent to use a programme

Special Conditions of Contract

Clause	Amendments
	based on his own assumptions to evaluate claims for extension of time for completion of the works, or for additional compensation."
SCC 5.11.4	*Add the following new sub-clause:* "The Contractor may, after giving fourteen (14) days written notice to the Employer, with a copy to the Engineer, (with specific reference to this sub-clause) suspend the progress of the Works where the Engineer or the Employer has failed in terms of sub-clause 6.10.4 to: 5.11.4.1 Deliver a payment certificate, or 5.11.4.2 Make full payment of the amount certified in the payment certificate, within the times prescribed in the sub-clause, without prejudice to the Contractor's other rights under this Contract or in law."
SCC5.14.1	Practical Completion *Replace the last sentence of the second paragraph:* "Should the Engineer … on the Due Completion Date." *with the following:* "Should the Engineer not issue such a list within 14 days, Practical Completion shall be deemed to have been achieved on the said fourteenth day."
SCC5.14.2	Issue of Certificate of Practical Completion *Replace* "the Engineer" *in the second line with the following:* "the Contractor shall notify the Engineer, who shall inspect the Works and the Engineer"
SCC5.14.4	Certificate of Completion *Replace* "the Engineer" *in the second line of the first paragraph with:* "the Contractor shall notify the Engineer, who shall inspect the Works and the Engineer"
SCC6.2.1	*In the last line of the sub-clause delete "selected" and replace with:* "specified".
SCC6.2.2	*Delete this sub-clause entirely*
SCC6.2.3	*In the first two lines delete the text "If the Contractor…….ensure that it" and replace with* "The Contractor shall ensure that the performance guarantee"
	The service provider shall obtain and provide a valid Construction Works Permit in order to gain access to the site

PART 1: DATA PROVIDED BY THE EMPLOYER

Clause	Contract Data

1.1.1.5	The Commencement Date shall be the date on which the Contractor obtain the site and schedule of deviations if applicable or on any other date thereafter to which the Employer may agree to.
1.1.1.13	The Defects Liability Period is 12 months, measured from the date of the Certificate of Completion.
1.1.1.14	The time for achieving Practical Completion, from the Date of the Appointment Letter is **10 months**. The period as stated in 5.3.2, and 5.3.3, are included in the above time for achieving Practical Completion. The Operation and Maintenance Period is 24 months. The special non-working dates are stated in 5.8.1 are excluded from the above time for achieving Practical Completion
1.1.1.15 & 1.2.1.2	The Employer's address for receipt of communications and notices is: EASTERN CAPE DEPARTMENT OF HEALTH Dukumbana Building Independence Avenue Bhisho 5605 The Implementing Agent's address for receipt of communications and notices is: EASTERN CAPE DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE Physical address: 3rd Floor. Office 3-46 Independence Avenue Qhasana Building, Bhisho 5605 Postal address: Private Bag X0022 Bhisho 5605
1.1.1.16	The Employer's Agent for receipt of communications and notices is FMA Engineers (Pty) Ltd 795 Main Street Mount Frere 1590
1.1.1.26	The Pricing Strategy is a Re-measurement Contract.
3.1.3	The Employer's Agent shall obtain the specific approval of the Employer before executing any of the following functions or duties: 1. Issuing instructions for dealing with fossils and the like in terms of Clause 4.7. 2. Authorizing the Contractor to repair and make good, excepted risks in terms of Clause 8.2.2.2. 3. Issuing a variation order in terms of Clause 6.3. 4. Reducing a penalty for delay in terms of Clause 5.13. 5. Agreeing the adjustment of the sums for general items in terms of Clause 6.11.1.
5.2.1	The Commencement Date shall be the date of a site handover that has been fully completed and signed by the Employer.

5.3.1	The documentation required before commencement with the Works execution is: 1. Health and Safety Plan (Refer to the Health and Safety Specification). 2. Environmental Site Management and Rehabilitation (ESM&R) Plan (Refer to Environmental Management Plan). 3. Initial programme (Refer to Clause 5.6.1). 4. Security (Refer to Clause 6.2.1). 5. Insurances (Refer to Clause 8.6.1).
5.3.2	The Contractor is required, within 14 days of the Commencement Date, to submit the documents listed below to the Employer's Agent for his approval. **Health and Safety Plan** A health and safety plan in terms of Clause 7(1) of the Construction Regulations (February 2014). **Environmental Site Management and Rehabilitation (ESM&R) Plan** (Refer to Environmental Management Plan in the specifications). **Initial Programme** An Initial Programme of work in terms of Clause 5.6. **Security** A guarantee from an Insurance Company to be jointly and severally bound with the Contractor for an amount equal to ten per cent (10%) of the Contract Price. The wording of the Guarantee shall be identical to the pro forma currently in use by the Employer on civil engineering contracts. **Insurance** Submit copies of receipts of registration, or payment for the premiums for the following insurances, as required by the new Clause 8.6 in this Contact Data. (a) Proof of registration with the Department of Labour as an employer, in terms of the Compensation for Occupational Injuries and Diseases Act 1993, as amended. (b) Common Law Liability Insurance for the duration of the Contract Period and with a minimum Limit of Indemnity of not less than R5 000 000 for any one accident but the Contractor must assess the risk and provide for additional cover at his own cost; (c) Insurance on an All Risks basis for construction plant, equipment and other things (except those intended to incorporation into the works) brought onto the site to the full value of such construction plant, equipment and other things; (d) Motor Vehicle Liability Insurance, comprising a minimum of Balance of Third Party motor risks, including Passenger Liability, subject to a minimum limit of R2,5 million but the Contractor must assess the risk and provide for additional cover at his own cost. (e) Where the Contract involves manufacturing and/or fabrication of the works or part thereof at premises other than the site, the Contractor shall satisfy the employer that all materials and equipment for incorporation in the works are adequately insured during manufacture and/or fabrication. In the event of the Employer having an insurable interest in such works during manufacture or fabrication, then such interest shall be noted by endorsement to the Contractor's Policies of Insurance. (f) Imported equipment or component parts or materials to be supplied in terms of this Contract which require any process of assembly or finishing in South Africa prior to delivery to the site are to be insured by the Contractor up to the commencement of transit to site of the assembled or finished equipment, component parts or materials, unless special arrangements are made with the Employer. These insurances shall be maintained in force for the duration of the Contract, including any Defects Liability Period and O & M period and in respect of Sub-Contractors, the Contractor shall

<table>
<tr><td></td><td>be deemed to have complied with the provisions of the requirements relating to insurance by ensuring that the Sub-Contractors have effected such insurance..</td></tr>
<tr><td>5.4.2</td><td>The access to the site shall not be exclusive to the contractor.</td></tr>
<tr><td>5.6</td><td>Add the following sub-clause 5.6.6 to Clause 5.6:
“Failure on the part of the Contractor to deliver to the Engineer, the
• programme of the Works in terms of Clause 5.6.1 and
• supporting documents in terms of Clause 5.6.2
within the period stated in the Contract Data, shall be sufficient cause for the Engineer to retain 25 percent of the value of the Fixed Charge and Value-related items in assessment of amounts due to the Contractor, until the Contractor has submitted aforementioned first Programme of the Works and Supporting Documents”.</td></tr>
<tr><td>5.8.1</td><td>The non-working days are Saturdays and Sundays.
The special non-working days are:
• Public holidays not falling within the year end break.
• The year-end break commencing on the first working day after the 15th December and ending on the first working day after 5th January of the following year.
• Any additional statutory public holiday proclaimed during the construction period.</td></tr>
<tr><td>5.12.2.2</td><td>In the event of normal climatic conditions, the number of working days per month that can be expected to be lost as a result of rainfall and extreme winds are shown in Table 5.12.2.2. The Contractor shall allow for these number of days in his programme.
<table><tr><td></td><td>Precipitation</td></tr><tr><td>Months</td><td>Normal</td></tr><tr><td>January</td><td>12</td></tr><tr><td>February</td><td>9</td></tr><tr><td>March</td><td>6</td></tr><tr><td>April</td><td>5</td></tr><tr><td>May</td><td>2</td></tr><tr><td>June</td><td>1</td></tr><tr><td>July</td><td>1</td></tr><tr><td>August</td><td>2</td></tr><tr><td>September</td><td>3</td></tr><tr><td>October</td><td>5</td></tr><tr><td>November</td><td>6</td></tr><tr><td>December</td><td>9</td></tr><tr><td colspan="2">Tabular view for precipitation per month</td></tr></table>
During the execution of the Works, the Employer’s Agent Representative will certify a day lost due to climatic conditions if at least 75% of the work force and plant on site could not work during that specific working day. All relevant facts regarding any work stoppages resulting from prevailing climatic conditions shall be recorded in the daily Site Diary.

Extension of time as a result of abnormal climatic conditions shall be calculated monthly being equal to the number of working days certified by the Employer’s Agent Representative as actually lost due to climatic conditions, less the number of days allowed for as in Table 5.12.2.2. These monthly values may be negative. The total extension of time shall be the cumulative algebraic</td></tr>
</table>

	sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as nil.
5.13.1	The penalty for failing to complete the Works by the due completion dates shall be R 5,500.00 per calendar day.
5.16.3	The latent defect period is 10 years.
6.2.1	The type of security shall be a Performance Guarantee, issued by an insurance company or bank, of 10% of the Contract Sum. If the Guarantor is an Insurance Company, it shall be one listed in the Financial Services Board "List of Registered Insurers" (see www.fsb.co.za). If the Guarantor is a bank it shall be one listed in the South African Reserve Bank list of "Registered Banks and Representative Offices" and appear either in the list of "locally Controlled Banks" or in the list of "Branches of Foreign Banks" (see www.resbank.co.za). The Performance Guarantee shall be provided in accordance with the approved format and wording as indicated in the Pro-Forma Performance Guarantee contained in the returnable documents.
6.2.2	Delete the entire contents of Clause 6.2.2 and replace with: "Failure to deliver an acceptable security as selected in the Contract Data within the stipulated period is a fundamental breach of Contract".
6.3	Omit the words "Provided that" under Clause 6.3.2 and omit Clause 6.3.2.1.
6.8.2	Contract Price Adjustment shall not apply on this contract.
6.10	Add to the end of Clause 6.10.1 the following paragraph: "The Contractor shall complete the 'Contractor's Monthly Report Schedule', which pro forma documentation is obtainable from the Engineer. Pursuant to Sub-Clause 6.10.1.8, these, duly signed by all concerned, together with the Contractor's statement and a VAT invoice in original format are to be submitted to the Engineer. Issue by the Engineer to the Employer and Contractor of any signed payment certificate is conditional to this information being fully endorsed, accurately and timeously submitted to the Engineer".
6.10.1.5	The maximum percentage advance on materials not yet built into the Permanent Works is 80% of the invoice value.
6.10.2	Add to the end of Clause 6.10.2 the following paragraph: "All documentary evidence of such materials shall be unambiguous with respect to ownership having fully passed to the Contractor on or before the date of submittal of the Contractor's monthly statement. Should the Contractor fail to supply unambiguous documentary evidence, he shall, prior to submittal of his monthly statement, deliver to the Employer a Guarantor Guarantee in the form contained in the Appendices to the Contract Data."
6.10.3	The percentage retention shall be 10% of the monthly amounts certified for payment. The Limit of retention money shall be 10% of the Contract Sum.
6.10.4	Delivery, dissatisfaction with and payment of payment certificate *Replace* "28 days" *in the seventh line with* "30 days".

8.6.1.1.2	The value of Plant and Materials supplied by the Employer to be included in the insurance sum is "Nil".
8.6.1.3	The limit of the liability insurance required is R10 000 000 for any single claim with the number of claims unlimited during construction and defects liability period.
10.	Claims and Disputes shall be resolved in line with the General Conditions of Contract (GCC 2015).

PART 2: DATA PROVIDED BY THE CONTRACTOR

Clause

1.1.1.9 The name of the Contractor is ……

1.2.1.2 The Contractor's address for receipt of communications is:

Physical address:	Postal address:
……	.....
……	.....
……	.....
……	.....

Telephone: .....

Fax: .....

E-mail: ……

6.5.1.2.3 The percentage allowance to cover overheads and charges shall be as per those stated in the Schedule of Quantities.

C1.3: PERFORMANCE GAURANTEE (PROFORMA)

GUARANTOR DETAILS AND DEFINITIONS

"Guarantor" means: .....

Physical address:

"Employer" means: .....

"Contractor" means: .....

"Engineer" means: .....

"Works" means:

"Site" means: .....

"Contract" means: The Agreement made in terms of the Form of Offer and Acceptance and such amendments or additions to the Contract as may be agreed in writing between the parties.

"Contract Sum" means: The accepted amount inclusive of tax of R .....

Amount in words:

"Guaranteed Sum" means: The maximum aggregate amount of R.....

Amount in words:

"Expiry Date" means:

CONTRACT DETAILS

Engineer issues: Interim Payment Certificates, Final Payment Certificate and the Certificate Completion of the Works as defined in the Contract.

PERFORMANCE GUARANTEE

1 The Guarantor's liability shall be limited to the amount of the Guaranteed Sum.

2 The Guarantor's period of liability shall be from and including the date of issue of this Performance Guarantee and up to and including the date of issue by the Engineer of the Certificate of Completion of the Works or the date of payment in full of the Guaranteed Sum, whichever occurs first. The Engineer and/or the Employer shall advise the Guarantor in writing of the date on which the Certificate of Completion of the Works has been issued.

3 The Guarantor hereby acknowledges that:

3.1 Any reference in this Performance Guarantee to the Contract is made for the purpose of convenience and shall not be construed as any intention whatsoever to create an accessory obligation or any intention whatsoever to create a suretyship;

3.2 Its obligation under this Performance Guarantee is restricted to the payment of money.

4 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor hereby undertakes to pay the Employer the sum certified upon receipt of the documents identified in 4.1 to 4.3:

4.1 A copy of a first written demand issued by the Employer to the Contractor stating that payment of a sum certified by the Engineer in an Interim or Final Payment Certificate has not been made in terms of the Contract and failing such payment within seven (7) calendar days, the Employer intends to call upon the Guarantor to make payment in terms of 4.2;

4.2 A first written demand issued by the Employer to the Guarantor at the Guarantor's physical address with a copy to the Contractor stating that a period of seven (7) days has elapsed since the first written demand in terms of 4.1 and the sum certified has still not been paid;

4.3 A copy of the aforesaid payment certificate which entitles the Employer to receive payment in terms of the Contract of the sum certified in 4.

5 Subject to the Guarantor's maximum liability referred to in 1, the Guarantor undertakes to pay to the Employer the Guaranteed Sum or the full outstanding balance upon receipt of a first written demand from the Employer to the Guarantor at the Guarantor's physical address calling up this Performance Guarantee, such demand stating that:

5.1 The Contract has been terminated due to the Contractor's default and that this Performance Guarantee is called up in terms of 5; or

5.2 A provisional or final sequestration or liquidation court order has been granted against the Contractor and that the Performance Guarantee is called up in terms of 5; and

5.3 The aforesaid written demand is accompanied by a copy of the notice of termination and/or the provisional/final sequestration and/or the provisional liquidation court order.

6 It is recorded that the aggregate amount of payments required to be made by the Guarantor in terms of 4 and 5 shall not exceed the Guarantor's maximum liability in terms of 1.

7 Where the Guarantor has made payment in terms of 5, the Employer shall upon the date of issue of the Final Payment Certificate submit an expense account to the Guarantor showing how all monies received in terms of this Performance Guarantee have been expended and shall refund to the Guarantor any resulting surplus. All monies refunded to the Guarantor in terms of this Performance Guarantee shall bear interest at the prime overdraft rate of the Employer's bank compounded monthly and calculated from the date payment was made by the Guarantor to the Employer until the date of refund.

8 Payment by the Guarantor in terms of 4 or 5 shall be made within seven (7) calendar days upon receipt of the first written demand to the Guarantor.

9 Payment by the Guarantor in terms of 5 will only be made against the return of the original Performance Guarantee by the Employer.

10 The Employer shall have the absolute right to arrange his affairs with the Contractor in any manner which the Employer may deem fit and the Guarantor shall not have the right to claim his release from this Performance Guarantee on account of any conduct alleged to be prejudicial to the Guarantor.

11 The Guarantor chooses the physical address as stated above for the service of all notices for al purposes in connection herewith.

12 This Performance Guarantee is neither negotiable nor transferable and shall expire in terms of 2, where after no claims will be considered by the Guarantor. The original of this Guarantee shall be returned to the Guarantor after it has expired.

13 This Performance Guarantee, with the required demand notices in terms of 4 or 5, shall be regarded as a liquid document for the purposes of obtaining a court order.

14 Where this Performance Guarantee is issued in the Republic of South Africa the Guarantor hereby consents in terms of Section 45 of the Magistrate's Courts Act No. 32 of 1944, as amended, to the jurisdiction of the Magistrate's Court of any district having jurisdiction in terms of Section 28 of the said Act, notwithstanding that the amount of the claim may exceed the jurisdiction of the Magistrate's Court.

Signed at

Date .....

Guarantor's signatory: (1) .....

Capacity .....

Guarantor's signatory (2) .....

Capacity .....

Witness signatory (1).....

Witness signatory (2).....

C1.4: AGREEMENT IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO 75 OF 1993)

THIS AGREEMENT made at .....

on this the ..... day of ..... in the year ……

between …… *[hereinafter called "the Employer"]* of the one

part, herein represented by .....

in his capacity as .....

and .....

[hereinafter called "the Mandatory"] of the other part, herein represented by.....

.....

in his capacity as .....

WHEREAS the Employer is desirous that certain works be constructed and has accepted a Tender by the Mandatory for **ST BARNABAS HOSPITAL LIBODE, OR TAMBO DISTRICT: REFURBISHMENT, REPAIRS, AND UPGRADES TO WATER & WASTEWATER TREATMENT WORK.**

Construction, completion and maintenance of such Works and whereas the Employer and the Mandatory have agreed to certain arrangements and procedures to be followed in order to ensure compliance by the Mandatory with the provisions of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);

NOW THEREFORE THIS AGREEMENT WITNESSETH AS FOLLOWS:

1 The Mandatory shall execute the work in accordance with the Contract Documents pertaining to this Contract.

2 This Agreement shall hold well from its Commencement Date, which shall be the date of a written notice from the Employer or Engineer requiring him to commence the execution of the Works, to either.

(a) The date of the Final Approval Certificate issued in terms of Clause 5.16.1 of the General Conditions of Contract (GCC 2015).

(b) The date of termination of the Contract in terms of Clauses 9.1, 9.2 or 9.3 (GCC 2015) of the GCC.

3 The Mandatory declares himself to be conversant with the following:

(a) All the requirements, regulations and standards of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), hereinafter referred to as "The Act", together with its amendments and with special reference to the following sections of The Act:

(i) Section 8 : General duties of employers to their employees;

(ii) Section 9 : General duties of employers and self-employed persons to persons other than employees;

(iii) Section 37 : Acts or omissions by employees or mandatories, and

(iv) Subsection 37(2) relating to the purpose and meaning of this Agreement.

(b) The procedures and safety rules of the Employer as pertaining to the Mandatory and to all his subcontractors.

4 In addition to the requirements of Clause 8.4 of the GCC 2015 and all relevant requirements of the Contract, the Mandatory agrees to execute all the Works forming part of this Contract and to operate and utilise all machinery, plant and equipment in accordance with the Act.

5 The Mandatory is responsible for the compliance with the Act by all his subcontractors, whether or not selected and/or approved by the Employer.

6 The Mandatory warrants that all his and his subcontractors' workmen are covered in terms of the Compensation for Occupational Injuries and Diseases Act, 1993 which cover shall remain in force whilst any such workmen are present on site. A letter of good standing from the Compensation Commissioner to this effect must be produced to the Employer upon signature of the agreement.

7 The Mandatory undertakes to ensure that he and/or subcontractors and/or their respective employers will at all times comply with the following conditions:

(a) The Mandatory shall assume the responsibility in terms of Section 16.1 of the Occupational Health and Safety Act. The Mandatory shall not delegate any duty in terms of Section 16.2 of this Act without the prior written approval of the Employer. If the Mandatory obtains such approval and delegates any duty in terms of Section 16.2 a copy of such written delegation shall immediately be forwarded to the Employer.

(b) All incidents referred to in the Occupational Health and Safety Act shall be reported by the Mandatory to the Department of Labour as well as to the Employer. The Employer will further be provided with copies of all written documentation relating to any incident.

(c) The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of Section 32 of the Occupational Health and Safety Act into any incident involving the Mandatory and/or his employees and/or his subcontractors.

In witness thereof the parties hereto have set their signatures hereon in the presence of the subscribing witnesses:

SIGNED FOR AND ON BEHALF OF THE EMPLOYER: .....

WITNESS 1 2

NAME 1 2
(IN CAPITALS)

SIGNED FOR AND ON BEHALF OF THE MANDATORY: .....

WITNESS 1 ..... 2 .....

NAME 1 2
(IN CAPITALS)

CERTIFICATE OF AUTHORITY FOR SIGNATORY TO AGREEMENT IN TERMS OF OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

The signatory for the company that is the Contractor in terms of the above-mentioned Contract and the Mandatory in terms of the above-mentioned Act shall confirm his or her authority thereto by attaching to this page a duly signed and dated copy of the relevant resolution of the Board of Directors.

An example is given below:

"By resolution of the Board of Directors passed at a meeting held on 20……,

Mr/Ms ..... whose signature

appears below, has been duly authorised to sign the AGREEMENT in terms of THE OCCUPATIONAL

HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993) on behalf of .....

.....

SIGNED ON BEHALF OF THE COMPANY : .....

IN HIS/HER CAPACITY AS : .....

DATE : .....

SIGNATURE OF SIGNATORY : .....

WITNESS: 1. ..... 2.

NAME (IN CAPITALS): 1. ..... 2.

C1.3: DISPUTE RESOLUTION MECHANISM

C3.1.3: CIDB ADJUDICATOR'S AGREEMENT

This agreement is made on the . . . . day of . . . . between:. . . . . (name of company / organization) of . . . . (address) and. . . . . (name of company / organization) of . . . . (address) (the Parties) and. . . . . (name) of . . . . (address) (the Adjudicator).

Disputes or differences may arise/have arisen* between the Parties under a Contract dated . . . . and known as. . . . . and these disputes or differences shall be/have been* referred to adjudication in accordance with the CIDB Adjudication Procedure, (hereinafter called "the Procedure") and the Adjudicator may be or has been requested to act.

* Delete as necessary

IT IS NOW AGREED as follows:

1 The rights and obligations of the Adjudicator and the Parties shall be as set out in the Procedure.
2 The Adjudicator hereby accepts the appointment and agrees to conduct the adjudication in accordance with the Procedure.
3 The Parties bind themselves jointly and severally to pay the Adjudicator's fees and expenses in accordance with the Procedure as set out in the Contract Data.
4 The Parties and the Adjudicator shall at all times maintain the confidentiality of the adjudication and shall endeavour to ensure that anyone acting on their behalf or through them will do likewise, save with the consent of the other Parties which consent shall not be unreasonably refused.
5 The Adjudicator shall inform the Parties if he intends to destroy the documents which have been sent to him in relation to the adjudication and he shall retain documents for a further period at the request of either Party.

SIGNED by: ____________	SIGNED by: ____________	SIGNED by: ____________
Name:	Name:	Name:
who warrants that he / she is duly authorized to sign for and on behalf of the first Party in the presence of	who warrants that he / she is duly authorized to sign for and behalf of the second Party in the presence of	the Adjudicator in the presence of
Witness ____________	Witness: ____________	Witness: ____________
Name: ____________	Name ____________	Name: ____________
Address:	Address:	Address:
Date: ____________	Date: ____________	Date: ____________

Contract Data

1	The Adjudicator shall be paid at the hourly rate of R. . . . . in respect of all time spent upon, or in connection with, the adjudication including time spent travelling.
2	The Adjudicator shall be reimbursed in respect of all disbursements properly made including, but not restricted to: a) Printing, reproduction and purchase of documents, drawings, maps, records and photographs. b) Telegrams, telex, faxes, and telephone calls. c) Postage and similar delivery charges. d) Travelling, hotel expenses and other similar disbursements. e) Room charges. f) Charges for legal or technical advice obtained in accordance with the Procedure.
3	The Adjudicator shall be paid an appointment fee of R . . . . . This fee shall become payable in equal amounts by each Party within ….. days of the appointment of the Adjudicator, subject to an Invoice being provided. This fee will be deducted from the final statement of any sums which shall become payable under item 1 and/or item 2 of the Contract Data. If the final statement is less than the appointment fee the balance shall be refunded to the Parties.
4	The Adjudicator is/is not* currently registered for VAT.
5	Where the Adjudicator is registered for VAT it shall be charged additionally in accordance with the rates current at the date of invoice.
6	All payments, other than the appointment fee (item 3) shall become due in 30 days after receipt of invoice, thereafter interest shall be payable at 5% per annum above the Reserve Bank base rate for every day the amount remains outstanding.

* Delete as necessary

PART C2: PRICING DATA

C2.1 Pricing Instructions

1. The pages in the schedule of quantities are numbered continuously. The tenderer must check the pages before he submits his tender, and if any pages are missing, duplicated, or unclear or contain obvious errors, the engineer should be notified to have these errors rectified.

2. The Project Specifications, the General Conditions of Contract, the Contract Data, the special conditions of contract if any, the drawings, site information and notice(s) to the tenderers are to be read in conjunction with the schedule of quantities.

3. Descriptions in the schedule of quantities are abbreviated and the schedule has been drawn up generally in accordance with the 1990 issue of Civil Engineering Quantities. Should any requirements of the measurement and payment Clause of the applicable standardised specification, or the project specification, or the project or standard specification or section conflict with the terms of the schedule, or, when relevant, the said Civil Engineering Quantities, the requirement of the standardised project, or project specification section, as applicable shall prevail.

   The measurement and payment Clauses of each specification, read together with the relevant Clauses of the project specification, set out what ancillary or associated activities are included in the rate for the works specified.

4. Unless otherwise stated, items are measured nett in accordance with the drawings and specifications, and no allowance has been made for waste. All quantities are provisional, and payment will be made after the actual quantities have been measured on site after completion of the works and agreed to.

5. The prices and rates to be inserted in the schedule of quantities are to be the full inclusive prices to the employer for the work described under each item. Such prices shall cover all costs and expenses that may be required in and for the construction of the work described, and shall cover the cost of all general risks, liability, and obligations set forth or implied in the documents on which the bid is based. These prices and rates must be nett and not include value added tax. Value added tax must be added as a separate item on the summary page.

6. A price or rate is to be entered against each item in the schedule of quantities, whether the quantities are stated or not. An item against which no price is entered will be considered to have a price or rate of R0-00. It will be accepted that items against which no price has been inserted are covered by other prices or rates in the schedule.

7. Arithmetical errors will be corrected in accordance with the Standard Conditions of Tender. (The tender price remains fixed, and rates and prices are adjusted and balanced.) it is important to note however, that such balancing will not include the altering of provisional sums made by the Engineer. Moreover, all balancing will be approved by the Engineer and/or Employer prior to it being accepted.

8. The contractor must not order the quantities of materials stated in the schedule of quantities until he has confirmed from the construction drawings or measurement on site and with the engineer that such quantities are in fact the correct quantities.
9. Reference to Clauses in this and other documents and drawings are generally abbreviated as follow:

   Document/ Source Abbreviation

   PS…. Project Specification

   BS….. Particular Specification

   SABS/ SANS SABS 1200 standardized specification

   E765 -….. Drawings

LI Labour Intensive

10. An ordinary number in the reference column refers to the standardized specifications. A letter followed by a number in the reference column refers to an applicable Clause of the project specifications or particular specifications.

    The absence of a reference must not be construed that no specification is applicable. The tenderer must ensure that all the requirements of the project specifications and standard specifications are covered by the items and rates tendered. If he is of the opinion that a specific Item needs to be added, he must insert such an Item with a price or a rate as applicable. Therefore, the items in the schedule of quantities are considered to cover the project specifications entirely.

11. The tenderer must price and extend each item and total each section in the schedule of quantities in BLACK INK.

C2.2: Bill of quantities

NOTE: The bill of quantities is numbered separately from the rest of the tender document.

PART C3: SCOPE OF WORKS

C3.1 STANDARD SPECIFICATIONS

The latest edition as at date of tender of the following Standardised Specifications for Civil Engineering Construction as published by the South African Bureau of Standards shall apply. The applicable standardised specifications for this Contract shall be the following:

SANS 1200	A	-	General
SANS 1200	AB	-	Engineer's Office
SANS 1200	C	-	Site Clearance
SANS 1200	D	-	Earthworks
SANS 1200	DA	-	Earthworks
SANS 1200	DB	-	Earthworks (Pipe Trenches)
SANS 1200	DM	-	Earthworks (Roads, Subgrade)
SANS 1200	L	-	Medium Pressure Pipelines
SANS 1200	LB	-	Bedding (Pipes)
SANS 1200	LE	-	Stormwater Drainage
SANS 1200	G	-	Concrete Works
SANS 1200	HA	-	Steel Work (sundry items)
SANS 1200	DK	-	Gabions and Pitching
SANS 1200	MF	-	Base
SANS 1200	MM	-	Ancillary Roadwork

Copies of the above listed specifications are not bound into this document but may be purchased by Tenderers at their own cost from: -

SA Bureau of Standards
Private Bag X191
PRETORIA
0001

C3.2 PROJECT SPECIFICATIONS

The project specification is covered in the following sections:

ITEM	DESCRIPTION STATUS
	PROJECT SPECIFICATION PORTION 1: GENERAL
PS-1	Project Description
PS-2	Extent of the Works
PS-3	Description of the Site and Access
PS-4	Nature of Ground and Subsoil Conditions
PS-5	Construction and Management Requirements
PS-6	Construction Programme
PS-7	Site Facilities Available
PS-8	Site Facilities Required
PS-9	Existing Services
PS-10	Requirements for Accommodation of Traffic
PS-11	Occupational Health and Safety
PS-12	Adverse Weather Conditions
PS-13	Site Meetings & Reporting
PS-14	Preferential Procurement
	PROJECT SPECIFICATION PORTION 2: AMENDMENTS TO THE STANDARD AND PARTICULAR SPECIFICATIONS
PSA	General
PSD	Earthworks
PSDB	Earthworks (Pipe Trenches)

PSG/PSGA	Concrete (Small Works)
PSLB	Bedding (Pipes)
PSLD	Sewers
PSLE	Stormwater Drainage
	PARTICULAR SPECIFICATIONS
PA	Brickwork and Plaster
PB	Carpentry, Joinery and Ironmongery
PC	Painting
PD	Disinfection of Pipelines
PES	Environmental Specification
PW	Portable Water Storage
PG	Gravel Access Road
PME	Mechanical and Electrical Works
PF	Clear-vu Fencing

STATUS

The Project Specification, consisting of two parts, forms an integral part of the contract and supplements the Standard Specifications.

Part A contains a general description of the works, the site and the requirements to be met.

Part B contains variations, amendments, and additions to the Standardized Specifications and, if applicable, the Particular Specifications.

In the event of any discrepancy between a part or parts of the Standardized or Particular Specifications and the Project Specification, the Project Specification shall take precedence. In the event of a discrepancy between the Specifications, (including the Project Specifications) and the drawings and / or the Bill of Quantities, the discrepancy shall be resolved by the Engineer before the execution of the work under the relevant item.

PROJECT SPECIFICATION

PORTION 1: GENERAL

SABS 1200 PS: GENERAL

PS-1 PROJECT DESCRIPTION

This scope of works defines key project milestones and nature of work that the contractor is expected to perform in identified areas for the refurbishment, repairs, and upgrades to water & wastewater treatment work infrastructure at St Barnabas Hospital, Libode, OR Tambo District. The details of the works are set out in the Bills of Quantities with provision for changes as directed by the client should the need arise.

PS-2 EXTENT OF THE WORKS

The scope of works for the St Barnabas Hospital water and sanitation systems refurbishment and upgrades are as follows:

COMPONENT	SCOPE OF WORKS
Raw water abstraction	▪ Construction of new raw water pump station building with capacity to house two sets of pumps (i.e., 2No. low lift pumps and 1No. high lift pumps). ▪ Supply and installation of raw water sump next to raw water pump station with capacity of 12 hours x AADD. ▪ Installation of 2 No. new low lift pumps with suction lift capability, including pipework and electrical controls. ▪ Installation of 1 No. new high lift pumps, including pipework and electrical controls.

COMPONENT	SCOPE OF WORKS
	▪ Pump test and repair existing raw water rising main, from pump station to the Water Treatment Works.
Water Treatment	▪ New 300KL/day Water Treatment Package Plant consisting of: ▪ Raw water buffer tank, ▪ Coagulant dosing equipment, ▪ Flocculation Column, ▪ Clarifiers with lamella plates, ▪ Pressure filters and feed pumps and, ▪ Chlorine dosing equipment.
Potable Water Storage	▪ Refurbish, clean, and disinfect the existing ground tanks including repair and replacement of corrugated iron roof sheeting. ▪ Refurbish, clean, and disinfect the existing 116 m3 elevated tank and reinstall on existing stand. ▪ Install 2No. new elevated tank feeder pumps, including pipework and electrical controls. ▪ Supply and install additional new 200 m3 prefabricated steel panel tank, on 20m high steel stand.
Outfall Sewer Line	▪ Construction new screening chamber at head of outfall sewer line. ▪ Installation of manually raked screen in the proposed screening chamber at head of outfall sewer line. ▪ Construction of a new 160mm diameter outfall sewer line, with high density polymer covers to the manholes, and ▪ Commissioning of the sewer line.
Wastewater Treatment	▪ Replacement of ponds lining. ▪ Construction of ponds inlet and outlet structures. ▪ Installation of new effluent disinfection system. ▪ Construction of access road to the ponds. ▪ Refurbishment of existing steel palisade fencing.
Mechanical & Electrical	This portion of the works covers the supply, factory testing, insurance, delivery, transport, handling, storing, erection, site welding and making good coatings, aligning, fixing, supporting, connecting, adjusting, drilling for and grouting in and caulking up all holding down bolts, bedplates and pipework, balancing, guaranteeing, site testing, painting, commissioning, handing over in complete working order, providing drawings, operating and maintenance instructions in quadruplicate, and instructing staff. This portion of the works has a maintenance period of 12 months after completion for the mechanical and electrical equipment, pipework, and other plant all as described in greater detail elsewhere in this document and/or shown on the drawings and set out in the Schedule of Quantities. (Note the nominated subcontractor contractor will be issued with a separate appendix containing the specifications for the M&E components of the works. These will form part of the complete specifications (ANNEXURE 1). The main contractor remains liable for all works undertaken in this specifications appendix and should be thus familiarize themselves with all the requirements of the works.)

PS-3 DESCRIPTION OF THE SITE AND ACCESS

PS-3.1 Restrictions and Constraints

- The completion of the project is urgent, and work shall be executed during normal working hours i.e., 7h00 until 17h00 daily including weekends. Work required to be executed outside of these hours must be arranged with the Facilities Manager and the Chief Executive of the hospital, in advance.
- Noise must be always kept to a minimum and within acceptable levels. It is possible that the hospital could impose restricted times for demolition due to the proximity of the site to existing facilities.

- All shut-offs and tie/cut-ins to existing services must be arranged in advance with the Facilities Manager and a methodology with appropriate mitigation of risks must be prepared by the contractor and submitted to the relevant Professional discipline in advance, for approval.
- Dust emanating from the work site must be controlled.

PS-3.2 Operational Protocols

- Security is a priority, and the site shall be always kept safe.
- The approved Health and Safety plan shall be always adhered to.
- All staff members of the contractor shall always wear PPE.
- All staff members of the contractor shall be always specifically identifiable and to this end shall wear a predetermined coloured overall to be able to enter and work on the site.
- Regular meetings, the frequency of which is to be determined, shall be held with the management of the hospital to always ensure a cohesive spirit of co-operation.

PS-3.3 Access

Prospective bidders are to fully familiarize themselves with the site and access to the site and restricted area for site establishment.

PS-4 NATURE OF GROUND AND SUBSOIL INVESTIGATIONS

Subsoil investigations have been undertaken on the site. The details of the subsoil conditions are provided in Part C4 of this document. No responsibility is taken by the Employer because of any deductions made by the tenderer/contractor from observation/analysis of the results.

PS-5 ENGINEERING AND DESIGN

PS-5.1 Design Services and Activity Matrix

The following matrix of responsibilities for design of permanent and temporary works will apply:

Activity Work designed by, per design stage	Responsible Party
Concept, feasibility, and overall process	Employer
Basic engineering and detail layouts to tender stage	Employer
Final design approved for construction stage	Employer
Temporary works	Contractor
Permanent Works	Contractor
Preparation of as built drawings	Contractor

PS-5.2 Employer's Design

The Employer's design will be for all permanent works and will be detailed in drawings, site instructions and the technical specifications to be issued with the tender documents and issued during construction.

PS-5.3 Design Brief

The contractor will be responsible for design of the following (which are all subject to approval by the Engineer):

- Site layouts for the contractor's camp and office accommodation
- Construction Methodology
- Formwork
- Scaffolding and all staging work

- All other temporary works
- Concrete Mix designs
- Mechanical and electrical plant and equipment to be supplied (nominated subcontractor)

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

PS-5.4 Drawings

The drawings issued to tenders as part of the tender documents must be regarded as provisional and preliminary for the Tenderer's benefit to generally assess the scope of work. The work shall be carried out in accordance with the latest available revision of the drawings approved for construction.

At commencement of the contract, the Engineer shall deliver to the Contractor copies of the construction drawings and any instructions required for the commencement of the works. From time to time thereafter during the progress of the works, the Engineer may issue further drawings or revisions for construction purposes as may be necessary for adequate construction, completion, and defects correction of the works.

The following drawings will be required to be prepared by the contractor as a minimum:

- Site layouts for the contractor's camp and office accommodation
- Scaffolding and all staging work
- Within two weeks of the acceptance of his tender, the Contractor shall supply the Engineer, in duplicate, with fully dimensioned drawings of the plant ordered from him, the necessary data concerning the geometry and the position and sizes of all plinths, foundations, bolt holes, ducts, openings in walls or floors and all other special features affecting the design and construction of the new M&E Works. The Employer will then arrange for the necessary new concrete work, foundations, bolt holes, openings for pipes, cable ducts, etc., to be available for the proper erection and installation of the plant.

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

The tender drawings applicable to the contractor are detailed in Part C5 of these documents. These drawings have been used for setting up the Schedule of Quantities.

PS-5.5 Design Procedures

The contractor will be required to furnish the following designs for approval by the Engineer at the indicated times:

- Site layouts of the Contractor's camp and office accommodation – within 14 days from commencement date of the contract and in any case prior to the erection of the contractor's camp and offices
- Formwork design – within 14 days of commencement of work and in any case prior to the construction of permanent reinforced concrete works.
- Scaffolding and all staging work – within 14 days of commencement of work and in any case prior to the construction of permanent reinforced concrete works.
- Concrete Mix Designs for all classes of concrete as measured in the Schedule of Quantities prior to the placement of any concrete work.

The costs of the designs will be deemed to have been included in the scheduled items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

Any re-design and/or cutting or alteration of new structural or building work arising from inadequate or incorrect dimensions and particulars afforded by the Contractor under this Contract, or through late receipt of any such particulars, and any modifications to existing structures to suit plant supplied under this Contract will be arranged by the Engineer to be carried out as he thinks fit, at the expense of the Contractor under this Contract.

PS-5.6 Interface with other Contractors

The contractor may be required to provide access to other contractors undertaking work as per parallel contracts. The costs of this interface will be deemed to have been allowed for in the appropriate items in the Schedule of Quantities. No other additional payments will be certified to cover these activities.

PS-6 CONSTRUCTION AND MANAGEMENT REQUIREMENTS

PS-6.1 General

The Contractor is referred to SANS 1921: 2004: Construction and Management Requirements for Works Contracts, Part 1: General Engineering and Construction Works, and Part 2: Accommodation of Traffic on Public Roads. These specifications shall be applicable to the contract under consideration and the Contractor shall comply with all requirements relevant to the project.

Certain aspects however require further attention as described hereafter.

PS-6.2 Quality Assurance (QA) *(Read with SANS 1921 – 1: 2004 clause 4.4)*

The Contractor will be solely responsible to produce work that complies with the Specifications to the satisfaction of the Engineer. To this end it will be the full responsibility of the Contractor to institute an appropriate Quality Assurance (QA) system on site. The Engineer will audit the Contractor's quality assurance (QA) system on a regular basis to verify that adequate independent checks and tests are being carried out and to ensure that the Contractor's own control is sufficient to identify any possible quality problems which could cause a delay or failure.

The Contractor shall ensure that efficient supervisory staff, the required transport, instruments, equipment, and tools are available to control the quality of his own workmanship in accordance with his QA-system. His attention is drawn to the fact that it is not the duty of the Engineer or the Engineer's representative to act as foreman or surveyor.

PS-6.3 Management and disposal of water *(Read with SANS 1921-1: 2004 clause 4.6)*

The Contractor shall pay special attention to the management and disposal of water and stormwater on the site. It is essential that all completed works or parts thereof are kept dry and properly drained. Claims for delay and for repair of damage caused to the works as a result of the Contractor's failure to properly manage rain and surface water, will not be considered.

PS-6.4 Disposal of spoil or surplus material *(Read with SANS 192-1: 2004 clause 4.10)*

The Contractor shall dispose all surplus and unsuitable material in legal spoil areas of his own choice. He shall be responsible for all arrangements necessary to obtain such spoil sites.

PS-6.5 Testing *(Read with SANS 1921 – 1: 2004 clause 4.11)*

PS-6.5.1 Process control

The Contractor shall arrange for all tests required for process control to be done by a laboratory acceptable to and approved by the Engineer.

The Contractor may establish his own laboratory on site or he may employ the services of an independent commercial laboratory. Whatever method is used, the Contractor must submit the results of tests carried out on materials and workmanship when submitting work for acceptance by the Engineer. The costs for these tests shall be deemed to be included in the relevant rates and no additional payment will be made for testing as required.

PS-6.5.2 Acceptance control

The process control test results submitted by the Contractor for approval of materials and workmanship may be used by the Engineer for acceptance control. However, before accepting any work, the Engineer may have further control tests carried out by a laboratory of his choice. The cost of such additional tests will be covered by a provisional sum provided in the schedule of quantities, but tests that failed to confirm compliance with the specifications, will be for the account of the Contractor.

PS-6.6 Survey beacons (Read with SANS 1921 - 1: 2004 clause 4.15)

The Contractor shall take special precautions to protect all permanent survey beacons or pegs such as bench-marks, stand boundary pegs and trigonometrical beacons, regardless whether such beacons or pegs were placed

before or during the execution of the Contract. If any such beacons or pegs have been disturbed by the Contractor or his employees, the Contractor shall have them replaced by a registered land surveyor at his own cost.

PS-6.7 Existing Services (Read with SANS 1921 - 1: 2004 clause 4.17)

The Contractor shall make himself acquainted with the position of all existing services before any excavation or other work likely to affect the existing services is commenced.

The Contractor will be held responsible for any damage to known existing services caused by or arising out of his operations and any damage shall be made good at his own expense. Damage to unknown services shall be repaired as soon as possible and liability shall be determined on site when such damage should occur.

PS-6.8 Management of the environment (Read with SANS 1921 - 1: 2004 clause 4.19)

The Contractor shall pay special attention to the following:

(a) Natural Vegetation

The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of constructing the works.

Only those trees and shrubs directly affected by the works and such others as the Engineer may direct in writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Engineer.

(b) Fires

The Contractor shall comply with the statutory and local fire regulations. He shall also take all necessary precautions to prevent any fires. In the event of fire, the Contractor shall take active steps to limit and extinguish the fire and shall accept full responsibility for damages and claims resulting from such fires which may have been caused by him or his employees.

PS-6.9 Overhaul

No payment will be made for overhaul on this contract unless provision is made thereof in specific items.

PS-6.10 Excavations

Due to the depths of sewer lines and their location nets to a water course, the Contractor is to allow in their tendered rates for excavation, for shoring and protection of trenches. No additional payment will be made for protection of excavations for whatever reason.

PS-6.10 Security

The Contractor shall provide security watchmen for the contract as he deems fit at no extra cost for the Employer. The Contractor must ensure that all his employees as well as the employees of his subcontractors are able to identify themselves as members of the construction team.

PS-7 CONSTRUCTION PROGRAMME

PS-7.1 Preliminary programme

The Contractor shall include with his tender a preliminary programme on the prescribed form to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions and special non-working days as specified in the Special Conditions of Contract, in the Project Specifications and in the Contract Data.

In determining his construction programme, the contractor should allow for disruptions/stoppages/requirements and intermittent "hold" of work while awaiting Engineer's inspections at the following critical stages:

Stage	Delay
Excavation works for pipelines and prior to preparation of bedding	1 day
Following preparation of bedding and laying of pipes and prior to backfilling	1 day
Prior to commencement of testing of pipelines	1 day
Prior to testing of manholes	1 day
Prior to pouring of concrete	1 day

The contractor must consider the above requirements when pricing and preparing the programme of works. No additional payments, other than through scheduled items, will be made for these stoppages/disruptions/constraints.

PS-7.2 Programme in terms of Clause 5.6 of the General Conditions of Contract

It is essential that the construction programme, which shall conform in all respects to Clause 5.6 of the General Conditions of Contract, be furnished within the time stated in the Contract Data. The preliminary programme to be submitted with the tender shall be used as basis for this programme. The Contractor's attention is also drawn to Clause 5.7.1 of the General Conditions of Contract 2015.

PS-8 SITE FACILITIES AVAILABLE

PS-8.1 Contractor's camp site and depot (Read with SANS 1921 - 1: 2004 clause 4.14)

The Contractor will be permitted to locate his offices, storage facilities, workshops, latrines, etc, on a site approved by the Engineer, in liaison with the community.

Temporary buildings and fencing are to be neat and presentable and the surrounding areas must at all times be kept in a neat, clean and orderly condition. The Contractor must not cut down or damage any trees nor make any excavation without the written permission of the Engineer and will be required to restore the site to its original condition on completion of the Works.

All buildings and latrines shall be in accordance with the Local Authority and State Heath regulations and shall be kept in a clean, sanitary condition to the satisfaction of the Engineer.

PS-8.2 Accommodation of Employees

No employees except for security guards will be allowed to sleep or be accommodated on the site in urban areas.

No housing is available for the Contractor's employees and the Contractor shall make his own arrangements to house his employees and to transport them to site.

No informal housing or squatting will be allowed.

The Contractor shall provide the necessary ablution facilities at his camp site and the site of the works for the use of his employees. Chemical toilets only will be allowed where temporary facilities must be provided.

PS 8.3 Source of Water Supply

The Contractor shall make his own arrangements for the supply of water for construction purposes. The source of water shall be subject to the approval of the Engineer.

The Water Services Authority in the area is Rustenburg Local Municipality. Should the contractor's source of water be the Rustenburg Local Municipality, the contractor will be required to ensure that the water account with The Rustenburg Local Municipality is in good standing prior to the issue of completion certificate. The Engineer will withhold any payments until arrears are cleared with The Rustenburg Local Municipality.

PS 8.4 Source of Power Supply

The power supply authority is Eskom. The Contractor will be required to make his own arrangements with, and pay all the requisite connection and consumption charges to Eskom for whatever temporary power supplies he may require for his use on the site and his tender will be held to include for all such costs and charges.

PS 8.5 Notice Boards

Construction notice boards shall comply with EPWP standards.

PS-9 SITE FACILITIES REQUIRED

PS-9.1 Facilities Required for the Engineer

PS 9.1.1 Temporary/Permanent Offices

The Contractor is to provide a temporary office for use by the Engineer as detailed in the drawing issued at tender stage. The offices should be able to accommodate one full time Engineer's Representative and two assistants.

The Engineer's offices are to be equipped with the following as a minimum:

- Three desks each with lockable drawers
- Three high back swivel chairs
- Three visitors' chairs
- A facility to store/hang drawings.
- An electric refrigerator of at least 200 litres capacity

The Contractor should also make arrangements for covered facilities to enable the accommodation of approximately 12– 16 people during progress site meetings, to be held fortnightly or monthly.

The facilities are to be provided, to the satisfaction of the Engineer, within 14 days of commencement date. Should the contractor fail to provide approved establishment within the stipulated 14 days, the contractor will pay a penalty calculated as follows:

Mileage of the Engineer's Representative from other offices from the nearest business centre to site and back to office at R5.50/km
Rented Office space equivalent to that stipulated in this contract at offices in Rustenburg or other place closer to the site.

This penalty shall be deducted from the Contractor's payment certificates and paid to the service provider providing the site office of the specification as detailed above.

PS 9.1.2 Laboratory Facilities

The Contractor will not be required to provide a testing laboratory on site for use by the Engineer. However, the contractor will be required to provide compaction test results for all backfilling across roads from a recognised laboratory. No additional payment will be made from the compaction tests and the contractor is to allow for the costs thereof in the tendered rates.

PS 9.1.3 Sanitary Facilities

All latrines shall conform to the requirements of the Local Authority and shall be subject to approval by the Engineer. All sanitary fees and charges due under the Local Authority or State Health Regulations or bylaws shall be paid by the Contractor. Throughout the progress of the contract, all latrines shall be maintained by the Contractor in a clean, sanitary condition to the satisfaction of the Engineer.

PS 9.1.4 Telephone Facilities

The Contractor will not be required to provide a telephone for use by the Engineer. The contractor will however be required cover cell phone costs for the engineer's site staff for airtime valued at R250/week. Appropriate items have been provided in the Schedule of Quantities to cover these costs.

PS 9.1.5 Housing Facilities

The Contractor will not be required to provide housing facilities for the Engineer's staff. However, a provisional sum has been provided in the schedule of quantities for payment through the contract for accommodation for the Engineer's staff.

PS 9.1.6 Parking Facilities

The Contractor will be required to provide one covered parking bay for the Engineer.

PS 9.1.7 Engineer's Transport

The Contractor will not be required to provide transport for the Engineer's staff.

PS 9.1.8 Security

The Contractor will be responsible for providing adequate security for the Works and for the site establishment. All costs associated with the provision of security staff shall be borne by the Contractor and should allowed for in the rates tendered for items in the Schedule of Quantities. No additional payments will be made for security measures taken during the contract period, other through the schedule items in the Schedule of Quantities.

PS 9.1.9 Contract staff to assist the Engineer

The following staff will be recruited by the contractor to assist the Engineer in carrying out his services:

Description of Staff	Nº Required	Remarks
Environmental Monitoring	One	Provisional sum provided for appointment as directed by the Engineer. Personnel directed by and report to Engineer
Occupational Health & Safety Monitoring	One	
Technical Assistant	One	
Community Liaison Officer	One	

The required personnel will be identified by the Engineer and will report to the Engineer. Provisional Sums and the relevant mark-up Items are provided for in the Schedule of Quantities to cover these costs.

PS 9.1.10 Survey Equipment

The contractor shall provide the following survey equipment, in good condition, for use by the Engineer throughout the duration of the contract:

- A dumpy level
- Measuring tape
- An assistant, when required, to assist the Engineer to operate survey equipment, when provided.

PS 9.1.11 Project Nameboard

The contractor shall supply, erect, and maintain the project nameboard for the duration of the project. The board will be as per issued detail and any deviations from such detail will result in the item not being paid for by the Engineer.

PS 10. EXISTING SERVICES

PS 10.1 Care, Damage and Protection

Known services will be indicated in the tender and contract documents. The Contractor will be responsible for identifying all services with the relevant Service Providers.

The Contractor shall familiarize himself with all services and expose them at the start of the Contract to verify their position and establish their depths.

No additional payment will be made to the Contractor for identifying and locating services. Therefore, the Contractor will have to include the costs thereof in the scheduled items in the Schedule of Quantities.

Any information regarding existing services is given in good faith and without guarantee.

PS 10.2 Blasting

No blasting will be permitted unless the Contractor can satisfy the Engineer that his proposed blasting methods and controls are such that no damage will be caused to the adjoining building structures, pipelines, or services. In any event the Engineer will require the Contractor to plan and execute each blast in such a manner as to ensure that no damage will be caused to any structure, pipeline, or service.

In addition, the Engineer will require vibro-recordings to be taken at no additional cost to the Employer. No blasting is to be carried out in Eskom servitudes or wayleaves unless the Eskom authorities have been advised in writing three weeks prior to blasting. Where blasting is done adjacent to Eskom power lines, the Contractor shall arrange for a representative of Eskom to be present prior to and during any blast.

PS 10.3 Environmental Aspects

The Contractor will be required to plan and undertake his work in a manner that minimises its impact on the natural environment. Trees and other vegetation shall, wherever possible, be left undisturbed. Trees that are marked by the Engineer shall not be damaged and in the event of the Contractor doing so, a penalty will be deducted from monies due to the Contractor.

Every effort shall be made by the Contractor to prevent pollution of the adjacent areas and river and to reduce the noise, dust and fumes emanating from his construction activities.

PS 10.4 Dealing with Water

Where necessary, the Contractor shall construct temporary drainage channels to divert ground water from his excavation and excess water must be pumped out.

No compensation for any variation of the actual conditions during construction from the data given will be considered. Neither will additional compensation be considered for data omitted or inaccurately given.

The rates tendered shall allow for the requirements of this clause and all incidentals.

The Contractor shall include with his tender a preliminary programme on the prescribed form to be completed by all Tenderers. The programme shall be in the form of a simplified bar chart with sufficient details to show clearly how the works will be performed within the time for completion as stated in the Contract Data.

In drawing up his programme, the tenderer is to consider the following:

Permissible period of downtime of the existing water pipeline to allow the contractor to make the necessary interconnections: 09:00 up to 16:00, i.e. 7 hours, during the day.

The water pipelines must be operational every day except for the period mentioned above.

The water pipelines are currently in use.

The Employer shall be responsible for the operation of all valves and its water supply system.
The Contractor shall not operate any valve unless the Contractor has received from the Engineer prior written permission to do so which permission shall be limited to a specific time and operation in each case unless expressly stated to the contrary in writing by the Engineer.
It shall be the responsibility of the Contractor to give prior written notice timeously (min 2 working days) to the Engineer in every case in which the Contractor may request valve operation or prevention of valve operation by the Employer.

The Employer cannot guarantee watertight closing of valves; it shall be the responsibility of the Contractor to do and provide everything necessary for the timeous, efficient and safe disposal of all water which may leak through closed isolating valves and thence into places from which, in the opinion of the Engineer, the leaking water has to be removed for good reason. (The Engineer shall certify extra payment in respect of the costs of such valve-leakage-water disposal measures as in his opinion could not reasonably have been avoided or reduced.)

The Contractor shall be deemed to have allowed fully in his tendered rates and prices as well as in his programme for all possible delays due to normal adverse weather conditions and special non-working days as specified in the Project Specifications and in the Contract Data.

Where necessary, the Contractor shall construct temporary drainage channels to divert ground water or leakage from non-closing valves and fire hydrants from his excavation and excess water must be pumped out.

No compensation for any variation of the actual conditions during construction from the data given will be considered. Neither will additional compensation be considered for data omitted or inaccurately given.

PS 10.5 Servitudes and Rights of Way

The Employer will, where necessary, obtain permanent servitudes and rights of way along the road routes indicated on the tender drawings. New servitudes will only be registered after completion of the Works.

PS 10.6 Dealing with Damaged Services

In the event of any service being damaged or accidentally disconnected for any reason, the Contractor shall immediately contact the relevant authority for instruction and shall report the occurrence of the incident. The damage is to be repaired as soon as possible to the approval of the Engineer and the authority. The Contractor will be held responsible for paying all costs incurred by the authority or himself as a result of each such incident, where relevant.

PS 10.7 Accommodation of Traffic

The Contractor shall ensure the safe and expeditious passage of traffic at all times and shall provide all necessary temporary road traffic signs, barricades, flagmen, etc to safeguard the travelling public. Any detours or bypasses constructed by the Contractor shall be adequately signposted, as per the South African Road Traffic Signs Manual, and maintained in such a manner as to provide safe and easy passage of traffic.

PS 10.8 Spoil Material

No indiscriminate spoiling of material will be allowed. All surplus or unsuitable material shall be spoiled, levelled and spread in designated areas as directed by the Engineer. All haul will be regarded as free haul.

PS 10.9 Finishing and Tidying and Defects Liability Period

On no account must rubble and spoil materials, other materials, equipment or unfinished operations be allowed to accumulate in such a manner as to unnecessarily impede the activities of other Contractors or Authorities.

Finishing and tidying must not simply be left until the end of the construction period. The Contractor will be entitled, subject to prior agreement with the Engineer and within reasonable limits, to request that work in a particular area and/or work of a particular discipline, be inspected for partial completion. The specified defects liability period in respect of any specific section of the Works shall commence on the date on which the relevant section is accepted by the Engineer as being completed, i.e., fully commissioned, including finishing and tidying.

On completion of the Contract the Contractor shall ensure that all materials used in the construction of the temporary Site office, workshop and storage yard are removed from Site. Waste materials such as construction debris and soil contaminated with oil and fuel are to be disposed of at the solid waste disposal site used approved by the Engineer. Prior to the handover of the Site to the Employer, the Contractor and the Engineer will conduct a post construction audit to determine if any additional measures that are to be taken. The Completion Certificate will only be issued after this stage.

PS 10.10 Employee Accommodation

(See Subclause 3.2.1 of Section A of Part 2 and Subclause 1.2.1 of Section A of Part 3 of SABS 0120)

The Contractor shall conform in all respects with the provisions of any Act, Regulations or By-Law of Rustenburg Local Municipality, which may be applicable to employee accommodation. Save for a security guard on active duty, no employees may be housed on Site or the Contractor's campsite after normal working hours.

PS 10.11 Employment of Local Labour

The Employer has determined that 100% of the Contractor's unskilled labour force shall be made up from the local community. A labour sub-committee (of a Project Steering Committee) comprising representatives of the community and other stakeholders will be responsible for the recruitment of all local labour. The Contractor will be required to provide details of the numbers of semi-skilled and unskilled workers he will require, together with their anticipated starting dates. The PSC through its labour sub-committee will then make this labour available to the Contractor.

A minimum of 50% of the local labour shall comprise of women and, where appropriate, disabled labour shall be employed. It is a requirement that tenderers acquaint themselves fully with requirements for registration with Unemployment Insurance Fund.

The Employer requires that the successful contractor registers all labour with the Unemployment Insurance Fund. The Contractor shall adhere to "The national minimum wage determined by the Minister in accordance with the National Minimum Wage Act (NMWA)", and yearly pronounced increases for duration of contract. (Currently R 23.19 for each ordinary hour worked).

During project execution, the successful contractor will be required to provide progress reports indicating to what level these requirements have been met.

PS 10.12 EPWP Construction Methods

EPWP construction methods will be utilized on this contract in order to generate employment opportunities for the local community.

PS 10.13 Frequency of Labour Wages Payments

The contractor will be required to pay labour on a fortnightly basis.

PS 10.14 Training and Capacity Building

During project execution, it is the desire of the Employer that an identified number of community members receive appropriate level of non-accredited training in either pipe laying activities or construction management activities. Within 14 days of appointment, the successful contractor will be required to provide, together with his method statement, a proposal for consideration by the Project Steering Committee for activities in which the community members can receive training. This proposal will be considered by the Project Steering Committee after which the Contractor will be given an instruction on the training to provide. Training will be provided to local labour that is already in the employ of the contractors as per clause PS 10.11. It must be noted that the Contractor will be required to pay the labour based on their daily rates indicated in PS 10.11.

Should the contractor fail to provide this training, the Employer reserves the right to seek training from alternative sources. In that case, the cost of the training sought will be deductible from any monies due to the contractor.

PS 10.15 Contractor Participation Goal (CPG) Partner

The Employer will require that the contractor utilize a CPG partner on the contract as part of development of emerging contractors. The CPG partner will be approved by the Employer and will be required to undertake 30% of the scope of work. Should the contractor be unable to provide a CPG partner, the Employer will provide one on this contract.

PS-11 REQUIREMENTS FOR ACCOMMODATION OF TRAFFIC

PS-11.1 General

The Contractor will be responsible for the safe and easy passage of public traffic past and on sections of roads of which he has occupation or where work has to be done near traffic.

Accommodation of traffic, where applicable shall comply with SANS 1921-2: 2004: Construction and Management Requirements for Works Contracts, Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor. The Contractor shall obtain this specification from Standards South Africa if accommodation of traffic will be involved on any part of the construction works.

PS-11.2 Basic Requirements

The travelling public shall have the right of way on public roads, and the Contractor shall make use of approved methods to control the movement of his equipment and vehicles so as not to constitute a hazard on the road.

The Contractor shall ensure that all road signs, barricades, delineators, flagmen and speed controls are effective and that courtesy is extended to the public at all times.

Failure to maintain road signs, warning signs or flicker lights, etc, in a good condition shall constitute ample reason for the Engineer to suspend the work until the road signs, etc, have been repaired to his satisfaction.

The Contractor may not commence constructional activities affecting existing roads before adequate provision has been made to accommodate traffic in accordance with the requirements of this document and the South African Road Traffic Signs Manual.

The Contractor shall construct and maintain all temporary drainage works necessary for temporary deviations.

The Contractor shall provide and grant access to persons whose properties fall within or adjoin the area in which he is working.

PS-11.3 Traffic Safety Officer

Where warranted by traffic conditions on or near the site, the Contractor shall nominate a suitable member of his staff as traffic safety officer to be responsible for the arrangement and maintenance of all the measures for the accommodation of traffic for the duration of the project. Duties of the traffic safety officer shall be as set out in SANS 1921 Part 2 and shall also be in compliance with the Occupational Health and Safety Act No 85 of 1993 and the Construction Regulations 2003.

PS-11.4 Payment

The Contractor's tendered rates for the relevant items in the Bill of Quantities shall include full compensation for all possible additional costs which may arise from this, and no claims for extra payment due to inconvenience as a result of the modus operandi will be considered.

Items that may be considered for payment are specified in SABS 1200 Standardized Specifications and the related project specification.

PS-12 OCCUPATIONAL HEALTH AND SAFETY (Read with SANS 1921 - 1: 2004 clause 4.14)

PS-12.1 General statement

It is a requirement of this contract that the Contractor shall provide a safe and healthy working environment and to direct all his activities in such a manner that his employees and any other persons, who may be directly affected by his activities, are not exposed to hazards to their health and safety. To this end the Contractor shall assume full responsibility to conform to all the provisions of the Occupational Health and Safety Act No 85 and Amendment Act No 181 of 1993, and the OHSA 1993 Construction Regulations 2003 issued on 18 July 2003 by the Department of Labour.

For the purpose of this contract the Contractor is required to confirm his status as mandatary and employer in his own right for the execution of the contract by entering into an agreement with the Employer in terms of the Occupational Health and Safety Act by executing the Agreement form C1.2.4 included in Section C1: Agreements and Contract Data.

PS-12.2 Health and Safety Specifications and Plans to be submitted at tender stage

a) Employer's Health and Safety Specification

The Employer's Health and Safety Specification will be included in the tender documents as part of the Project Specifications.

b) Tenderer's Health and Safety Plan

The successful Tenderer shall, on receipt of notification that he has been awarded the contract, submit without delay his own documented Health and Safety Plan for the execution of the work under the contract. His Health and Safety Plan must at least cover the following:

(i) a proper risk assessment of the works, risk items, work methods and procedures in terms of Regulations 7 to 28;
(ii) pro-active identification of potential hazards and unsafe working conditions;
(iii) provision of a safe working environment and equipment;
(iv) statements of methods to ensure the health and safety of subcontractors, employees and visitors to the site, including safety training in hazards and risk areas (Regulation 5);
(v) monitoring health and safety on the site of works on a regular basis, and keeping of records and registers as provided for in the Construction Regulations;
(vi) details of the Construction Supervisor, the Construction Safety Officers and other competent persons he intends to appoint for the construction works in terms of Regulation 6 and other applicable regulations; and
(vii) details of methods to ensure that his Health and Safety Plan is carried out effectively in accordance with the Construction Regulations 2003.

The Contractor's Health and Safety Plan will be subject to approval by the Employer, or amendment if necessary, before commencement of construction work. The Contractor will not be allowed to commence work, or his work will be suspended if he had already commenced work, before he has obtained the Employer's written approval of his Health and Safety Plan.

Time lost due to delayed commencement or suspension of the work as a result of the Contractor's failure to obtain approval for his safety plan, shall not be used as a reason to claim for extension of time or standing time and related costs

PS-12.3 Cost of compliance with the OHSA Construction Regulations

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming to the requirements of the Act, the Construction Regulations and the Employer's Health and Safety Specification as applicable to this contract. Should the Contractor fail to comply with the provisions of the Construction Regulations, he will be liable for penalties as provided in the Construction Regulations and in the Employer's Health and Safety Specification.

Items that may qualify for remuneration will be specified in the Safety Specifications included or in the Project specifications.

PS-13 ADVERSE WEATHER CONDITIONS

In terms of Clause 5.12.2 of the General Conditions of Contract, extension of time will be considered for abnormal rainfall. The numbers of days per month on which work is expected not to be possible as a result of normal rainfall, and for which the Contractor shall make provision in his tendered rates, prices and programme, are listed in Table PS-13 hereafter. Only the number of days lost as a result of adverse weather conditions, exceeding the number of days listed in Table PS-13.1, will qualify for consideration of extension of time.

During the execution of the Works, the Engineer's Representative will certify a day lost due to abnormal rainfall and adverse weather conditions only:

if no work was possible on the relevant working day on any item which is on the critical path according to the latest approved construction programme; or

if less than 30% of the work force and plant on site could work during that specific working day.

Extension of time as a result of abnormal rainfall and adverse weather conditions shall be calculated monthly being equal to the number of working days certified by the Engineer's Representative as lost due to rainfall and adverse weather conditions, less the number of days allowed for as in Table PS-13, which could result in a negative figure for certain months. The total extension of time as a result of abnormal climatic conditions for which the Contractor may apply, shall be the cumulative algebraic sum of the monthly extensions. Should the sum thus obtained be negative, the extension of time shall be taken as nil."

Table PS-13: Expected No of Working Days Lost Monthly Due to Normal Rainfall

Month	Number of working days expected to be lost due to climatic conditions	Average rainfall (mm)	Month	Number of working days expected to be lost due to climatic conditions	Average rainfall (mm)
January	12	251.44mm	July	1	28.11mm
February	9	224.49mm	August	2	42.67mm
March	6	137.86mm	September	3	48.63mm
April	5	82.51mm	October	5	121.65mm
May	2	34.67mm	November	6	150.12mm
June	1	24.69mm	December	9	228.42mm

(Based on information obtained from the Weather Bureau, Department of Environment Affairs. The average monthly rainfall figures quoted, are included for information only, and shall not be taken into consideration for calculation of extension of time.)

PS-14 SITE MEETINGS AND REPORTING

The Contractor will be required to attend site meetings organized by the Engineer. In these meetings he (the Contractor) will be required to provide progress reports and other reports to monitor the outputs of the contractor, as may be required from time to time, to be presented in a format prescribed by the Engineer. The frequency of such meetings will be monthly, as a minimum. However, the frequency can be reviewed, depending on the progress of the contract.

PS-15 PREFERENTIAL PROCUREMENT

For the purpose of this contract the Contractor shall comply with the preferential procurement statement provided in F.3.11 and T2.2 of the Tender Data.

PROJECT SPECIFICATION

PORTION 2: AMENDMENTS TO THE STANDARD AND PARTICULAR SPECIFICATIONS

INTRODUCTION

In certain clauses the standard, standardized and particular specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in this part of the project specifications. It also contains additional specifications required for this particular contract.

The number of each clause and each payment item in this part of the project specifications consists of the prefix PS followed by a number corresponding to the number of the relevant clause or payment item in the standard specifications. The number of a new clause or payment item, which does not form part of a clause or a payment item in the standard specifications and which is included here, is also prefixed by PS, but followed by a new number which follows on the last clause or item number used in the relevant section of the standard specifications.

SABS 1200 PSA: GENERAL

PS A3 MATERIALS

PS A3.1 Quality

Where there is a standardization mark programme for any material, all such material supplied shall bear the official standardization mark.

Alternative materials or equipment proposed by the Contractor shall be tested. The test, as well as the materials or equipment, shall be approved by the Engineer prior to any such materials or equipment being built into the works and all costs involved in testing shall be deemed to be included in the rates tendered.

PS A3.3 Applicable Standards for Cement (Additional Sub clause)

The standard cement specifications SABS 471, SABS 626, SABS 831 and SABS 1466, referred to in clause 3.3, have been withdrawn and are replaced by the new SANS 50197-1 and -2: Common cements, and SANS 50413-1 and -2: Masonry cement. These specifications will be applicable to this contract, and the descriptions and types of cements specified, will be based on the designations as defined in these specifications.

PS A4. PLANT

PS A4.2 Contractor's Office, Stores and Services

The Contractor's camp shall be kept neat and clean at all times and all surplus or rejected material shall be removed from the site.

PS A5 CONSTRUCTION

PS A5.1 Survey

PS A5.1.1 Setting Out of the Works

Substitute the first sentence in A 5.1.1 with the following:

"Setting out of the works is the sole responsibility of the Contractor and shall be done from survey beacons identified by the Engineer. The Contractor shall, within two (2) weeks after the site has been handed over to him, confirm himself that the survey beacons are correct. Any discrepancy shall immediately be reported in writing to the Engineer. Any costs or subsequent costs arising from discrepancies, which had not been reported to the Engineer within the aforementioned period, shall be the sole responsibility of the Contractor. A grid of final terrace levels over the site of the works will be issued to the Contractor at the commencement of the contract and it is the Contractors responsibility to preserve all setting out pegs based on this information as given for the duration of the contract."

PS A5.4 Protection of Overhead and Underground Services

Add the following paragraph:

" The Contractor shall as soon as possible after handing over of the site, commence with the detection to existing services, continue with it without interruption, and finalize it at least 7 days before excavation starts at that particular section."

PS A5.8 Ground and access to works

Add the following:

" On completion of operations the Contractor shall restore the ground surface, wherever it may have been disturbed, to its original condition by filling in all ruts with material similar to the material within

the rut and levelling the ground and, where necessary, planting grass and shrubs as may be required. Any boundary fences which have been removed or damaged by his operations and activities shall be repaired and/or reinstated at the Contractor's expense".

PS A5.9 Accommodation of Traffic (additional subclause)

Where construction work has to be carried out on or near public roads, the Contractor shall deal with traffic as specified in SANS 1921-2 (2004): Construction and Management Requirements for Works Contracts, Part 2: Accommodation of Traffic on Public Roads occupied by the Contractor. The Contractor is also referred to Project Specification PS-10.

PS A8. MEASUREMENT AND PAYMENT

PS A8.3 Scheduled fixed-charge and value-related items

PS A8.3.2 Establishment of Facilities on the Site

PS A8.3.2.1 Facilities for the Engineer

Add the following additional subitems:

(a)	Furnished Office (1 No.)	Unit: Sum
(b)	Nameboard (1 No.)	Unit: Sum
(d)	Carports (state number)	Unit: Sum

The tendered rate shall cover all costs as specified in Subclause 8.3.2.3 of SABS 1200 A (and 5.5 of SABS 1200 AB to provide these facilities as specified in Clauses PSAB-3.2, 3.3 and 4.2. if applicable).

PS A8.3.2.2 Facilities for Contractor

The tendered rate shall cover all costs as specified in Subclause 8.3.2.3 of SABS 1200 A for the provision of facilities specified in Clauses PS A8.3.2.2.

PS A8.4 Scheduled time-related items

PS A8.4.5.2 Implementation of Health And Safety Plan

The unit of measurement for item A1.5 and A1.6 shall be the month, or part thereof for the duration of the approved contract period. Part of a month shall be calculated to two decimal places. The contract rate shall include full compensation for implementing the health and safety plan, including the provision of a dedicated, full time health and safety officer, carrying out all the required site health and safety training and briefings, staff medical evaluations, monitoring and administrating the health and safety plan and for supplying all transport, personal protection safety items, other health and safety equipment, safety notices and any other health and safety related items that are required.

PS A.8.3.1 & PS.8.4 Preliminaries and General (Fixed charge obligations and Time-related obligations)

Payment of the lump sums tendered under Item, PSA8.3.1 and the sum for Item (PS.8.4) PSA8.4.1, shall, for the contractor's general obligation together, include full compensation for all the contractor's charges in respect if the following items, collectively termed the "contractor's general obligations".

(i) Setting up and maintaining his organization, personnel, camps, accommodation, ablution and other facilities, offices, stores, workshops, other temporary structures, fencing, testing facilities and construction plant on the site and their removal on completion of the contract.

(ii) Complying with the requirements of the general conditions of contract including the effecting of the insurances and providing the sureties required.

(iii) All general site and office overheads, profit, financing costs, risks, legal and contractual responsibilities and other costs and obligations of the preliminary and general nature which are not specifically measured for payment under any other items of payment.

The lump sum tendered under Item PSA8.3.1 shall represent full compensation for the fixed part of the contractor's general obligations, i.e., that part which is substantially fixed and is not a function of the time required for the completion of the contract or of the value of work.

Payment of these lump sums will be made in three instalments, as follows:

(i) The first instalment, 50% of the lump sum, will be paid in the first payment certificate after the contractor has met all his obligations under this section and has made a substantial start with construction in accordance with the approved programme.

(ii) The second instalment, 35% of the lump sum, will be paid when the value of work done reaches one half of the tendered amount, excluding contingencies and price adjustments.

(iii) The third and final instalment, 15% of the lump sum, will be paid when the works have been completed and the contractor has fulfilled all the requirement of this section.

Before any payment is made under this item PSA.8.3.1 the contractor shall satisfy the engineer that they have provided camps and constructional plan of good quality on the site, the value of which exceeds that of the first instalment.

The contractor may also be required to furnish documentary proof that they own the camps and constructional plant, the engineer shall have the right to withhold parts of any payments to be made under this subitem, until the works have been completed.

The tendered sum for subitem item (PS.8.4) PSA.8.4.1 represents full compensation for that part of the contractor's general obligations which are mainly a function of construction time. The tendered rate will be paid monthly, pro rata for parts of a month, from the date of which the contractor has been granted access and possession of site in terms of clause 5.4 of the general condition of contract for construction works 2015 (GCC2015), until the end of the period of for the completion of the works, plus any extension thereof as provided in clause 5.12 of the GCC2015 provided that:

Should the works be certified as having been completed before the contractual date for completion of the works, the contractor will then be entitled to payments regarding the unexpired period for completion. Should the progress of the contractor in terms of the value of work done be in arrear in relation to their approved original programme, payments in respect of this item may be limited to payments for this period, which in his original programme (after suitable adjustments in respect of the extension of time) agree with the actual value of work done.

In the event of Extension of Time, Clause 6.6.2 of the GCC 2015 will be applicable for time-related obligations (PS8.4) (i.e., the Contractor will be required to provide rate breakdown and as such, be paid a proven cost determined by the Engineer).

PS A8.5 Preliminaries and General (Provisional Sums).

The provisional sums as included in the bills of quantities by the Employer's Agent under this section shall be utilized only as directed by the Engineer on site in the form of an instruction. The instruction will

detail the works to be carried out and the respective provisional item from which the tenderer will be compensated.

Prior to the execution of the works, the tenderer shall submit to the Engineer on site, the amount required for the execution of such works excluding handling, profit, and all other charges.

Payment
Payment will be for the amount as agreed between the Engineer on site and the tenderer including the handling cost, as billed separately as a percentage (%) based on the agreed amount for the executed works and not the full amount as provisioned on the bills of quantities.

Binding Remedial Action for omitted Provisional Sums
The provisional sums stated by the Employer's Agent on items A3.1 to A3.14 and A4.3.1 are for critical works, and statutory requirements which form part of the contract. It is incumbent on the Tenderer that the total Tender Sum as transferred to the Form of Offer includes these provisional sums. Should the tenderer omit/not include these provisional sums in the Tender Sum and Form of Offer, and is awarded tender the following shall apply:

- The tenderers will be instructed to re-balance the tendered rates under the following specific rules:
  - When re-balancing the rates the tenderer shall **not omit** and or alter any of the Provisional Sums stated by the Engineer in the bills of quantities,
  - When re-balancing the rates the tenderer shall **not unrealistically lower** the key tendered rates for critical works, as this will inevitably increase the commercial risk of the project,
  - When re-balancing the rates the tenderer shall **not increase** of any originally tendered rates,

PS A8.8 Temporary Works

The sums tendered under items PS A8.8.1, 8.8.2 and 8.8.7 shall be used only as directed by the Engineer on site. The cost of executing the related works shall be quantified and the tenderer will be compensated based on that cost or amount and not on the full tendered sum. Payment shall include the tenderers handling fee, profit, and all other charges.

SABS 1200 PSD: EARTHWORKS

PSD-1 EARTHWORKS

The Contractor is referred to SANS 1921 - 5: Earthworks activities which are to be performed by hand.

PSD-3 MATERIALS

PSD-3.1 Classification for excavation purposes

PSD-3.1.2 Classes of excavation

The classes of excavation in clause C.1.2 shall in general apply to all excavations where use is made of conventional methods and plant and equipment.

Where labour-intensive methods applicable to targeted labour are specified, soft excavations shall be defined as follows:

“PSD-C.1.2(a) Soft excavation

Soft excavation for labour-intensive work where excavations are to be carried out by hand methods, shall be excavation in material that can be efficiently removed and loaded with picks, shovels and other hand tools by an average able-bodied person or group of persons. Soft excavation shall include small boulders that can be removed by hand methods. All intermediate excavation will be classified as soft for this contract

Soft excavation can be further broken down by introduction of an additional class such as “Soft Excavation Class A”, which is excavation defined as soft, but which can only be excavated with difficulty.

The criteria for classifying Soft Excavation Class A shall be as follows:

Granular material: - dense material with high resistance to penetration by the point of a geological pick; several blows are required for removal of material; 7 to 15 blows of the dynamic cone penetrometer are required to penetrate 100 mm; and

Cohesive materials - stiff to very stiff material requiring 6 to 8 blows of the dynamic cone penetrometer to penetrate 100 mm, where:

"stiff" material can be indented by thumbnail; slight indentation produced by pushing a geological pick point into the soil; cannot be moulded by fingers; and where:

"very stiff" material can be indented by thumbnail with difficulty; slight penetration of point produced by blow of geological pick.

Where soft excavation class A material is encountered, it shall be measured and paid for as an extra over soft excavation.

PSD-5 CONSTRUCTION

PSD-5.1 Precautions

PSD-5.1.1 Safety

PSD-5.1.1.2 Safeguarding of excavations

Add the following subparagraph:

"(g) The Contractor or his agent or his representative shall not require or allow any person to work under unsupported overhanging material or in an excavation which is more than 1,5 m deep, and any excavation which has not been adequately supported or braced if there is a danger of the overhanging material or the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question."

PSD-5.2.2.1 Excavations for general earthworks and for structures

Add the following additional subparagraph:

"(f) The Contractor shall so plan his cut-to-fill operations that all excavated material is used in the manner that is most appropriate.

The Contractor shall conserve all suitable surplus material and he shall not borrow, spoil or waste any material unnecessarily. If excavated material designated for a particular purpose become contaminated, is incorrectly used or becomes unavailable through injudicious planning of excavation operations, the Contractor shall replace the contaminated material and make good any shortfall with material of quality at least equal to that of the said selected material.

Where selection of excavated material is required, the method of excavation shall be so arranged as to avoid double handling. Wherever possible excavated material shall be placed in its final position without being stockpiled. If stockpiling is unavoidable, materials intended for different uses shall be stockpiled separately

PSD-8.3.1.2 Remove topsoil; to nominal depth of 150mm, stockpile and maintain

Note the following:

Rate shall be deemed to include the preparations, composting and re-laying of maintained in-situ topsoil as directed by the Engineer on site.

PSD-8.3.9 Extra over item 8.3.9

Note the following:

Backfill using material form commercial sources to underside of pumpstation sump to a nominal depth of 500mm. Import material to be G5 compacted to 95% of Mod AASHTO density.

SABS 1200 PSD: EARTHWORKS (PIPE TRENCHES)

PSDB-5 CONSTRUCTION

PSDB- 5.1 Precautions

PSDB-5.1.5 Trench Excavations (additional subclause)

The precautions for excavations as specified in Clause 5.1.1 of Section 1200 D, 1200 DA, and the relevant clauses in PSD and PSDA, shall also apply to all trench excavations.

The Contractor shall take all the steps necessary to ensure that no person is required or allowed to work in a trench or any other unsupported overhanging excavation which is more than 1,5 m deep, and any excavation which has not been adequately supported, shored or braced if there is any danger whatsoever of the sides of the excavation collapsing. The support, shoring or bracing to be designed and constructed by the Contractor, shall be strong and sturdy enough to support the sides of the excavation in question.

PSDB-8.3.6 Finishing
PSDB-8.3.6.1 Reinstate road surfaces complete with all courses.

The tenderer shall provide G7 material obtained from a commercial source in order to eliminate the need to sample and test materials obtained from local borrow pits and in the event that there is no type G7 materials in the local borrow pits. The G7 material shall be stabilized with 3 percent cement and be compacted to a minimum of 95% Mod AASHTO density.

The unit of measure shall be m^3 and the tendered rate include the cost of cement, placing, mixing, compacting and testing.

SABS 1200 GA: CONCRETE (SMALL WORKS)

PS GA-3 MATERIALS

PS GA-3.2 Cement

PS GA-3.2.1 Applicable specifications

The standard cement specifications SABS 471, SABS 626, SABS 831, SABS 1466 and SABS 1491, have been withdrawn and are replaced by SANS 50197-1: Common cements, and SANS 50413-1: Masonry cement. These specifications will be applicable to this contract and the descriptions and types of cements, where specified, will be based on the designations as defined in these specifications.

PS GA-5.4.1.4 Prescribed mix concrete

Add the following:

"The structural concrete in this contract shall comply with the following specification.

The minimum 28-day strength shall be as specified in drawings
The maximum water/cement ration shall be 0.42
The minimum cement content shall be 400 kg/m3
The cement used must be extended with a minimum of 30% Fly Ash or 50% GGBS

A detailed mix design by an approved concrete testing laboratory before any concrete is poured in the works and provision shall be made by the contractor for the cost of the design in his rates.

PS GA-8: MEASUREMENT AND PAYMENT

PS GA-8.1 Measurement and rates

PS GA-8.1.2 Reinforcement

Replace subclause 8.1.2.2 with the following:

PSGA-8.1.2.2 Mild steel and high tensile steel will be measured by mass for the diameters or range of diameters as scheduled.

Welded mesh will be scheduled separately for each type and mass per square metre of mesh."
Replace subclause 8.1.2.3 with the following:

"PSGA-8.1.2.3 The unit rate for steel bars shall cover the cost of supply, cutting, bending, placing in position, and fixing of the reinforcing and supporting steel scheduled. The rate shall also include the provision of all spacer devices and binding wire, as well as the cost of tests in terms of SANS 920.

The unit rate for welded mesh shall cover the supply, cutting and placing of mesh, as well as the cost of all waste due to laps."

SABS 1200 LB: BEDDING (PIPES)

PS LB 3.3 BEDDING

Add the following to LB 3.3:

All pipes shall be classified as rigid pipes and shall be laid on a Class C bedding except sub soil drainage, which shall be classified as flexible pipes.

PS LB 5 CONSTRUCTION
PS LB 5.1 General
PS LB 5.1.4 Compacting

Substitute "90 % of mod AASHTO" in LB 5.1.4 with "93 % of mod AASHTO (100 % for sand)".

PS LB 8 MEASUREMENT AND PAYMENT
PS LB 8.2 Scheduled Items
PS LB 8.2.2.4 From stockpile (provisional)

a) Selected granular material Unit : m3

b) Selected fill material Unit : m3

The rate shall cover the cost of obtaining, handling and transport regardless the distance, of the required bedding material from the stockpile, the delivery thereof at positions that are spaced along the trench in such a way as suits the working method of the Contractor, as well as the removal of material displaced by this importation within the free-haul distance.

SABS 1200 LD: SEWERS

PSLD 2.3 DEFINITIONS

Add to the Sub-Clause:

Normal Blasting

The method which an experienced blaster employs when carrying out general blasting of hard rock material in trenches.

Close Proximity Blasting

The method which an experienced blaster employs when carrying out blasting of hard rock close to adjacent service or structures requiring additional but smaller charges in order to break up the hard rock without damaging the adjacent services or structures.

PSLD 3 MATERIALS

PSLD 3.1.1 Vitrified Clay Pipes

Delete Sub-Clause 3.1.1.2 and substitute:

Vitrified clay sewer pipes shall be plain ended "Vitro" (or equal) pipes having a crushing strength of at least 45Kn/m. The joints of pipes of 100mm and 150mm diameter shall comprise natural rubber rings within polypropylene couplings.

PSLD 3.1.3 FC Pipes

The FC pipes and fittings comply with the applicable requirements for Series 4 pipes as set out in SABS 819.
The FC pipes and couplings shall be bitumen dipped.

PSLD 3.4 Bedding

Bedding of sewers shall be for flexible pipes (SABS 1200 LB) or concrete encased.

PSLD 3.5.2 Precast Concrete Manhole Sections

Add the following end of the Sub-Clause:

Joints between all wall sections and under roof slab shall be primed and sealed with a plasticized butyl rubber compound ("Bltujoint Putty" by ABE or similar approved) complete with one layer of 200mm wide compatible PVC tape and primer (similar or equal to the "Corro Clad" system supplied by Denso South Africa (Pty) Ltd) to be supplied and applied circumferentially to the outside of each wall section joint.

PSLD 3.5.6 Mortar

Delete the sub-clause and substitute the following:

Mortar for brickwork and, where so ordered by the Engineer, for external plasterwork to manholes shall be composed of one part of cement to three parts of clean pit sand. Mortar for the internal plasterwork to manholes where ordered and to the benching within manholes shall be composed of one part of cement to three parts of sand.

PSLD 3.5.8 Manhole Covers and Frames

Add to the first paragraph of the Sub-Clause:

After installation all exposed portions of the CI cover and frame shall be thorough cleaned and painted with two coasts of approved epoxy tar, particular attention being paid to the painting of the underside of the covers and frames.

Precast concrete manhole covers slabs, adaptor slabs and lids shall comply with the applicable requirements of SABS 1294 and to the details shown on the drawings. The precast concrete cover slab shall be so designed as to withstand a point load in the centre, as specified in Clause 8.7 of SABS 1294, of 50 kN for light duty covers and 100Kn for heavy duty covers. The lifting lugs shall be made of 6mm dia grade 316 stainless steel rod. The openings and undersides of all covers and slabs be coated with two coats of "Proofex 3".

PSLD 4 PLANT

PSLD 4.1 Pipe Handling and Rigging Equipment

Add to the Sub-Clause

The Contractor will be responsible for clearing the areas required for pipe storage which shall include the removal of rock, stones and all combustible material. He shall also be responsible for maintaining the area in a clean and tidy condition for the duration of the Contract.

Upon delivery of the pipes, fittings, specials and valves, these will be inspected jointly by the Engineer's Representative and the Contractor. Any pipes, etc. found to be damaged shall be returned to the factory for repair or replacement; in which case the costs of additional transport, repair or replacement shall be borne by the Contractor.

The Contractor will be held fully responsible for the care and safety of all pipes and fittings, etc on site and shall bear the cost of all renewals which may be necessary to make good losses, damages or breakages. Furthermore, he shall fully responsible for handling and re-loading material at the storage areas and for transporting and offloading of all such materials to their correct places along the pipeline route.

PSLD 5 CONSTRUCTION

PSLD 5.4 Connections to Manholes

Add the following paragraph to the sub-clause:

The rates tendered for the construction of manholes are to include for whatever additional costs there may be over and above the tendered rates for the supply, lay, joint, bed and test pipelines, for the supply and fixing the short lengths of pipes entering and leaving manholes.

PSLD 5.6.1 General

The underside of all manhole roofs and edges of the access opening therein and precast concrete covers and lids shall be painted with two coats of "Proofex 3" as supplied by Fosroc (Pty) Ltd, P.O. Box 477, New Germany,3620, or similar approved rubberized bitumen coating so as to protect the concrete from the effects of sewage gases.
The tendered rates for manholes shall include for this work.

PSLD 5.6.5 Precast Concrete Manholes

In the first sentence, delete "Delete LD-5" and substitute with "with drawings"

PSLD 5.7 Concrete Casing to Pipes

Add to the sub-clause:

Concrete casing is to be of 20/19 grade concrete with a minimum thickness of 100 mm below, above top and on each side of the pipe as and where ordered by the Engineer.

PSLD 5.9.3 Recording Location

Delete the last sentence and substitute

The records shall be handed to the Engineer, in a form acceptable to the Engineer, at the time when the Contractor claims payment for the relevant work.

PSLD 6 TOLERANCES

PSLD 6.2 Overall Centre-line Control and Manhole Locations

In second line delete "+-300mm" and substitute "+-150mm"

PSLD 6.3 Manhole Invert-levels

In second line read "+- 25mm" for "+-50mm"

PSLD 7 TESTING

PSLD 7.1.4 Sub Clause

Delete the Sub-Clause and substitute the following:

The sewer, and the house connections along its length, shall be tested simultaneously between manholes or chambers, as applicable. The house connections and the section of the sewer under test shall be suitably "plugged" at the open ends using plugs or stoppers which have been braced adequately.

PSLD 7.2.2 Water Test

The Water Test will not be acceptable under this Contract.

PSLD 7.2.6 Watertightness Testing of Manholes

Wherever ordered in writing by the Engineer that a manhole is to be tested, it is to be tested in his presence or in the presence of his authorized representative, in the following manner.

All sewer inlets and outlets to and from the manhole shall be closed with expanding plugs or other apparatus. Water is then to be introduced into the manhole up to a level 25mm below the underside of the roof slab. The water level is to be maintained for not less than one hour or such longer periods as may be necessary to accurately record the rate of leakage, if any. Careful and accurate records shall be kept at frequent and regular intervals of the variation in the level of the water in the manhole and of the quantity of the water added so that the rate of leakage may be properly determined. In the event of the rate of leakage, if any, exceeding 1.25l/h/m of depth of manhole, or in the event of any weakness, defect or fracture or visible signs of leakage occurring in the manhole under test, the Engineer shall have the right to order the test to be discontinued and the Contractor shall thereupon, at his own expense, search for and rectify any weakness or defect in the manhole under test, such work or rectification to consist of repair or replacement or both. The manhole shall thereafter be refilled with water and retested in the manner specified. This process shall be repeated until a satisfactory test is obtained.
The Contractor will be paid once only for the hydraulic testing of any given manhole at the rate per manhole to be quoted by him in the Schedule of Quantities. The Contractor's prices for the hydraulic testing of manholes shall include for all arrangements for the supply of water for testing the cost of water used in testing where the water is not obtained free of cost from the Employer for all work of rectification for retesting and for all labour required to carry out the specified tests.

PSLD 8 MEASUREMENT AND PAYMENT

PSLD 8.2.5 Inspection Chambers

Delete the first and second lines and substitute the following:

Separate items will be scheduled for manholes, backdrops and inspection chambers, etc. of each type and of each depth (measured from top of cover to invert) in increments of 1.0m for the first one metre thereafter in increments of 0.5m. The rate shall cover the cost of dealing with any excavation (in all materials, including backfilling and the disposal of surplus materials).

PSLD 8.2.11 Connection to Existing Sewers

The tendered sum is to include for breaking into the existing sewer manholes, dealing with the flow, caulking in the new pipe and for breaking out and reforming benching as required, making the manholes watertight.

PSLD 8.2.13 Intermediate and Hard Rock Excavation (New Sub-Clause)

Insert new Sub-Clause as follows:

8.2.13 Extra over item 'Manholes' above for

Intermediate excavation ..... Unit : m3
Hard rock excavation by normal blasting or other methods as selected by the contractor (see PSLD 2.3) ..... Unit : m3
Hard rock excavation by close proximity blasting (see PSLD 2.3) ..... Unit : m3
Boulder excavation Class A ..... Unit : m3

Separate items will not be provided for depth increments. Volumes will be computed from the plan area of either the intermediate or hard rock material, excluding the plan area of the specified pipe trench, which is within the area occupied by the manhole plus a side allowance of 600mm and the depth from the top of either the intermediate or hard rock material to the bottom of the same material or to the underside of the Manhole base slab, whichever is the lesser.

The rates shall cover the additional cost of the excavation and handling of the more difficult material and the disposal of material.

SABS 1200 LE: STORMWATER DRAINAGE

PS LE 3 MATERIALS

PS LE 3.1.1 Material for Subsoil Drainage

PS LE 3.1.1.1 Pipes

Pipes for subsoil drainage shall be uPVC pipes complying with the requirements of SABS 791, but shall be perforated or slotted.

The size of perforations in perforated pipes shall in all cases be 8 mm in diameter ± 1,5 mm and the number of perforations per metre shall be not less than 26 for 110 mm pipes and 52 for 160 mm pipes. Perforations shall be spaced in two rows for 110 mm pipes and in three rows for 160 mm pipes.

Slotted pipes shall have a slot width of 8 mm ± 1,5 mm. The arrangement of slots shall be subject to the Engineer's approval, but the total slot area shall be not less than that presented for perforations.

Pipes without slots or perforations required for conveying ground water from the subsoil drainage proper to the point of discharge, shall be uPVC pipes as specified above.

PS LE 3.1.1.2 Crushed-stone

Crushed-stone in subsoil drains shall be 19 mm single-sized stone complying with the grading requirements of stone for concrete in SABS 1083.

PS LE 3.1.1.3 Geotextile Blanket

The geotextile blanket around subsoil drains shall comply with the requirements of PS DK 3.1.4 in all respects.

PS LE 3.1.1.4 Sand
Sand obtained from approved commercial sources shall be clean, hard and durable and shall comply with the following grading requirements:

D15 : 0,2 mm to 0,4 mm
D85 : 1,2 mm to 4,7 mm

PS LE 5 CONSTRUCTION

PS LE 5.1 Trench Bottom

PS LE 5.1.3 Unsuitable Founding Conditions

Substitute "90 % of MAASHTO maximum density" in LE 5.1.3 with "90 % of MAASHTO maximum density (100 % for sand)".

PS LE8.2 BEDDING AND LAYING

PS LE 8.2.14 Supply And Install Subsurface Drains According To Drawings Unit: m
The length shall be measured on the centre line of the completed subsurface drain.

The rate shall cover the cost of supplying, transporting, off-loading and installing all materials as well as for cutting, wasting, overlapping and installing of the materials where applicable.

C3.3: PARTICULAR SPECIFICATIONS

PARTICULAR SPECIFICATIONS: PA

BRICKWORK AND PLASTER

PA1 SCOPE

PA1.1 This specification covers the general requirements for buildings and other masonry structures, including plastering.

PA2 INTERPRETATION

PA2.1 Other relevant Standards/Specification

This specification should be read together with SABS 1200 AA.

PA2.2 Applicable Edition of Standards

Each standard specification referred to in this specification shall be deemed to be the latest edition, applicable on the tender closing date.

PA2.3 Definitions and Symbols

For purposes of this specification, the definitions and symbols given in the National Building Regulations and Building Standards Act, 1977 (referred to further on in this specifications as "Building Act"), where applicable, shall apply. (Definitions: pages 5 to 14, Symbols : page 23.)

PA3 MATERIALS

PA3.1 Cement

Cement shall conform to the requirements of SABS 471.

PS3.2 Lime

Lime shall be of approved manufacture, well burnt and of uniform quality conforming with SABS 523.

PA3.3 Sand

Sand to be used for mortar and plaster shall comply with the requirements of SABS 1090.

PA3.4 Clay Bricks

Clay bricks must conform to SABS 227. A sample of bricks to be used for construction must be given to Engineer for approval before construction bricks are delivered to site.

The contractor will be required to carry out necessary tests and provide certificates for compliance of the bricks with SABS 227. The cost of these tests will be deemed part of the scheduled rates and no additional payment will be made therefore.

Best quality engineering bricks shall be used for all foundation and concealed situations.

PA3.5 Damp-Proofing

Material used as a dampproof course shall conform to the requirements contained either in SABS 248 or in SABS 952. Type FV fibre-felt sheets or Type C polyethylene sheets shall be supplied under the contract.

PA3.6 **Fibre Cement Sheets**

Fibre cement flat sheets, minimum 15 mm thick, shall comply with the requirements of SABS 685.

PA3.7 **Storage**

PS3.7.1 **Cement and Lime**

Cement and lime stored on the site shall be properly protected against moisture to the satisfaction of the engineer.

PA4 **CONSTRUCTION**

PA4.1 **Brickwork**

Brickwork shall be well and regularly bonded, with no false headers and none but whole bricks except where legitimately required as closers. All bricks must be thoroughly dampened before laying and each brick is to be laid with full joints and pressed into its bed so as to squeeze out superfluous mortar and give a finished joint not exceeding 8 mm thick in the case of the face work or 13 mm thick in the case of plastered walls or work not exposed to view.

All joints, both horizontal and vertical, notwithstanding any grade custom to the contrary, are to be filled solid with mortar for their full width and depth, each course being flushed with mortar, worked well down into all vertical joints before the succeeding course is laid. Horizontal joints and vertical joints of face work shall be pointed flush in manholes and catchpits, but shall be pointed and finished with a tooled recessed joint elsewhere. Plastered walls shall have the joints raked out to a depth not less than 13 mm and not more than 20 mm, and subsequently refilled with mortar of the same proportions as the original bedding mortar. In no circumstances may joints to be so formed as to expose any perforation in the units.

Wire ties, where required, shall be stainless steel and are to be installed at 5 per square metre.

PA4.2 **Mortar**

The mix proportions for the mortar are given below:

Portland cement	50 kg
Lime	0-40 l
Sand*	200 l max.

* measured loose and damp

PA4.3 **Plastering**

Plaster shall be of the same proportions as the bedding mortar. Any other plaster mixes will be subject to the approval of the Engineer.

PA4.4 **Dampproof Courses**

The areas to be covered by dampproof courses are indicated on the drawings. Dampproof shall be laid on a surface which shall not contain any sharp objects which may perforate the membrane. The full width of the wall and the whole area under the floor is to be covered by the membrane and shall overlap by not less than 100 mm under the floor, and by not less than 150 mm under the wall. All joints shall be effectively sealed. Where shown on the drawing, the dampproof course is to be stepped up one course of brickwork in the inner skin. Proper returns are to be made at all doorframes.

PA4.5 **Window Sills**

Windowsills shall be formed as shown on the drawings and as hereafter described:

Dampproof sheeting shall be provided one brick course below the sill and shall be turned upwards and terminate behind the window frame to provide an efficient weather-tight seal.

All external sills and some internal sills, where shown, shall be formed in quarry tiles and other internal sills where shown are to be of fibre cement sheet minimum thickness 15 mm to SABS 685 with approximately 20 mm projection beyond the finished face of the walls.

External sills shall be laid to a 20° weathered slope while internal sills shall be laid horizontal.

All tiles shall be bedded in 3:1 cement mortar and neatly pointed.

PA4.6 Lintels with Brickwork Reinforcement

Lintels over doors, windows and openings, where ordered by the Engineer, shall be reinforced with four layers of BRC brick force, or approved equal. The latter reinforcement shall extend a minimum of 450 mm beyond any opening. All joints in the six courses of brickwork above the opening shall be fully flushed with cement mortar. Shoring to soffits of lintels shall be left in position for at least 14 days after building the lintel and the brickwork shall be kept damp with wet bags for the whole of this period.

PA4.7 Wall Vents

Ventilator openings shall be formed through walls where indicated and shall be provided with double brick terracotta louvred air bricks (fitted with plastic insect screens) both externally and internally (where scheduled) set flush into the work and neatly pointed. Internal wall vents are to be of an approved plaster of paris type where scheduled.

PA4.8 Building in Frames, etc

Door and window frames are to be set up, built into position, bedded and pointed in cement mortar, with any necessary cutting to brickwork, fitting and making good, as the brickwork is built up. In the case of doorframes, wrought iron right angled cramps are to be fixed to doorframes and built into brickwork at every eighth course.

Where pipes, frames, brackets or other such parts pass through or have to be set into brickwork, the bricks shall be carefully cut and fitted to maintain regularity of courses and uniformity of joints, the shaped bricks being embedded and pointed to conform with the surrounding brickwork. Where such parts have to be set into position after brickwork is built, holes shall be left wherever possible, in preference to cutting out bricks, and the work shall be subsequently made good in the manner described.

PA4.9 Floor Finishes

PA4.9.1 Granolithic Floor Screed

Granolithic shall consist of one part cement, one part sand and two parts 5 mm stone chips and oxide where required, thoroughly mixed as for concrete and placed in a layer not less than 20 mm thick, levelled or graded and trowelled to a smooth uniform surface. To ensure proper bond, the concrete surface to be covered shall be clean, roughened by chipping, flushed with water and coated with cement grout just before placing of the granolithic layer. Granolithic finish is to be steel floated with V joints in squares of 1,20 m to 1,80 m, the joints extending for the full depth of the granolithic. Joints are not required in the granolithic screed where it is to be overlaid by tiles or carpeting.

PA4.10 Chasing Walls

Where indicated by the electrical contractor, the construction contractor shall chase brickwork and concrete work to accommodate electrical conduit - such chasing shall precede plastering or rendering and on no account shall plastering or rendering be commenced until the electrical tubing has been installed. No horizontal or diagonal chases shall be permitted.

Elsewhere, electrical conduit shall either be cast into concrete or shall be run on the surface afterwards as may be directed by the Engineer.

PA4.11 Weather

In any period of interruption caused by inclement weather, and at the completion of each day's bricklaying, freshly laid brickwork should be protected.

PARTICULAR SPECIFICATION: PB

CARPENTRY, JOINERY AND IRONMONGERY WORK

PB1 SCOPE

PB1.1 This specification covers the general requirements for carpentry, joinery and ironmongery work for civil engineering projects and the methods by which the finished work is to be measured for the purpose of payment.

PB2 INTERPRETATION

PB2.1Other Standards/Specification

This specification is to be read with SABS 1200 AA .

PB2.2Applicable Edition of Standards

Each standard specification referred to in this specification shall be deemed to be the latest edition, at the closing date of tenders for this contract.

PB3 MATERIALS

PB3.1 Timber

Roof timber forming a permanent part of the work shall conform to the requirements of the relevant standard specifications SABS 563, SABS 653, SABS 876, SABS 1089 or SABS 1245. All timber other than that used for temporary works or shuttering shall be treated as specified in SABS 1288 and SABS 05, and allowed to dry thoroughly before being used.

PB3.2 Fibre Cement Sheets

Fibre cement flat and corrugated sheets shall comply with the requirements of SABS 685. The flat sheets shall be minimum 15 mm thick.

PB3.3 Hardware

Locks, hinges and other hardware shall be provided to doors; all ironmongery and fixings shall be chromium plated on brass except where otherwise specified.

PB3.3.1 Hinges

Hardwood doors in hardwood frames are to be provided with brass butt hinges as scheduled with three hinges per leaf.

PB3.3.2 Door Locks and Furniture

External door to be fitted with a night latch (to be supplied by the Employer) and a Henderson No 463 bow handle, secured with brass bolts passing through the door with nuts on the inside.

PB3.3.3 Cabin Hooks

One 200 mm brass cabin hook complete with eyes to be fitted to each door including for hardwood block plugged to walls or post as scheduled.

PB4 MEASUREMENT AND PAYMENT

PB4.1 The work will be measured and paid for in accordance with the units and rates scheduled.

PB4.2 The tendered rates for doors are to include for the manufacture, fitting hanging and protective painting thereof.

PB4.3 The tendered rates for ironmongery shall include for the supplying and fitting complete with non-corrosive screws and/or bolts.

PARTICULAR SPECIFICATION: PC

PAINTING

PC1 SCOPE

PC1.1 This specification covers the general requirements for painting, including methods of preparation of materials to be painted, cleaning, priming, undercoating and finishing, and also methods by which the finished work will be measured and paid for.

PC2 INTERPRETATION

PC2.1 Supporting Specification

This specification must be read together with SABS 1200 AA

PC2.2 Applicable Edition of Standards

Each standard specification referred to in this specification shall be deemed to be the latest edition at the tender closing date.

PC3 MATERIALS

PC3.1 Emulsion Paints for Exterior Use

Emulsion paints for exterior use shall comply with SABS 634.

PC3.2 Calcium Plumbate Primer

Calcium plumbate primer shall comply with SABS 912.

PC3.3 Undercoats for Paints

Undercoats for air-drying protective and decorative paints shall comply with SABS 681.

PC3.4 Structural Steel Paints

Structural steel paints shall comply with SABS 684.

PC3.5 Colours of Paints

Specification for colours of paints shall comply with CKS 279.

PARTICULAR SPECIFICATION: PD

DISINFECTION OF PIPELINES

PD 1 INTRODUCTION

The price for testing and disinfecting pipelines and fittings is included in the scheduled items for supply and installation.

On completion of construction, after pressure testing and prior to commissioning the pipeline is to be disinfected by the contractor in accordance with this specification.

PD 1.1 Scope of the Code of Practice

This Code of Practice relates to the disinfection of parts used for the disinfection of complete installations.

It includes the requirements for bacteriological sampling and dosage of disinfectants, dose rates of disinfectants, disposal of chlorinated water and quality standards for bacteriological samples.

PD 1.2 Definitions

Within this document the term HYPOCHLORITE SOLUTION means a commercial solution of sodium hypochlorite containing 10% to 15% of available chlorine. Also, 10% HYPOCHLORITE SOLUTION means hypochlorite solution diluted one part in ten which thus has approximately 1% of available chlorine.

Within this document AVAILABLE CHLORINE and all chlorine concentrations means FREE CHLORINE available to the water environment for its disinfection.

'Water Supply Personnel' means any employee or contract or casual labour whose work includes, even temporarily, the performance of work concerned with partially or fully treated water and sources of underground water and who must possess a current certificate of medical suitability signed on behalf of the Authority.

PD 1.3 Hygiene

Only 'Water Supply Personnel' may undertake the procedures laid out in this Code of Practice.

PD 1.4 Safety

This Code of Practice does not cover the safety aspects of the construction or maintenance of installations or apparatus or of disinfection procedures.

Remember always that chlorinating agents are strongly corrosive so protect EYES AND HANDS especially.

PD 2GENERAL REQUIREMENTS FOR DISINFECTION OF POTABLE WATER APPARATUS

PD 2.1Components and Equipment

Clean all pipework components, equipment and tools used for repair and remove all grease or scale from components and equipment before use or assembly.

Where full chlorination and bacteriological testing is impractical, then disinfect all materials, components and equipment which could transmit contamination. Use a solution containing 1% of available chlorine (e.g. 10% chloros or other commercial hypochlorite solution or 2% solution of bleaching powder. Contact time must exceed 20 minutes. Rinse or flush the equipment with mains water to prevent excessive corrosion.

PD 2.2Completed Installations

Ensure that all water used for disinfection purposes has a free chlorine residual of at least 20 mg/ℓ. Refer to section PD 4 and Tables 1 and 2 for volumes or dose rates.

During chlorination the pipeline shall be kept full of water.

Whenever possible keep the installation at normal operating pressure or greater during the contact period.

PD 2.3Portable Test Equipment

Portable test equipment which may be used in contact with potable water must be kept clean. Any equipment which is in uncertain condition or which is contaminated must be cleaned and disinfected before use.

PD 3 MAINS

PD 3.1New Mains

PD 3.1.1Introduction

Do not connect any new main into supply until the water from designated sampling points, having stood in the main for at least 20 hours, has met the criteria specified herein.

New mains are laid with the intention of ensuring as far as possible, the exclusion of debris and contamination, but presume at the disinfection stage that debris and contamination does exist and that this debris is resistant to disinfection, e.g. compacted soil or detritus in joints.

The disinfection procedures, which should follow pressure testing, include:

(a) swabbing and flushing of the main

(b) soaking of the main for a minimum period of 20 hours, using a minimum concentration of 20 mg/ℓ of available chlorine in mains water.

removal of excess chlorine by flushing the main

PD 3.1.2Pressure Testing

Only use potable quality mains water for pressure testing new mains. Pressure testing normally follows the construction of each section of the pipeline but precedes final connection to supply. Do not rely on a single sluice valve to isolate the new main from the supply network, while the main is under pressure until disinfection and approval are complete.

PD 3.1.3Swabbing and flushing

Swab all new mains after pressure testing and prior to disinfection.

After insertion of a soft foam swab, which has been soaked in 10% hypochlorite solution, recharge the pipeline at a rate less than 50 mm per second (3 m per minute) to ensure that the swab is not moved.

Open the inlet valve fully and drive the swab along the pipeline, at a velocity less than 0,5 m per second (30 m per minute), by controlling the valve at the discharge end.

When the swab reaches the discharge end of the pipeline, flush the main for at least 5 minutes to remove all excess chlorine and discoloured or dirty water. Where possible open inlet and outlet valves as fully as possible.

If the swab removes excessive amounts of debris then re-swab the main.

PD 3.1.4Chlorination

Chlorinate all new mains to a minimum of 20 mg/ℓ available chlorine and leave to soak for a minimum of 20 hours, prior to flushing with mains water to a chlorine residual equal to that of the background level in the incoming mains water.

Tables in PD 4 show the required minimum dose rates and volumes.

To chlorinate sections of distribution main, less than about 50 m long not exceeding 150 mm in diameter, use a soft swab which has been soaked in 10% hypochlorite solution and proceed as follows:-

- Pour 1 litre of hypochlorite solution for each 1 m³ of pipeline, into the end of the pipe upstream of the final connection.

- Insert the swab into the end of the upstream pipe to retain the hypochlorite solution.

- Make the final connection.

- Drive the swab past the final connection and along the pipeline, but do not allow the swab to travel at a speed greater then 0,3 metres per second (20 m per minute).

- Remove the swab and flush the main for 25 minutes.

- Close up the main prior to soaking and sampling in accordance with section PB 3.1.6.

The volume of hypochlorite needed for 50 m of pipeline is:-

50 mm - 100 mℓ, 75 mm - 200 mℓ, 100 mm - 500 mℓ,
150 mm - 900 mℓ, 200 mm -1600 mℓ, 250 mm - 2500 mℓ.

Take all necessary care with the disposal of chlorinated water; follow the procedure laid out in PB 5.

PD 3.1.5Sampling for Bacteriological Analysis

Once all pressure testing, swabbing and chlorination is complete, fill the main with clean mains water free from excessive chlorine.

Flush all hydrants, washouts and other outlets until the water is clean and free from excessive chlorine. Shut the valves and leave the main to soak for a minimum period of 20 hours.

First check with the laboratory staff to determine a suitable time for collection of samples and delivery of them to the laboratory for analysis.

Then pressurise the main and take samples for bacteriological analysis in accordance with the procedure given in section PB 3.1.6. Take these samples from sampling points agreed with the Resident Engineer.

Deliver all samples to the laboratory as soon as possible. Analysis must start within six hours but store the samples in a refrigerator if the delay between taking the sample and the start of analysis is likely to exceed four hours.

Then isolate and leave the main until the results of analysis are available. In the event that the samples fail, flush the main and re-sample after a further soak period of at least 20 hours.

Repeat the above process until disinfection criteria have been satisfied.

The costs of all necessary testing are to be borne by the Contractor.

PD 3.1.6Sampling Points

Sample points should consist of a ferrule connection, with a short length of polythene piping terminating in a ½" BSP gate valve or manual air valve. Protect this sampling outlet by suitable boxing. Attach a sampling standpipe to the gate valve, disinfect the apparatus with hypochlorite solution and then flame the bib tap outlet on the standpipe. Flush out all traces of hypochlorite, check that the residual chlorine level is not greater than the normal level in the incoming mains water.

At scour points and air valves, flush out all trace of hypochlorite, check that the residual chlorine level is not greater than the normal level in the incoming mains water, then take samples.

PD 3.1.7Temporary Cross Connections and Final Connections

Where a temporary cross connection supplies mains water to the new main, before making the final connection complete the disinfection procedure of the new main as set out above.

When the new main has been proved bacteriologically satisfactory the cross connection may be removed and isolated after suitable disinfection.

PD 4 DOSAGE OF CHLORINATING AGENTS

PD 4.1 Sodium Hypochlorite Solution

Bulk supplies of sodium hypochlorite solution (Chloros for instance) are supplied at 10 to 15% available chlorine. This fraction declines progressively as the hypochlorite decays to chloride, chlorate, and oxygen. Assume in practice that there is only 10% available chlorine.

Assuming 10% available chlorine and using mains water having a zero-chlorine demand, then the following values give estimates of the dilutions required.

- 10% hypochlorite solution (1 part hypochlorite solution in 10 parts solution) contains 10,000 mg available chlorine per litre of 10 kg available chlorine per cubic metre.

- 20 mg available chlorine per litre is equivalent to 200 ml of hypochlorite solution per cubic metre of water.

- 0,5 mg available chlorine per litre is equivalent to 5 ml of hypochlorite solution per cubic metre of water.

PD 4.2 Chlorine Gas

Chlorine gas, dosed into water by weight, is likely to be about 98% available chlorine. Therefore, a direct measurement gives a reasonable estimate.

- Disinfection of replacement parts with chlorine gas in not a practicable possibility.

- 20 mg Chlorine gas (by weight) per litre for disinfection of complete installation is equivalent to 20 grams per cubic metre.

- 0,5 mg Chlorine gas (by weight) per litre of water is equivalent to 0,5 grams per cubic metre.

PD 4.3 Bleaching powder, granules and tablets

Bleaching powders, granules or tablets based on Calcium hypochlorite contains 50% to 70% of available chlorine by weight. These materials must be stored under dry conditions. During storage some available chlorine is lost. Follow the manufacturers instructions particularly concerning the shelf life of the material and dose rate of the tablets.

For calculation purposes presume a maximum value of 50% available chlorine i.e. 1 gm of powder, granules etc in 1 litre of water provides 500 mg per litre available chlorine.

PD 4.4 Dose rates

Tables 1 and 2 provide estimates of the minimum dose rates of sodium hypochlorite solution, chlorine gas or bleaching powder, tablets or granules to achieve available chlorine levels of 20 mg per litre when dilute with mains water which has a zero chlorine demand.
Table 1 - dosage for 1,000 m of pipeline to give 20 mg available chlorine per litre

Pipe Diameter	Volume of 1000 m of pipeline	Weight of bleaching powder granules or tablets to give 20 mg/ℓ	Weight of chlorine to give 20 mg/ℓ	Volume of hypochlorite solution to give 20 mg/ℓ
mm	m³	gm	gm	litres
50	1,9	80	40	0,4
75	4,4	180	90	0,8
100	7,9	320	160	1,5
150	17,7	700	350	3,5
200	31,4	1,260	630	6,2
250	49,1	2,000	980	9,7
300	70,7	2,800	1400	14,0
350	96,2	3,800	1900	19,0
400	125,6	5,000	2500	24,6
500	196,3	7,800	3900	38,4
600	282,6	11,200	5600	55,4

Table 2 - dose rates for 20 mg available chlorine per litre

Flow rate in pipeline*		Hypochlorite solution injection rate for 20 mg/ℓ		Chlorine injection rate for 20 mg/ℓ
litres/sec	m³/hr	litres/hr	mℓ/sec	gm/hour
1	3,6	0,7	0,2	72
2	7,2	1,4	0,4	144
3	10,8	2,2	0,6	216
4	14,4	2,9	0,8	288
5	18,0	3,6	1,0	360
6	21,6	4,3	1,2	430
7	25,2	5,0	1,4	500
8	28,8	5,8	1,6	576
9	32,4	6,5	1,8	650

* For flows greater than 9 litres/sec the dose rates can be calculated by multiplying by an appropriate factor of 10 e.g.

186 litres/sec = 100 +n 80+ 6 litres/sec
hypochlorite solution = 70+ 58 + 4.3 = 132,3 litres/hr

PD 5 DISPOSAL OF CHLORINATED WATER

PD 5.1 Introduction

When the pipeline has passed all disinfection criteria if must be drained without causing hazard.

PD 5.2 Methods of Disposal

PD 5.2.1 Overland

Explore the possibility of soaking away disinfection water on adjacent land in rural situation.

PD 5.2.2 Foul sewers

Where disinfection water is discharged into a combined or foul sewer, no de-chlorination is normally necessary but in the former case take care that the rate of discharge of disinfection or flushing water avoids operation of storm sewage overflows and/or the creation of a hazardous atmosphere within the sewer.

PD 5.2.3 Watercourses

In rural areas where disinfection water is discharged to watercourses, either directly or through surface water drains, do not permit a free chlorine concentration in the receiving stream in excess of 0,1 mg/l about 50 metres downstream of the point of discharge. If the discharge is into a ditch, which is not a spawning ground or a nursery or a fishing stream, take advantage of that ditch to mop up chlorine provided that in a significant stream the earlier mentioned limit is not exceeded. In these circumstances use flush water to dilute the chlorinated water whenever possible. Avoid discharge of disinfection water to the head of a watercourse because this area is probably a spawning ground.

PD 5.2.4 Disposal of large volumes

When disposing of large volumes of disinfection water from very long lengths of new main, or in any cases of doubt, consult through the Resident Engineer, the laboratory staff of the Employer.

PD 5.3 De-chlorination

There is no objection to the use of thiosulphate or sulphur dioxide as de-chlorination agents. In some cases, at least partial de-chlorination may be achieved by discharge over land. In all cases consult the Resident Engineer.

PD 6 QUALITY STANDARDS AND REPORTING PROCEDURES

PD 6.1 New Mains

PD 6.1.1 Bacteriological Standards

No coliform organisms shall be detected in 100 mℓs of the sample.

The increase in the yeast agar plate count when compared with that of the incoming water shall generally be less than 50 and never more than 150 colonies per ml when incubated at 37°C for 24 hours.

PD 6.1.2 Procedure for Unsatisfactory Samples

Whenever even one E.Coli, or 5 or more coliforms per 100 ml are detected, re-chlorinate the main or serve reservoir. When E.Coli are not detected but the total coliform count is less than 5 per 100 ml flush and re-sample the main.

PD 6.1.3 Physical Standard

If the sample is unusually coloured, turbid or frothy flush the main until acceptable. If this condition is severe, re-sample the main but do not put into service until the samples have passed the required standards.

PD 6.2 Reporting Procedure

Records of disinfection are to be handed to the Resident Engineer.

PARTICULAR SPECIFICATION: PES

ENVIRONMENTAL SPECIFICATION

PS EMP ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan and specifications are included under this section and must be adhered to in all respects.

The rates and prices tendered by the Contractor shall be deemed to include all costs for conforming. The following specifications must be adhered to in all respects:

PS EMP1

No natural vegetation, trees or crops may be damaged by the Contractor without the written approval of the Engineer. The Contractor must keep the site neat and free of refuse, etc. to prevent possible damage to crops or livestock.

The Contractor's construction activities shall be performed by methods that will prevent the entrance of, or accidental spillage of solid matter, debris, contaminants and other pollutants and wastes into streams and water-courses. Any dewatering for earthworks or structure foundations adjacent to or encroaching on streams or water-courses shall be conducted in a manner to prevent muddy or contaminated water from entering streams or water-courses by means of the construction of intercepting and bypassing ditches, barriers, ponds and other approved means.

Construction activities shall be performed in a manner to keep dust nuisance to a minimum by means of the application of sufficient water or other efficient measures wherever and as often as may prove necessary.

The cost for complying with the requirements regarding protection of the environment specified above shall be included in the rates tendered in the Schedule of Quantities for the various items of work and no additional payment will be made in this regard. The Engineer will be entitled to retain an amount of money, should a dispute between property owners and the Contractor arise. The balance of this money will be released as soon as the dispute is resolved. Should any of the above mentioned items not be complied with, the Engineer reserves the right to appoint another Contractor to rectify these matters. Costs for this work will be deducted from the payment of the Contractor for this Contract.

In order to reduce and control the release of airborne pollutants the Contractor shall ensure that:

(a) No fires are lit on Site to dispose of waste or for cooking.
(b) All loose material that could be blown about or into neighbouring properties by wind is secured.
(c) The spraying of formwork oils, paints and other toxic substances is limited to the application area.
(d)

PS EMP2

The Site Agent shall ensure that his team, including sub-contractors, comply with the environmental management requirements of this Contract.

PS EMP3

The Contractor may be required to submit a Construction Method Statement at the Site handover. Activities having an effect on the environment must be addressed in this Construction Method Statement. A list of possible activities is included below.
Possible activities having an effect on the Environment:

1. Collection, storage and disposal of solid waste
2. Collection, storage and disposal of liquid waste

3. Protection of indigenous plant species
4. Protection of natural water sources from liquid and solid wastes
5. Control of noise and dust
6. Security on site
7. Control of veld fires
8. Temporary storage of spoil, disposal of excess spoil and unsuitable materials and the importation of earthworks materials
9. Site clearance prior to construction
10. Felling of trees
11. Habitat restoration
12. Site reinstatement, removal of site offices and final site clearance

PS EMP4

In the event that the Contractor fails to comply with the Environmental Management Specifications, included in the Contract Documents, the following penalties will be imposed per incident:-

Unauthorised damage or removal of trees	R2 500,00
Failure to keep soil types separate during excavation and backfilling	R1 000,00
Failure to provide adequate portable chemical toilets	R 500,00
Failure to comply with solid waste disposal requirements	R1 000,00
Failure to clean up litter at the end of each working day	R1 000,00
Failure to comply with dust prevention requirements	R1 500,00
Failure of Contractor and/or materials supplier to cover vehicle	R 500,00
Failure to comply with noise, light or air pollution requirements	R 500,00
Spillage of hazardous substances	R1 000,00

The Engineer will notify the Contractor of a breach of specification and supply a time period within which remedial action will need to be carried out. Should the time period elapse then the penalty will be imposed and the sum deducted from the following month's certificate.

At the time of tender, the Contractor shall nominate two people who will be responsible for ensuring that the Contractor's team and sub-contractors comply with the environmental management requirements of this contract. While the positions are only part time, these staff members will be called upon from time to time to deal with any events that are not in compliance with the specifications.

PARTICULAR SPECIFICATION: PW

PORTABLE WATER STORAGE

PW ELEVATED TANK

Inspections should be carried out by the tenderers nominated tank supplier or specialist. The repairs may include the tank panels, steel stand, leader, feeder pipes, feeder pumps, water gauge, connection points, trenching to expose feeder piping from the feed pump station.

The tendered Sum shall include all works as necessary including but not limited to the works mentioned above and include connecting the existing tank with the new tank.

Existing elevated tank:

The tenderer shall supply a new 200kl prefabricated panel pressed galvanized steel elevated tank complete with a 15m high stand, pipework, fittings and valves. The tank shall be SABS approved steel grade.
The unit of measure shall be Sum which includes supply and erection on site including appurtenances as may be required, connecting and commissioning.

The tank shall conform to the following specification or similar approved.

The tank shall:

- Have a standard wind rating of 43m/s and carry a minimum of 12-month workmanship and material guarantee and a 10-year no leak warranty for liner.
- Be an Abecco, SBS Tank Comp or similar approved - 200KL.
- Rate shall include Tank Access, Fixed, (Ladders, P/form, Hatch).
- Rate shall include M/Inlt 100NB; 3ring; S/Mnt; Int Dual Valve adaptor.
- Rate shall include 50NB Balem Level Control Valve.
- Rate shall include Mun O/let 100NB; S/Mnt;Int A/Vrtx Std; DPipe Flange.
- Rate shall include overflow 150NB; 3 Ring; int Bell Mouth; ext DPipe Groved.
- Scour 100NB; Floor Mount; Int Flange; ext. thread.
- Have a Ball Valve; Threaded; 100NB.
- Have a water level indicator, Mechanical, Full Height.
- Have a Ventilator Static - 76 mm.
- Rate shall include transporting of the tank to the Bedford Hospital.
- Rate shall include Commissioning.
- Rate shall include Elevated Tank Stand 15m high.
- Rate shall include Installation, Elevated Tank & Tank Stand.
- Rate shall include Stand Access, Fixed.
- Pipework, Stand - Inlet 100NB, 15m High.
- Pipework, Stand - Outlet 100NB, 15m High.
- Pipework, Stand - Overflow 150NB, 15m High.

PARTICULAR SPECIFICATION: PF

FENCING

CLEAR-VU FENCING AROUND THE STABILIZATION PONDS AND PUMP STATION

The tenderer is expected to supply Clear-vu fencing as per the following spec or similar approved as specified by an accredited manufacture. The submission must be accompanied by shop drawings, specification in the format below and manufacturer's accreditation.

Panel Specification:

Panel Dimension	Aperture Size (centres)	Wire Diameter	Horizontal V-Bends	Flanges
3050mm x 2400mm	76.2mm x 25mm	3mm horizontal and 4mm vertical or as Specified by manufacturer	4x50mm deep V	2x70ºx75mm + 2x30º or 2x90ºx90mm

Post Specification:

Fence Panel Height	Post Length	Post Size	Locking Recess Mechanism	Polymer Cap	Post Finish
2.4m	3.0m	85mm x 45mm x 85mm taper post or 150mm x 75mm x 150mm taper post	Required	Required	Galvanized, Powder coated.

Fencing Clips and Accessories:

Clip Type	Dimensions	Wall Thickness	Material	Finish
Single bolt clamp plate	50mm x 76mm	3.0mm – 5.0mm	Hot dipped steel or powder coated	Galvanized

PART C4: SITE INFORMATION

C4.1 GENRAL

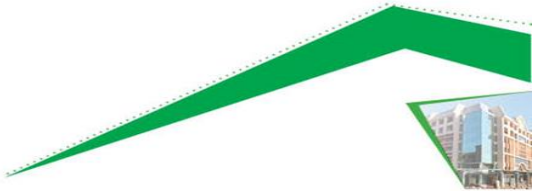
C4.1.1 Documentation
The documentation included in this section describes the site as at the time of tender to enable the Tenderer to price his tender, furthermore, to decide upon his method of working and programming and to evaluate his risks.

C4.1.2 Information
Only actual information about physical conditions of the site and its surroundings (if any available) is included in this Site Information and the interpretation thereof is a matter for the Tenderer.

C4.1.3 Records and Physical Condition
Refer to the layout drawings in ANNEXURES of the Scope of Works for a graphical overview of the works.

C4.1.4 Services
No formal records are available of the existing services that are above or below ground. The onus therefore is on the tenderer to familiarize themselves with the site, and prove all services in the working areas prior to bringing big machinery.

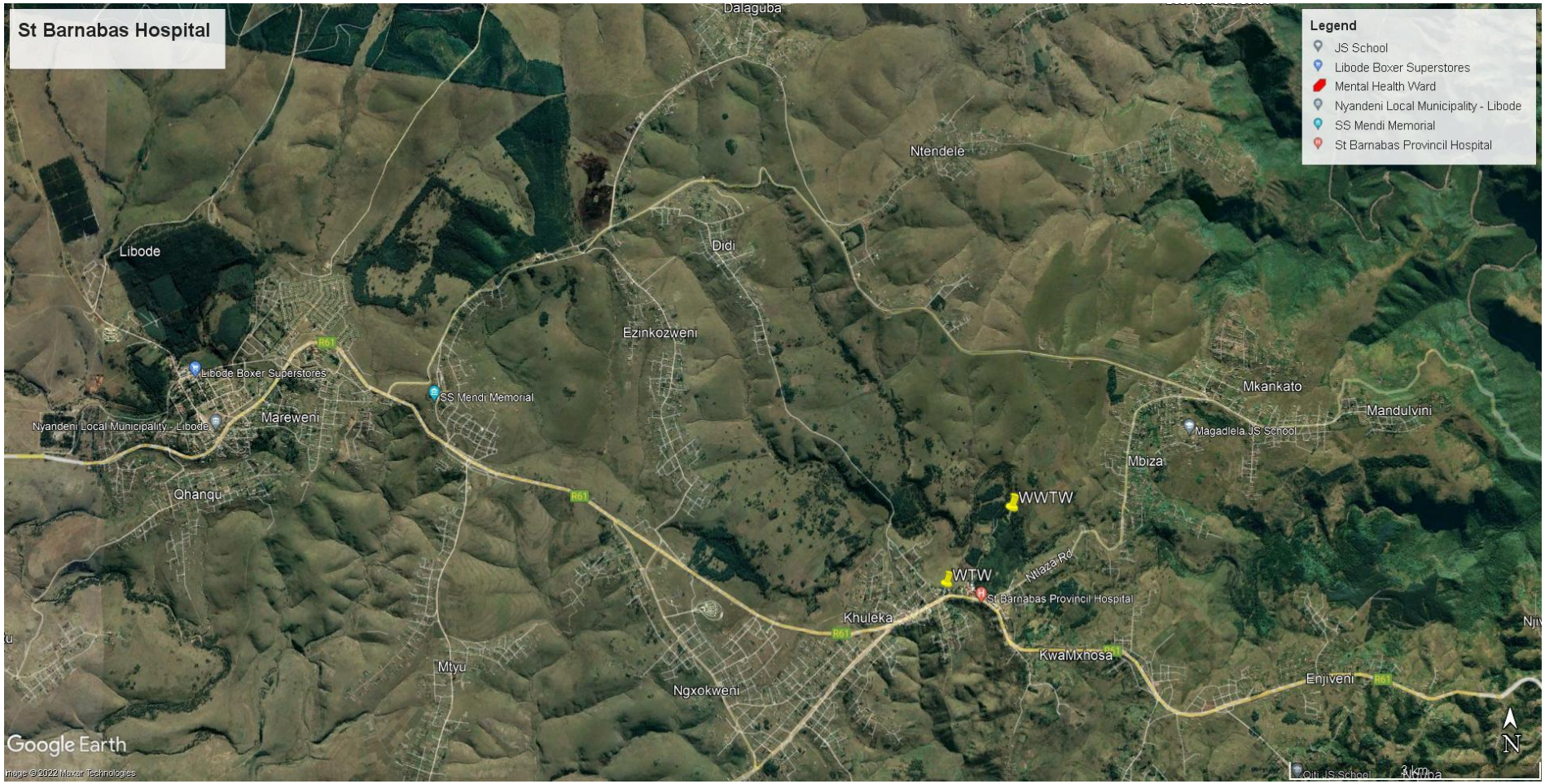
C4.1.5 Fencing of Works
Tenderers are to note that it is a condition of contract that the “site” shall be always fenced and secure.
Existing fencing cannot be removed in one go. Rather it must be done in segments, such that the new fencing being erected forms a completely protected area which to prevent unauthorized access. Bidders are to price accordingly.



C4.2 PROJECT LOCATION

St Barnabas Hospital is a Provincial government funded District hospital for the Nyandeni Local Municipality area in Libode, Eastern Cape in South Africa. The hospital is located approximately midway between Mthatha and Port St Johns along the National Route R61.
Coordinates:

PROJECT SUB-AREA	LATITUDE	LONGITUDE	DISTRICT MUNICIPALITY	LOCAL MUNICIPALITY
Hospital	31°33′52.71″S	29°06′81.81″E	OR Tambo	Nyandeni
WTW	31°33'51.80"S	29° 06'44.00"E		
WWTW	31°33'27.30"S	29° 07'13.50"E		



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PART C5: ANNEXURES

ANNEXURE 1 – MECHANICAL & ELECTRICAL SCOPE OF WORKS

NOTE: The MECHANICAL & ELECTRICAL SCOPE OF WORKS constitutes 54 pages that are numbered separately from the rest of the tender document.

ANNEXURE 2 – WASTEWATER TREATMENT PONDS: GCL PARTICULAR SPECIFICATION

NOTE: The WASTEWATER TREATMENT PONDS: GCL PARTICULAR SPECIFICATION constitutes 5 pages that are numbered separately from the rest of the tender document.

ANNEXURE 3 - LIST OF DRAWINGS

The following drawings/annexure shall be issued during the bid period to form part of the bid documentation. Where applicable, drawings/annexure could be re-issued to the Contractor at commencement of the construction phase.

K049.1-S0T-100	Sewer General Layout
K049.1-S2T-101	Screening Chamber Layout
K049.1-S2T-102	Standard Drawing Details (Sheet 1 of 2)
K049.1-S2T-103	Standard Drawing Details (Sheet 2 of 2)
K049.1-W0T-100	Raw Water Abstraction General Layout
K049.1-W0T-101	Water Treatment Plant General Layout
K049.1-W0T-102	Water General Layout
K049.1-W2T-103	Rising Main Standard Details (Sheet 1 of 2)
K049.1-W2T-104	Rising Main Standard Details (Sheet 2 of 2)
K049.1-W2T-105	Pump Station General Details (Sheet 1 of 2)
K049.1-W2T-106	Pump Station General Details (Sheet 2 of 2)
K049.1-W2T-107	Raw Water Storage Reservoir General Arrangement (Sheet 1 of 2)
K049.1-W2T-108	Raw Water Storage Reservoir General Arrangement (Sheet 2 of 2)
K049.1-R0T-100	Wastewater Treatment Works Access Road
K049.1-B2T-100	Raw Water Pumpstation Details
K049.1-O2T-100	Contract Name Board

ANNEXURE 4 - CONSTRUCTION HEALTH AND SAFETY

AWARDED TENDERER TO COMPLY WITH ALL OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS

ANNEXURE 5 - EPWP SPECIFICATION

EPWP SPECIFICATION
AWARDED TENDERER WILL BE REQUIRED TO ADHERE TO ALL EPWP SPECIFICATIONS AND REQUIREMENTS.
FOR FULL SPECIFICATIONS AND REQUIREMENTS VISIT www.epwp.gov.za

ANNEXURE 1

ANNEXURE 1 – MECHANICAL & ELECTRICAL SCOPE OF WORKS

INDEX

Page SW

APPLICABLE STANDARDS

SANS064 .....The preparation of steel surfaces for coating

SANS10111 .....Engineering Drawings.

SANS10142 .....Wiring of premises Part 1: Low voltage installations

SANS10313 .....Protection against lightning: Physical damage to structures and life hazard

SANS60947 ..... Low-voltage switchgear and control gear

SANS156 ..... Moulded-case circuit breakers.

SANS60269 ..... Low-voltage fuses

SANS1091 ..... National colour standards for paint

SANS1274 ..... Coating applied by the powder coating process.

SANS1973-1 .....Low-voltage switchgear and control gear assemblies Part 1: Type-tested assemblies with stated deviations and a rated short-circuit withstand strength above 10kA

SANS1973-3 ..... Low-voltage switchgear and control gear assemblies Part 3: Safety of ..... assemblies with a rated prospective short-circuit current of up to and including 10 kA

SANS60529 ..... Degrees of protection provided by enclosures (IP Code)

SANS1507 .....Electric cables with extruded solid dielectric insulation for fixed installations .....(300/500V to 1 900/3 300 V)

SABSISO 9000 .....Quality management systems -- Fundamentals and vocabulary

SANS1019 .....Standard voltages, currents, and insulation levels for electricity supply

SANS170 ..... Fasteners

MECHANICAL EQUIPMENT: STANDARD SPECIFICATIONS

General

The Standard Specification gives a general description of the requirements to be met and sets out the relevant specifications relevant to the Contract as well as other relevant and additional clauses. In certain clauses the standard specifications allow a choice to be specified in the project specifications between alternative materials or methods of construction and for additional requirements to be specified to suit a particular contract. Details of such alternative or additional requirements applicable to this contract are contained in the project specifications.

Materials and Workmanship

All materials and components used in the manufacture and fabrication of plant to be supplied under this contract shall be the best quality and suitable for the purposes for which they are intended.

Quality Management

Applicable Quality Assurance Standards

The Tenderer shall provide a co-ordinated and formally documented statement of his quality management system, including quality management objectives, policies, organisation, and procedures, for the compulsory implementation of SANS 0157, Code of Practice for Quality Management Systems, Part III. The same applies to Part II of the said Code of Practice which must be implemented on certain selected items only. However, although Part II will not be implemented in all instances it will not exempt the Contractor of compliance with the quality requirements laid down in the tender documents. Monitoring and control by the Engineer may be done at any time on any material.

The Contractor shall submit with his tender an assessment report on his quality management and quality control system issued by an independent Quality Assurance Authority approved by the Engineer. The inspection on which this assessment report is based shall have taken place not more than 12 months prior to the closing date for this tender.

Responsibility for and all associated costs of compliance with this sub-clause shall rest with the Contractor.

Quality Assurance Enhancement

Should the Contractor or any of the proposed sub-contractors not comply with Sub-Clause 1.6.2.1 at the time of tender, a Contract may be awarded subject to a written undertaking to enhance his own and/or Sub-Contractor's quality assurance system to the satisfaction of the Engineer before commencement of the contract.

Quality Assurance Staff

The Contractor shall satisfy the Engineer that a quality specialist together with sufficient and suitably qualified staff will be assigned to control the quality of the material used by each sub-contractor engaged in the supply of critical and major components and sub-assemblies.

Engineer's Quality Assurance Representative/Inspector

The Engineer may elect to appoint an independent quality assurance representative to act in a surveillance capacity on his behalf for part or all of the contract.

The Engineer's Quality Assurance Representative will be a selected Sub-Contractor and will be paid by the Contractor under this Contract for all tests passed by the Inspector and certified by the Engineer. The Inspector will not act as the quality controller for the Contractor or his Sub-Contractors and

accordingly any tests failing inspection will be for the account of the Contractor. Similarly, the costs of all inspections arising following any failed tests will be for the account of the Contractor.

Classification of Material

Part II of the above-mentioned Code of Practice, i.e., a quality system for manufacture and installation, will apply only to certain critical material, products, and services if and were indicated hereunder in this document.

Sub-Letting

All enquiries made and contracts placed by the Contractor for critical components shall require that sub-contractors comply with the requirements of the preceding sub-clauses. Responsibility for and all associated costs of compliance shall rest with the Contractor. In instances where SANS 0157 is not applicable, Tenderers must indicate what equivalent alternative Code of Practice is being implemented.

Disqualification

Tenderers who do not include the formally documented statements called for in Sub-Clause 1.3.2.1 and who do not respond in terms of Sub-Clause 1.3.2.2 above may be disqualified.

Standard Specifications

Reference made hereinafter to specifications of the South African Bureau of Standards (SANS) or the British Standards Institute (BS) shall be deemed to include all revisions of and/or additions to such specifications ruling at the closing date of tenders.

Protection Against Corrosion and Paint Coatings

Where corrosion of metal may be expected, the Contractor shall supply materials which are resistant to corrosion. Any material showing signs of corrosion, tuberculation or pitting before expiry of the Defects Liability Period must be replaced by the Contractor at no cost to the Employer. The Tenderer's prices will be held to include the cost of all painting or other surface treatment which is not separately specified or scheduled but which is nevertheless necessary for the protection of surfaces against corrosion.

The coating systems to be applied under this Contract shall be carried out strictly in accordance with the manufacturer's instructions which written instructions shall be obtained by the Contractor and a copy handed to the Engineer's Representative prior to commencing painting operations. Overcoating times shall be strictly adhered to.
The paint system to be used shall be as specified below or an equivalent approved by the Engineer:

Paint System No 1

Epoxy coating for internal and external surfaces of Mild Steel pipes and/or Steelwork immersed in or located within 1 metre above the Polluted Water level. Surface Preparation - Sa 2½.

- Sigmacover 522 – Epoxy primer 50µm Dry Film Thickness (DFT)
- Sigmaguard 790.- Epoxy coating 2 coats x 150µm DFT

Paint System No 2

Structural Steelwork Coastal Regions - Exterior Work. Surface Preparation - Sa 2½

Coating for external surfaces of Mild Steel pipes and/or Steelwork both located more than 1 metre above the Polluted Water level.

- Sigmazinc 160 – Zinc primer 60µm DFT
- Sigmacover 435 - General purpose epoxy build coat 150µm DFT
- Sigmadur 550 - Polyurethane finishing coat 60µm DFT

Paint System No 3

Structural Steelwork: Coastal Regions Interior Work. Surface Preparation - Sa 2½

- Sigmacover 280 – Zinc phosphate primer 75µm DFT
- Sigmadur 550 - Polyurethane finishing coat 60µm DFT

Paint System No 4

Overcoating Galvanised Steel. Surface Preparation -Clean Surface with approved cleaner

- Sigmacover 280 – Zinc phosphate primer 75µm DFT
- Sigmacover 456 - Epoxy finishing coat 75µm DFT

Application of Paint Coatings

No application of paint shall be carried out before the paint manufacturer has approved both the proposed firm of applicators and the plant he proposes to use, except where instructed to the contrary by the Engineer.

When applicable, the range of temperature within which paint may be applied (outside the range from + 5° to + 35°C) shall be that range which the manufacturer of the paint shall approve in writing. Such approval shall be obtained by the Contractor.

Stripe coating to all sharp edges is required under this Contract.

The embedded lengths of irremovable fasteners which penetrate deeper than 75 mm from a concrete face, may be left as base metal. The remaining portion shall comply with the paint system specified for the adjacent steelwork.

Surfaces which will become inaccessible for coating after fabrication or erection shall be given the full paint treatment specified plus one further top coat prior to the surfaces becoming inaccessible. Surfaces of welded connections must be painted before welding is carried out and painted surfaces damaged by welding must be repainted without delay. In the case of bolted connections, edges of bolt holes must also be painted, and bolts, nuts and washers must be similarly treated. Washers must be used under all nuts to prevent damage to the treated surfaces of the plate.

Generally the paint system shall be applied at the factory and damage to the system caused during transport or erection shall be repaired on Site after erection has been completed.

Application of Metal Coatings

The grade of hot dip galvanising (HDG) required shall be that for SANS 935 heavy duty coatings carried out in accordance with that specification. This shall be applicable to all metalwork where HDG is called for either on the Drawings or in the Schedule of Quantities.

Structural Steelwork

The design of structural steelwork and the materials and workmanship used in the construction of same shall comply with the requirements of Part B of The National Building Regulations (Act 103 of 1977 as amended).

In the case of welded connections, in addition to welds required for structural strength, a sealing weld shall be carried right around the connection so as to facilitate protection against corrosion.

Unplasticised Polyvinyl Chloride Pipes and Fittings

Unplasticised Polyvinyl Chloride (uPVC) pipes and fittings shall comply with the requirements of SANS 966 and shall be of the class(es) as specified for each application.

Copper Tubes

Copper tubes shall be of Class suitable to the plant operating conditions and conforming to SANS 460. Where bends are required they shall be formed with a proper tube bending machine. Joints shall be brass compression fittings conforming to BS 864.

Stainless Steel Pipes and Fittings

All stainless-steel pipework is to be Grade 304 L welded austenitic pipe in accordance with the American Standard ASTM A312.

Mild steel flanges may be used on stainless steel pipes and joined with mild steel bolts and nuts and, in cases where stainless steel and mild steel flanges are joined together, nylon or plastic washers shall be used to prevent galvanic corrosion.

All welds on stainless steel are to be pickled and passivated.

Mild Steel Pipes and Fittings

Pipework

All mild steel pipes and fittings other than screwed and socketed pipes, shall comply with the requirements of SANS 719 Grade B, except where scheduled to the contrary. Unless otherwise specified, all pipes and fittings shall have a wall thickness of 6 mm.

Coating of Pipes and Fittings

Before leaving the factory all mild steel pipes greater than 150 mm diameter, fittings and other steelwork shall blast-cleaned internally and externally to Grade Sa 2,5 of the Swedish Standard SIS 05-5900 and then be coated in accordance with Clause:1.6.4

Pipes and fittings with nominal diameter less than or equal to 150 mm are to be hot dipped galvanised (heavy duty coating) with final coating in accordance with Clause 1.6.4.

For treatment of mating faces of flanges see Clause 1.6.16.

Plain ends of pipes and fittings shall be covered and protected against damage whilst being transported from the factory to the site. After installation, all coated pipes are to be further given two coats of gloss paint plus primer as required to suit the Employer's colour scheme for pipework and pumps.

Internal Rubber Lining of Pipes and Fittings

Where stated in the scope of work/project specification, mild steel pipes and fittings are to be rubber lined as described below, and not epoxy lined as described above.

Materials:

The material to be used shall be a Type 1, Grade A, Class 60 natural rubber compound to SANS 1198 – 1978 such as Natural Rubber - 153", having the following minimum physical properties:

Hardness Shore "A": 50 deg
Tensile strength: 18 Mpa
Elongation at break: 600%
Specific gravity: 1,08

and with a maximum service temperature of 90P^{oP}C.

Surface Preparation:

The internal surfaces to be lined shall be prepared as follows:

Clean by grit blasting to SA 2,5 as per Swedish Standard SIS 055900 – 1967 to provide an anchor profile of between 80 and 100 microns, with a minimum of 65 microns.

All dust and debris shall be removed and the surfaces solvent wiped.

Bonding System:

The cleaned and prepared surfaces are to receive the primer and tie coats associated with the application of the requisite rubber bonding system where such a process forms part of the lining procedure.

Application and Curing:

The bonding and rubber lining shall be applied by specialists to a minimum thickness of 10 mm unless otherwise stated in the project specification, and cured as necessary, all in accordance with the requirements of British Standard BS 6374 Part 5.

Testing and Repair:

All lined surfaces shall be visually inspected and shall undergo a holiday detection spark test using a pulse holiday detection unit set at 3 000 volts per mm thickness of the lining.

Repairs to defective or damaged areas of coating shall be carried out in strict accordance with the specialist applicator's instructions and under the supervision of their accredited representative

Notwithstanding the foregoing specification, the rubber lining applicator shall meet with representatives of the Engineer and the Employer prior to commencement of any rubber lining and agree the materials and application specifications and methodology to be used.

Valves

All valves shall be provided with individual test certificates for each valve from the manufacturer; and are to be inspected, and the hydraulic tests witnessed, by an Inspector to be appointed by the Engineer. The tendered rates for the valves shall include for making arrangements for independent inspections. The Inspectors' fee and recoverable expenses will be for the account of the Employer, fees and expenses arising from abortive or repeat visits due to non-compliance with the specified requirements will be for the Contractor's account and will be deducted from amounts due to the Contractor.

Gate Valves:

Gate valves shall be double flanged and shall comply with requirements of SANS 664, and to Class 10, i.e. 1000 kPa working pressure for the suction valves and delivery valves except where otherwise specified.

Valves shall be drop tight under test and working conditions and shall have non-rising spindle, wedge closure, and suitable for repacking under pressure. Bodies, gates and glands shall be cast iron or cast steel, spindles bronze, and seal rings on gate and body gunmetal or stainless steel.

All sluice valves shall be fitted with square caps or hand wheels as appropriate. The direction of rotation shall be anti-clockwise for closing when viewed from above. The direction of opening or closing of each valve, and the appropriate words shall be embossed on the cap and superfluous arrow heads shall be completely ground off the castings.

Gate valves shall be of the classes specified and shall be tested in accordance with SANS 191. The valves shall be subjected to both the "closed end" test and the "open end" test. There shall be no leakage under any of the test conditions.

Each gate valve shall be capable of being opened and closed by one man when the unbalanced head on the gate is equal to the rating of the valve as specified. If the design of the valves is such that gearing is necessary to achieve this, then the valves shall be equipped with machine-cut spur gearing and differential gear indicators.

All gate valves shall be double flanged with flanges drilled off-centre and with drillings to match existing flanges where applicable and/or to suit the pressure ratings of the valves. The non-rising spindles shall be bronze or stainless steel and the spindle nut either bronze or gun metal.

A complete specification, accompanied by drawings, is to be submitted at the time of tendering. Rates for all the gate valves shall include for testing and supply of test certificates, copies of which shall be attached to each relevant invoice and to each copy of each invoice. The open-end test pressure shall be stamped on the top of one flange of each valve. No payment will be made for valves unless the test certificates have been submitted. Valves not complying with SANS 664 will be considered as an alternative offer provided full technical details are submitted with the tender. Resilient seal valves will not be accepted for this contract.

Gate valves shall comply with SABS 664 for waterworks pattern valves of the types, classes and sizes listed in the Schedule of Quantities and shall be provided with the following:

	Description	**Specification**
1	Flanges	Double flanged, to be in accordance with and drilled off-centre to SABS 1123, Table 1600, 2500 or 4000 as scheduled.
2	Spindles	Non-rising, bronze or stainless steel with spindle nut either bronze or gunmetal
3	Handwheels	Direction of rotation for opening valves shall be clockwise when viewed from the top and appropriate wording must be embossed at the top indicating direction of “close” and “open” with arrow heads
4	Tests	Valves to be subjected to “closed end” and “open end” pressure tests to one and half times the working pressure. Valve body shall be tested to twice working pressure. Under all the tests, no leakage to occur
5	Paint	As in PF4
6	Other	Type B gunmetal trim Valves should permit repacking of the gland whilst valve is under pressure Factory test certificates to be provided with each valve Rates in the schedule of quantities to include requirements to comply with specification

Air Valves:

The materials and workmanship employed in the manufacture of air valves shall be of a similar standard to that set out in SANS 664 for waterworks pattern gate valves.

Types of Air Valves:

Air Valves shall be fully stainless steel (including all flanges, bolts, nuts, studs etc), of the double orifice type, and shall be equal or similar to the "Vent-O-Mat" (RBX series) type in which a small orifice, manufactured from Grade 316 stainless steel and having a minimum orifice size of 2,0 mm diameter, shall be capable of releasing accumulations of air at all pressures throughout the specified working pressure range and shall be drop-tight at the specified minimum working pressure. The large orifice

shall be suitable for admitting or expelling large quantities of air during emptying and filling of the pipeline. The opening of the valve (to atmosphere) shall be enclosed by a stainless-steel mesh which has been fixed into the valve body to prevent the entry of small insects or vermin into the valve.

All welding of stainless steel shall be carried out in workshops dedicated to the fabrication of stainless-steel products. Care shall be taken that the correct welding rods and approved welding procedures have been used for each application, and the Engineer shall have the right to request a certificate from the manufacturer in which the weld procedures used for the manufacture of valves supplied are stated.

All welds and weld beads, internal and external, shall be smoothed down by grinding and buffing. All stainless steel shall be pickled and passivated before the valve is assembled and tested.

Testing:

Each air valve is to be subjected to the following tests at the factory:

a. First, fill the valve with water and apply the factory test pressure through the inlet of the valve. Under this condition there shall be no weeping from any part of the valve.

b. Second, drain the valve and refill the valve with water and apply the maximum working pressure through the inlet of the valve and maintain for at least five minutes. Under this condition there shall be no loss of water from the valve.

c. Third, gradually reduce the pressure applied under b) above to atmospheric pressure, empty the valve and refill slowly expelling the air through the valve until it is full of water. Raise the pressure to the minimum working pressure, maintain that pressure for at least five minutes and against there shall be no loss of water from the valve.

d. Fourth, maintain the minimum working pressure applied in c) above, isolate the water inlet and introduce small amounts of compressed air into the valve without lowering the pressure in the valve. The lower float shall drop away from the upper float when sufficient air has accumulated in the valve. As soon as the accumulated air in the valve has discharged through the small orifice, the valve shall again close to a watertight condition. This process shall be repeated for at least five different pressures which are equally spaced between the specified minimum and maximum operating pressures and the valve shall close automatically when all the air has escaped without any dribbling and shall have a drop-tight shut-off.

Table of Particular Requirements for Air Valves

Scheduled Items			
Nominal diameter (mm)	80	80	25/50
Class	40	25	16
Flange Size and Rating	SABS 1123 Table 4000	SABS 1123 Table 2500	SABS 1123 Table 1600
Flange Drilling	SABS 1123 Table 4000	SABS 1123 Table 2500	SABS 1123 Table 1600
Factory Test Pressure (metres head of water)	800	500	320
Field Test Pressure (metres head of water)	as for pipeline	as for pipeline	as for pipeline

Working Pressure (metres head of water)			
(a) Maximum	400	250	160
(b) Minimum	10	10	10

Reflux Valves:

Reflux valves shall, except where otherwise specified, be double flanged single door swing type and shall be fitted with gun metal seats and bronze hinge and clack pins. In the case of reflux valves to be mounted horizontally, the design shall be such that the gate rests against the seat in the absence of flow or of differential pressure, without the aid of springs or external counterweights. Reflux valves shall comply with the requirements of SANS 144 for working pressures as required for each application, but not less than 1600 kPa working pressure.

Reflux valves shall incorporate, inter alia:

Bronze bushes at each end of the shaft which are capable of being maintained via a removable flange.

Extended shaft to which is attached an adjustable lever arm and counter weight.

Manually operated bypass valve.

Coatings to Valves:

Before leaving the factory valve bodies shall be treated as follows:

Externally – one coat zinc chromate primer to SANS 679 Type I

Internally – Clause 1.6.4 – System 1

After installation, valves shall be further treated with one coat of undercoat and one coat of approved gloss finish.

Flanges

The dimensions and drilling of standard flanges shall comply with the requirements of SANS 1123, 16 bar rating. Flanges shall be machined flat, ie without a raised joint face. Puddle flanges shall have the same dimensions as standard flanges but shall be undrilled.

Faces of flanges which will be in contact with jointing gaskets shall receive a protective coating of such thickness and consistency as will not impair the air/gas/water tightness of the joint. Where flanged pipes and fittings are rubber lined the rubber lining is to be wrapped around from the barrel onto the face of the flange and that rubber will form the gasket.

Flanges are to be drilled “off-centre” ie off horizontal and vertical centrelines.

Painting of Valves

The cleaning and painting of valves as specified hereunder is to be carried out at the factory prior to despatch to site.

All cast iron surfaces of every valve shall be prepared for painting to a thoroughly clean condition free of all grease and deleterious matter. Steel surfaces shall be prepared in accordance with Swedish Standard SIS 05 5900 for a Sa 2.5 finish.

Internal surfaces shall then be treated with two coats of Copon Hicote 151E or other approved non-toxic epoxy resin paint to give a total minimum dry film thickness of 160 micrometres; both coats being applied within 48 hours of commencement of painting.

External surfaces shall, immediately after cleaning, be treated with one of the following alternative paint systems:

a) System 1 - for valves situated in underground chambers or exposed conditions.

   Apply three coats of an approved epoxy coal tar paint to give a minimum total dry film thickness of 240 micrometres; all three coats being applied within 72 hours of commencing the first coat.

b) System 2 - for valves situated in pump stations etc.

   Apply one coat of zinc chromate primer followed by one coat of undercoat tinted where necessary, and a final coat of best quality gloss enamel. The total dry film thickness of the system shall be not less than 200 micrometres.
   PF 4.5 Non-ferrous metal or stainless-steel surfaces shall not be painted.

After erection on site all valves shall be cleaned and the paint work refurbished where necessary to restore the condition to that at the time of leaving the factory.

Payment

The prices quoted for all valves are to include for independent factory testing of valves, which test will be witnessed by Inspectors appointed by the Engineer.

Joints and Flexible Couplings

Jointing Material for Flanged and Coupled Joints

Bolts for flanges shall comply with the requirements of SANS 1123 for the working pressures specified and shall furthermore, together with the nuts and washers used in conjunction therewith, be of the material as specified in Clause 1.6.18. The jointing gaskets shall comply with the requirements of the relevant SANS specification and shall be cut to fit inside the bolts.

Gaskets in flanged joints shall comprise EPDM compound “Klinger 80” to SANS 974: 1986/ ISO 4633: 1983 and shall be inside bolt circle (not full face) gaskets.

All flexible/stepped couplings shall be as “Aqualok/Stepfit” (as manufactured by Rare Pipe Specials) or similar and approved and to the following minimum specifications:

Centre sleeve/body and endings: Rolled steel to SANS 1431: 1987 Grade 300W

Coatings (sleeve/body and endings):

Fusion-bonded epoxy to SANS 1217: 1986 minimum 300 microns externally

Each steel coupling shall be suitably protected externally by an approved anti-corrosion system after installation and the Tenderer is to include for his aspect in the pricing of the elements.

Bolts, Nuts and Washers

All bolts and nuts shall comply with the SANS 135. Washers shall be provided at each nut and shall be of the same material and coated where applicable to match the bolt and nut. Single coil square section spring washers shall be fitted to all nuts subject to vibration.

Bolts other than jacking bolts shall project not less than 3 mm and not more than 10 mm from the heads of the nuts after tightening.

Jacking bolts and holding down bolts to be built into concrete work as well as bolts to be installed under water shall all be of stainless steel Grade 304. Bolts for flexible couplings and flanges for underground installation shall be of Grade 4,6 steel hot-dip galvanised in accordance with SANS 763 and once fitted be given 2 coats of epoxy to give a dry film thickness of not less than 200 micron. Notwithstanding these requirements, the Contractor shall verify that the material of the bolts, nuts and washers used will not cause any galvanic action between itself and the surrounding material. Should galvanic action be possible, the Contractor shall provide suitable non-metallic sleeves and washers for such bolts.

Galvanising

Galvanising shall be carried out strictly in accordance with the requirements of SANS 763 (hot-dip zinc coatings) for heavy duty applications.

The Tenderer shall submit the name of the Sub-Contractor contracted to perform the galvanising, for approval by the Engineer. After delivery of the material to the galvanising plant, the Contractor shall inform the Engineer, who will arrange for inspection of the equipment, should he so require to ensure compliance with SANS 763.

After galvanising, the equipment shall be loaded carefully, making ample use of wooden spacers to prevent damage to the galvanised surface. Equipment with extensive damage to the galvanised surface will be accepted only after satisfactory re-galvanizing.

Electric Motors

The detailed specifications for the electric motors are included in the electrical specifications that form part of this document.

Pumps

The pumps offered shall be pumps of proven performance and preferably of standard design, except that the pumps must be located to suit the layout shown on the relevant drawing issued with the Tender Documents by the Engineer.

All parts are to be properly designed with ample margin of safety and are to be suitable for their pumping duties.

The speeds should preferably be as stated in the relevant clauses and should be such as to permit direct drive by a squirrel cage induction motor except in those cases where the drive is to be adapted to suit future changes in duty or where stated otherwise.

Pumps shall be of maker's standard and approved design, capable of doing the duty required at a speed preferably not exceeding 1500 rpm and shall be so balanced that there will be no end thrust when the pump is new or after wear has taken place, or alternatively, suitable heavy duty thrust bearings must be provided. Pump casings are to be of high grade close grained cast iron or cast steel of grade suitable to withstand the field or factor test pressure specified elsewhere, rigidly secured to a neat, properly designed bedplate or base. Impellers and guides shall be of CI (for sewage pumps) or stainless steel or phosphor bronze (for potable water pumps) and the shaft of high tensile steel with protecting sleeves of bronze or other suitable metal, the diameter being sufficient to withstand and transmit without whip and with ample margin of safety all torsional and bending stresses to which it may be subjected. The pump manufacturer shall utilise suitable materials for impellers, guides, shafts and protecting sleeves and other parts in contact with the fluid to be pumped to enable them to resist all corrosions and erosion damage. Bearings are to be of ample bearing area, dustproof with suitable provision for continuous lubrication.

The pumps offered are preferably to be of the self-regulating type with a "stable" characteristic i.e., for any selected manometric head each pump shall be capable of pumping at only one rate. Performance particulars and characteristic curves for each type of pump shall be submitted at the time of tendering. Efficiencies should be as high as possible in the normal indicated operating range. These will be considered in the adjudication of tenders.

Wherever possible axial thrusts should be counteracted by hydraulic balancing rather than by thrust bearings. The pumps shall be statically and dynamically balanced.

Components of the pumps should be so fitted and fixed that neither normal nor contra rotation can give rise to torques which will set them free to move out of their proper position.

The arrangements for bearing lubrication, water seals, air bleeding and priming of all pumps and pipework shall be such as to permit unattended stopping, starting and operation of the pumping plant by means of automatic remote control for the longest possible period under the control and operating conditions specified and in accordance with the general duty requirements.

The parts of each pump from suction inlet flange to delivery outlet flange shall be capable of withstanding the internal hydraulic pressures specified elsewhere or at least four times higher than those applicable under normal working conditions on the site, whichever is the higher.

Bedplates, Couplings and Guards

Each pump and its corresponding motor is to be mounted on a common bedplate of rigid construction which shall be provided with all holding down bolts and nuts for fixing pump and motor to bedplate and bedplate to concrete base. Each bedplate shall be provided with suitable openings for pouring in grout.

The tops of the concrete bases, constructed under another contract, will be at the elevations indicated on the drawings to be furnished by the Contractor and a space shall be left for grouting between the concrete and the bedplate.

In each case the bottom of the bedplate shall be set 25 mm above the concrete base, and in erecting the plant, the Contractor for the supply of the plant shall set each unit to precise line and level by means of brass shims and steel wedges and shall grout up the holding down bolts and carry out all grouting and finishing below, inside and round each bedplate.

Except in cases where special drives are required for future duty changes, in which cases the drive shall be arranged by the Contractor to suit his plant, each pump shall be direct coupled to its corresponding motor by means of pin and bush type, shrouded, flexible couplings of robust design constructed to restrict end-float of the motor shaft as required to prevent damage to motor bearings. Coupling halves shall be precisely machined and securely fitted so that the rims and faces of the two halves of any coupling may be used for checking alignment errors of parallelism and angularity of motor and pump shafts to accuracies of ± 0,025 mm and ± 0,025 mm on 100 mm, respectively, by means of feeler and/or dial gauges.

The coupling shall be of the so-called “tyre” type (“Fennaflex” or similar approved) which can tolerate slight misalignments.

Clearance between the two halves of the flexible couplings shall be adequate to avoid interference between the metal halves. Sufficient clearance is to be provided between the halves of the coupling to allow unhampered end-wise movement of the shaft of the motor to the limit of its bearing clearance. The running position of the motor-half of the coupling is to be checked by the Contractor by running the motor alone and the couplings halves set on the shafts accordingly.

Alignment errors shall be measured by the Contractor using dial gauges after final grouting and final tightening of holding down bolts and warming up of the motors by running for at least half an hour and the Contractor shall furnish the Engineer with a certificate stating that the positions of the coupling halves have been checked in accordance with the foregoing paragraphs and also stating the measurements of errors of angularity and parallelism of coupled shafts. The former shall not exceed 0,025 mm on 100 mm and the latter shall not exceed 0,025 mm.

The importance of ensuring that the suction and/or delivery pipework does not impose any forces onto the pump casing(s) is recognised. The Engineer will therefore require the Contractor to complete carry out the following after completion of the installation of the pump sets and pipework but before hydraulic testing:

Remove all of the bolts and nuts in the pump suction/suction pipework connecting flange.

Remove all of the bolts and nuts in the pump delivery/delivery pipework connecting flange.

There shall be no apparent movement of either the pump flanges or the pipe flanges and each bolt shall not require excessive force to insert it back into its hole in the abutting flanges. In the event of it not being possible to easily (without force) insert every bolt, the Contractor shall rectify the matter.

Thereafter the hydraulic pressure test shall be carried out.

Rigid steel guards shall be provided and bolted to the bedplate in such a way as to ensure protection of operators from moving parts.

Factory Tests on Pumps

Unless otherwise stated in the Project Specification/Scope of Work, the prices tendered for all pump sets will be held to cover all factory testing of pumps in compliance with this clause. The following tests shall be carried out in the manufacturer's works or in approved testing premises:

- Each new pump to be supplied under the Contract shall be tested in the Manufacturer's Works, or in other approved premises, in accordance with BS 5316 by Class "C" methods of measurement under the standard test conditions as laid down in that document. Before performance tests are carried out, each pump shall be subjected to an internal static hydraulic test pressure as stated in the Project specification with suction and delivery flanges blanked off. The pumps shall be watertight (except at packed glands if mechanical seals are not installed) under this test.
- The range of the performance tests shall be sufficient to enable the Engineer to compare the actual test performance of each pump with the performance figures entered on the data sheets and/or otherwise presented by the Tenderer at the time of tendering.
- The results of the tests on each pump shall be prepared in triplicate in the form of pump test sheets drawn up in the manner of Appendix Z to BS 5316:1976 and signed by the Manufacturer or Agent's Engineer who shall witness each test by the arrangement of and at the expense of the Contractor. Each such sheet or copy thereof shall be accompanied by curves accurately plotted on squared paper and depicting the following characteristics:

    - Test Curve: Total Pumping Head (metres of water) vs Discharge (ℓ/s)
    - Tender Curve for comparison with above
    - Test Curve: Pump Efficiency vs Discharge
    - Tender Curve for comparison with above
    - Test Curve: Input power (kW absorbed by pump) vs Discharge
    - Tender Curve for comparison with above
    - Test Curve: Amps per phase of motor vs Pumping Head (metres)
    - Tender Curve for comparison with above; calculated from tendered data relating to pump and motor.

NOTE: The above-mentioned test curve shall be calculated based on the results of the aforementioned pump tests in conjunction with the results of simultaneous or separate tests on the appropriate motor, without allowance for the operating effect of power factor correction capacitors and assuming a 415 V, 50 Hz electric power supply and operating at the altitude of the site as specified elsewhere.

The triplicate copies of pump test sheets certified by the Manufacturer or Agent's Engineer and the above-mentioned curves shall be posted timeously to the Engineer so as to reach him at least one week

before erection of the appropriate pump is completed on site so that the last listed curves above may be used for the purpose of re-checking the performance of the appropriate pump-motor-combination set at the time of commissioning.

Elsewhere in this specification the Employer's right to reject unsatisfactory plant is stated.

MECHANICAL EQUIPMENT: PARTICULAR SPECIFICATIONS

The scope of the Contract is described in general terms under the appropriate headings in PART C3: SCOPE OF WORKS

GENERAL

This section deals with the design, supply and commissioning of a 300 kl/day water purification plant to replace the existing plant which is in a deteriorating state. The plant must the treat raw water pumped directly into the treatment plant. The source is a river about 1 km away from the treatment works site.

The prices tendered shall be deemed to cover everything necessary for the supply, erection and commissioning of the mechanical and electrical equipment for the St Barnabas Hospital Water and Sanitation infrastructure.

The work covered by this contract shall include, inter alia, preparation of drawings of the proposed new mechanical and electrical plant showing full details of the required pipework, holding down arrangements, flexible couplings, and coupling guards, the manufacture and factory testing of pumps, motors and accessories, delivery, handling and erection, testing in situ, commissioning and maintenance for a period of 12 months of all mechanical, electrical plant and pipework and everything necessary for the satisfactory operation of the installations to the satisfaction of the Engineer

The system must be fully automated and have the capability of switching over to manual mode. Indications of fault conditions, or conditions that require maintenance or intervention must be clear.

The specifications in this Particular Specification for some of the stages of the plant describes traditional conventional systems. The contractor may deviate from these under the following conditions:

i. That it consists of technology and components that have a verifiable, proven successful track record,
ii. That the Contractor made a complete submission in his tender,
iii. That the advantage outweighs the use of traditional configuration,
iv. That full details be submitted to the Engineer for approval in writing,
v. Risk of the design remains with the contractor.

Should the proposed system be of a type with elevated components that requires maintenance or operator intervention, access platforms, ladders and railing must be provided.

It must have the ability to be dissembled to be relocated to another site without the necessity to reconstruct major components elsewhere.

The plant must be able to treat 300kl/day of raw water to the requirements of SANS 241 (2015).

The plant must be able to operate on a 12-hour day or intermittently as demand requires.

The treated water from the plant will be discharged into 2 underground tanks of approximately 450m^3 in total. The treated water is then pumped into an elevated tank from which it gravitates into the hospital.

It is expected that the treatment plant will have the following minimum components:

a. Sedimentation tank(s) for the removal of solids,
b. Buffer storage tank,

c. Sludge system with associated ancillaries,
d. Filter feed pump(s),
e. Chemical dosing pump(s),
f. Activated Media Filter(s) (AFM),
g. Activated Carbon Filter(s) GAC,
h. Maddox Filter(s),
i. Bag Filter(s),
j. Control panel,
k. NTU (turbidity) meter(s) and
l. All associated electrical and mechanical components including flow sensors, flow regulators, flow meters, cable racking, reticulation piping and struts.

Water Treatment Plant

Configuration

The general system configuration and operation of the plant is described in the table below.

Water Treatment Plant Configuration and Requirements.	
Description	**Requirement**
Flow rate	300kl/day
Final water quality	SANS 241(2015)
Duration of operation	12 hour per day
AFM Filtration	300kl/day - FRP Vessel 36”x72”
GAC Filtration	300kl/day - FRP Vessel 36”x72”
Maddox Filtration	300kl/day - FRP Vessel 36”x72”
Clarification Tank	with a 300kl/day capacity
Break/buffer tank	15kl with 12kl Operating Capacity in one tank
Coagulant Dosing Station	Aluminium sulphate used as a primary coagulant.
Disinfectant Dosing System	Sodium hypochlorite dosing pump with a sensor that automatically measures required amount of dosage. The average dosing is 8ppm with a residual of 2ppm.
Chemical treatment	Provision should be made for pH adjustment, turbidity, colour, iron as Fe, total coliform count and heterotrophic plate count.
Mixing requirements	Chemical dosage to ensure flash mixing.
Sedimentation	Sedimentation to take place at a rise rate not faster than 5m/h. Tenderer to indicate flow rate based on their proposed design.
Bag Filtration	Required for capturing residual suspended solids that surpass prior filtration.
Turbidity meter	NTU meter or Nephelometric turbidity meter to measure the water clarity by assessing the light scattered by particles suspended in the water.
Filter feed pump(s)	2x MN40-160B@380v with 3kw (duty and standby).
Storage	Treated water to discharge to ground storage reservoir tanks.

Sludge disposal	Sedimentation tank de-sludging to take place from under drain points through ball valve controls. A dewatering bag or system with associated ancillaries is required.
Backwash water disposal	Filters to be backwashed using portable water from 3 filters (no raw water flushing) and waste is to discharge to nearby manholes.
Design life	The plant must be designed for a 20-year life span.

Design Data

The following test results of raw water from the pump station at the dam are provided for design purposes of the plant:

Raw (R1) and Tap (T1) Water Analysis Results			
Date	**Unit**	**29/11/2023**	**29/11/2023**
Sample No		**672521**	**672522**
Total dissolved solids	mg/L	161	209
Total suspended solids	mq/L	4.6	22
Turbidity	NTU	3.81	64
Nitrogen ammonia as N	mq/L	0.12	0.13
pH at 25 degrees Celsius	pH units	6.44	6.77
Fluoride as F	mg/L	0.23	0.32
Nitrate as N	mq/L	0.78	0.8
Sulphate as SO4	mg/L	4.85	4.76
Colour	mq/L Pt-Co	35.5	518
Electrical conductivity at 25 °C	mS/m	21.8	21.3
Chlorides as Cl	mg/L	33.5	28.2
Cadmium as Cd	pq/L	<1	<1
Arsenic as As	pg/L	<10	<10
Aluminium as Al	ug/L	<10	224
Chromium VI as Cr	mg/L	<0.005	<0.005
Calcium as Ca	mg/L	9.43	9.58
Total hardness as CaCO3	mg/L	52	51
Lead as Pb	tJg/L	<10	<10
Iron as Fe	uq/L	<10	366
Potassium as K	mg/L	0.93	0.93
Manganese as Mn	ug/L	<10	<10
Magnesium as Mg	mg/L	6.7	6.59
Zinc as Zn	ug/L	<10	<10
Vanadium as V	ug/L	<10	<10
Sodium as Na	mg/L	23.7	24.1
Total coliform count	MPN/100ml	770	687
Escherichia Coli	MPN/100ml	62	64

Total organic carbons	mg/L	2.74	6.77
Heterotrophic plate count	cfu/ml	3996	924

The above results of samples taken at the raw water source and from a tap within the hospital indicate that the current treatment plant is no longer operating efficiently. The proposed treatment plant must be able to treat the raw water in accordance with SANS 241: 2015.

Clarification

A clarifier tank will be used to remove suspended solids and particulate matter from liquid. This process is achieved through sedimentation, where the heavier particles settle at the bottom of the tank, allowing clearer water to be extracted from the top. Smaller, typically unsettled floc particles fall only a short vertical distance onto the tube surface where they accumulate and coalesce, forming larger, denser particles capable of settling to the basin floor.

Break Tank

The purpose of a break tank between the clarifier and filtration system is to provide a buffer and maintain a consistent feed water pressure to the filters for optimal performance and stability. The tank should have a 15kl with a 12kl operating capacity in one (1) tank.

Filter Feed Pump

All the dosing units are to be supplied in a duty and standby configuration complete with all pipework and fittings required for normal operation. The installation shall provide for the de-coupling of any one unit for off-site repair. The dosing system shall include the delivery and suction line, the dosing unit, and the supply tank. The supply tank shall be large enough for 48 hours continuous operation and the necessary lids and agitators included.

AFM Filtration

The media filter performs the filtration of water through a layer of graded particles. These particles can be sand or activated glass media, gravel or other granular materials. The filtration rate depends on the effective size of the bedding and the water velocity through the filter.

Based on the expected flow rate, the minimum required media filter(s) are FRP Vessel 36”x72” with a 4” opening. The recommended minimum flow rate per hour is 13200 – 16200l for each of the filters.

The proposed design should indicate the adopted filtration rate based on the parameters indicated above.

The media should be equipped with an automated backwash system. The system should be able to pump water in the reverse direction in order to cause dirt particulate to be in suspension.

GAC Filtration

Any organic or inorganic pollutants are absorbed onto the surface of the GAC media and removed from the water. This media is mainly used to remove colour and smell from water.

Based on the expected flow rate, the minimum required media filter(s) are FRP Vessel 36”x72” with a 4” opening. The recommended minimum flow rate per hour is 13200 – 16200l for each of the filters.

The proposed design should indicate the adopted filtration rate based on the parameters indicated above

The media has to be backwashed frequently with an automated backwash system.

Maddox Filtration

Maddox filtration is used for the removal of iron and manganese. It involves the use of a media bed containing a combination of manganese dioxide-coated media and anthracite. As water passes through the media bed, the manganese dioxide coating catalyzes the oxidation of dissolved iron and manganese, converting them into solid particles. These particles are then trapped and removed by the media bed.

Based on the expected flow rate, the minimum required media filter(s) are FRP Vessel 36”x72” with a 4” opening. The recommended minimum flow rate per hour is 13200 – 16200l for each of the filters.

The proposed design should indicate the adopted filtration rate based on the parameters indicated above

The media has to be backwashed frequently with an automated backwash system.

Bag Filter

The bag filter is responsible for capturing residual suspended solids that surpass prior filtration stages. Composed of high density, micron-rated materials, it ensures fine particulate retention. The proposed filter should be sized in accordance with the expected flow rate.

Turbidity Meter

An NTU meter, or Nephelometric Turbidity Unit meter measures water clarity by assessing the light scattered by particles suspended in the water. It quantifies turbidity in NTUs, aiding in water quality monitoring by detecting changes in the concentration of particulates, which could indicate pollution or sedimentation.

The meter should have the following specifications:

Measurement Method	90° scattering measurement
Light Source	Tungsten (400 – 600nm) filament lamp, compliant with US EPA 180.1 Method
Measuring Range	0 to 1000 NTU (FNU), automatic range switch 0.01 to 19.99 NTU (FNU) 20.0 to 99.9 NTU (FNU) 100 to 1000 NTU (FNU)
Accuracy	≤ ±2% of reading+ stray light
Repeatability	≤ ±1% of reading or 0.02 NTU(FNU) (whichever is greater)
Resolution	0.01/0.1/1 NTU (FNU)
Stray Light	≤0.02 NTU (FNU)
Calibration Standard	AMCO Polymer solution or Formazin Solution: 0, 20, 100, 400 and 800 NTU (FNU)
Detector	Silicone photovoltaic
Measuring Mode	Normal measurement; Average Measurement
Display	TFT color screen
Sample Cuvette	Φ25×60 mm, high borosilicate glass with lid
Sample Cuvette Volume	18 ml
Power supply	3.7V Rechargeable lithium battery
Working Condition	Temperature: 0 to 50°C (32°F to 122°F); Relative humidity: 0 to 90% at 30°C, 0 to 80% at 40°C, 0 to 70% at 50°C, no condensation
Storage Condition	Instrument: -40 to 60°C (-40 to 140°F) Calibration Solution: 5 to 30°C (41 to 86°F)
Instrument sealing grade	IP67
Certificates	CE and RoHS

Filter Feed Pumps

The filter feed pumps should be equivalent to MN40-160B@380v with 3kw (duty and standby).

Pumps & Control Panels

The pumps shall be of the dry well, self-priming centrifugal type, specifically designed for the handling of raw water. Tenderers must offer pumps which they believe are capable of satisfying this arduous duty with a similar level of reliability. Full details of pumps offered, including testimonials from long-term users, are to be supplied at the time of Tender.

The openings and passages of the pump shall be large enough to permit the passage of a sphere 75 mm in diameter and any rubbish or stringy material which will be present in the raw water. The pump

must be equipped with a removable cover plate, allowing complete access to the pump interior to permit the clearance of stoppages and to provide easy access for service and repairs without disturbing suction or discharge piping.

The pump shall also be fitted with a replaceable wear plate. Replacement of the wear plate, impeller and seal shall be accomplished through the removable cover plate. The entire rotating assembly, which includes bearings, shaft, seal, and impeller, shall be removable as a unit without disturbing pump volute or piping.

The impeller shall be 2-vane, semi-open, non-clog, cast in ductile iron, with integral pump-out vanes on the back shroud, and shall thread onto a pump shaft of high carbon steel. Means shall be provided for external adjustment of the impeller to the wear plate.

The shaft shall be covered and protected with a removable sleeve. The shaft shall be contained within a bearing pedestal of ample size to contain heavy duty ball thrust bearings and radial bearings of adequate size to withstand all imposed loads. Bearings shall be oil lubricated, with the bearing pedestal cooled by pumped liquid.

The pump shaft shall be sealed against leakage by means of approved **gland packing**. Mechanical seals shall not be permitted on the raw water pumps.

The pump volute casing shall contain no openings of a lesser diameter than the sphere size specified. Screens or any internal devices that create a maintenance nuisance or interfere with priming and performance of the pump will not be permitted.

The price quoted shall allow for pumps, motors, couplings, coupling guards, baseplates and suction and delivery pipework (including delivery isolating and check valves) for a complete installation. The delivery pipework is to terminate with a BS4504 Table 16 flange set 1 m beyond the outer face of the pumpstation. Mechanical contractor shall include for connecting up to the flange supplied by the civil contractor, including electroplated bolts, nuts and washers and suitable jointing material.

Pump Duties

The pumpsets offered are required to operate at the following duty points:

1. **Low Lift Raw Water Pumps (Pumpset abstracting raw water from the river and pumping to the raw water storage sump)**

   Each pumpset operating alone shall deliver **15l/s against a head of 35 metres**. Two pumps to be provided (1 duty and 1 standby):

2. **High Lift Raw Water Pumps (Pumpset pumping raw water from the storage sump to the water treatment works)**

   Each pumpset operating alone shall deliver **10l/s against a head of 113 metres**. Two pumps to be provided (1 duty and 1 standby):

3. **Potable Water Storage Pumps (Pumpset pumping treated water from the water treatment works to the elevated storage tank)**

   Each pumpset operating alone shall deliver **10l/s against a head of 30 metres**. Two pumps to be provided (1 duty and 1 standby):

Motor Control Centres (MCCs)

The basic operation of the pumps will be controlled by “Auto”, “Off”, “Manual” selector switches on the pump station MCC. Automatic operation of the pumps will be controlled by stainless steel electrodes to be fitted in the pumpstation sumps.

Manually operated selector switches are to be provided to allow each pump to be selected for “Duty”, or “Standby” so that pump operation can be rotated amongst both pumps.

The switchboard(s) shall be, in all respects, suitable for receiving and distributing all the electric power required for starting and operating the pumps and ancillary equipment to be installed in the pumpstation under this contract.

The switchboard is to be boldly labelled:

“ST BARNABAS RAW WATER PUMPSTATION” as appropriate.

The switchboard(s) is to be of the floor/wall mounted, front access type suitable for installation in the position shown on the tender drawings.

The MCC’s will receive power supply from an Eskom transformer at the site. The tenderer is to allow for supplying and installing an appropriately sized cable to the MCC’s in the Pumpstations. All cabling shall be in accordance with SANS 10142: Code of Practise for the Wiring of Premises.

The following are specific requirements for the Electrical control panel and associated installations to control the pumps specified in the previous paragraph:

- The pump controls must include a manual override mode that allows manual switching on and off when within normal operating conditions in terms of level switching limits and pressure sensor signals from tank levels.
- Thermal, phase angle, overload and no- load protection.
- Ammeter & Voltmeter.
- Visual Fault condition indication.
- Pumps to be switched between duty and standby, controlled by an adjustable timer with 1h to 12h range. Please note that under normal circumstances the pumps are required to run continuously. Switch over from one pump to the other is therefore not necessarily preceded by an off signal as a default.
- Alternative pump to be switched on if fault condition on 1st pump is detected.
- Control panel to be mounted in a lockable corrosion resistant powder coated metal enclosure with IP55 rating against wall.
- The control panel to be mounted in the new plant room for pumping equipment.
- Pumps to be switched off by float level when minimum permissible level is reached in underground tank.
- The above does not limit the specification to ensure safe and functional operations.

Measurement and Payment:
The relevant prices and tendered rates must collectively include the following:

- Complete control panel mounted in powder coated metal box in plant room.
- Connected to distribution board in pump room. Cable lengths of 20m is included in the rates.
- Pressure sensors, sensor cabling to control panel, cabling, and mounting tray.
- Commissioning and Certificate of Compliance for the electrical installation by a registered electrical contractor.

Control Panel Function:

Enclosure:	Powder coated mild steel, IP 54
Function:	EN 10779, A.1.2 Main Switch Ammeter and Voltmeter
Operation:	Test-Off-Auto
Control Unit:	Start and Stop Button Pressure switch test for Pump 1 and 2 LED signal test button LED power unavailable LED pump on demand LED pump running LED power at motor LED start failure
Outputs for remote monitoring:	Mains supply status Pump in operation Pump start failure

Prior to ordering, the Contractor must submit to the Engineer the detailed information and specifications of the complete pump installation.

Measurement and Payment:

The items scheduled for the fire booster pump installation, collectively covers everything required or the final installation, testing and commissioning. It also includes the isolation valves and non-return valves and pipework to be connected to a single ø200mm Table 1600/3 flange. Pipework up to the suction flanges are scheduled elsewhere.

Elevated Tank Feeder Pumps

A pump set consisting of a duty and standby single stage, centrifugal pump, end suction set must be installed with the other equipment in the existing plant room to be refurbished. The purpose of the pump set is to pump water from the storage tank on ground level into the existing 116m3 and the new 300m3 elevated storage tanks that feed the hospital. The tank stands structural steel to be hot dipped galvanized grade 300W steel, in accordance with SANS 1431. The tank must be designed by the manufacturer in accordance with SANS016 – 1984 taking into consideration the loading of a full tank. All major connections are to be in accordance with SANS 094-1982. The following is the specification:

Pump Specification

- Medium: potable water.
- Pump type: single stage centrifugal pump
- Pump Model: SANS approved.
- NPSHA: 10kPa min available
- Electrical motor: Three Phase 380 V, 50Hz, IEC3 ±2,2 kW (or similar as proposed by the supplier)

- Required pump duty point: 200kPa @ 6.0 lit/sec o Pump Type: Grundfos NK32-125 A2-F-K-E-BAQE to ISO 2858 or similar approved.
- The pump motor must be equipped with thermal and electrical overload protection.
- Lightning and surge protection.

Control Panel and pump operation:

The following are specific requirements for the Electrical control panel and associated installations to control the pumps specified in the previous paragraph:

- The pumps must be switched off when the elevated tank reaches full level. This must be done with a remote level sensor.
- The pumps must switch of when the water level falls below the domestic water outlet level. This must be controlled with a level sensor in the fire tank.
- The pump controls must include a manual override mode that allows manual switching on and off when within normal operating conditions.
- Thermal, phase angle, overload and no- load protection.
- Ammeter & Voltmeter.
- Visual Fault condition indication.
- Pumps to be switched between duty and standby, controlled by an adjustable timer with 1h to 12h range. Switch over from one pump to the other is therefore not necessarily preceded by an off signal as a default.
- Alternative pump to be switched on if fault condition on 1st pump is detected.
- Control panel to be mounted in a lockable corrosion resistant powder coated metal enclosure with IP55 rating against wall.
- The control panel to be mounted in the new plant room. The above does not limit the specification to ensure safe and functional operations.

Measurement and Payment:

The relevant prices and tendered rates must collectively include the following:

- Complete control panel mounted in powder coated metal box in plant room.
- Connected to distribution board in plant.
- Level sensor cabling to control panel, cabling, and mounting tray.
- Commissioning and Certificate of Compliance for the electrical installation by a registered electrical contractor.

Existing equipment

When the new Water Treatment Plant and Raw Water Pumpstation are fully operational, the Contractor must dismantle and remove all the pipework and equipment off site. All motors and pumps remain the property of the Employer and must be delivered to his stores.

Backup generator

A backup generator must be provided and stationed at the abstraction works. The supplied generator must meet the following:

- Diesel generator,
- Prime power of 100kVA,
- Standby power of 110 kVA,

- Three (3) phase generator,
- Minimum power of 95/1500 (kW/RPM),
- Four (4) cylinder engine.
- Running time of 15 hours @75% load,
- Equipped with a low-pressure alert system,
- Equipped with a Low fuel cut out system.

ELECTRICAL EQUIPMENT: STANDARD SPECIFICATIONS

Introduction

This Electrical Standard Specification specifies the standard of workmanship and the quality of the material for the supply, delivery and installation, the scope of which is specified in the project specification, on the drawings and listed in the schedules and where applicable in the Bill of Quantities.

Where trade names and marks are specifically mentioned, then it will only relate to the type and quality of the product and it will not necessary exclude similar and equal products or equipment from other manufactures unless specifically so stated.

Switchgear and Electric Motor Control Equipment

(1) The equipment shall be designed to operate at the altitude of the site, an area subject to thunderstorms and an ambient temperature that may vary from -5°C to 45°C. The equipment shall be suitable for operation on three phase 50 hertz AC systems with neutral solidly earthed at the step down transformers. The short circuit capacity at the low voltage busbars shall be determined by the Contractor and shall comply with the Supply Authority's requirements in this regard.

The Supply Authority is Eskom.

Switchboards shall be to approval, of the metal enclosed, indoor, cubicle type conforming to the requirements of SANS 1180 and suitable for the service and electrical system conditions specified herein. The cabinets shall be of sheet steel construction braced and framed to approval and provided with hinged locking doors or removable bolted panels to provide access to the interior. Switchgear control components and associated instruments shall be flush mounted and grouped to approval on the front of the assembly in such a way that they are within reasonable reach and view of an operator, both for maintenance and normal operating purposes.

Approved automatic shutters shall be provided to close all openings giving access to live conductors after the withdrawal of circuit breakers or other removable equipment.

The switchboards shall be floor mounted, bolted on to the concrete floor and designed for front access only. Cables shall enter the assembly from the cable holes to be cut by the Contractor. End box glands shall be positioned at a suitable height to facilitate terminating of cables provided that the minimum radius of bends in the cables shall not be less than 12 times the overall diameter of the cable. All entries and openings to the assembly shall be vermin proofed to approval and all enclosed compartments shall be ventilated to approval to prevent condensation. The interior of the switchboard shall be partitioned off from the chamber housing cable entries by means of approved vermin proofing plates fixed at the level of the tops of the cable glands. Terminals for cable tails to each circuit shall be arranged not more than 300 mm above each cable entry. All cable terminals shall be marked to approval and be provided with appropriate cable lugs for the cables to be installed. For low voltage cables a gland plate shall be provided which shall be drilled and fitted with the appropriate glands for terminating PVC and swa cables.

Short circuit ratings shall apply not only to the switch but also to all component parts and jointings on each assembly. All components shall withstand for three seconds a symmetrical current stated in rms values corresponding to the short circuit rating of the switchgear specified.

In addition the maximum continuous working loads which can be carried shall be as stated.

Temperature rises shall be in accordance with BS 116:1952 as amended and current densities for all current carrying parts of each assembly shall not exceed the limits laid down in BS 159:1957.

The Contractor shall submit a photographic or certified copy of short circuit type tests proving the rupturing capacity of the switchgear.

(2) Busbars shall be of solid hard drawn high conductivity copper in accordance with SANS 1195 BS 159 and BS 1433. Busbars shall be suitable for the maximum total loads to which they can be subjected.

Busbars and busbar connections and risers shall be air insulated and supported upon approved ceramic or fibreglass insulators and shall conform to the requirements of BS 159:1957. Fibreboard busbar supports will not be acceptable. Clearances from phases to earth and between phases or parts subject to potentials above earth shall be in accordance with SANS 1180.

All connections from the busbars shall be supported on insulators to provide the same spacing between phases and to earth as the busbars, up to the point of entry into an hrc fuse or circuit breaker.

An approved copper earth bar shall be provided along the entire length of the assembly to which all metal parts of the assembly shall be earthed. The earth bar shall be not less than 25 x 3 mm in section. This earth bar shall be brought down and connected at both ends of the assembly to a 10 mm minimum diameter earthing terminal located within 100 mm of the bottom of the switchboard all to approval. An earth is to be provided in accordance with the Supply Authority's Regulations.

A bolted link to connect the neutral busbar to the switchboard earth bar shall be provided.

Secondary wiring to approval consisting of suitably rated high conductivity stranded copper conductors insulated with PVC in the appropriate colours shall be cleated to approval within the switchboard. All conductors shall be numbered at both ends in accordance with the markings shown on the schematic and wiring diagrams. The connections from all dual ratio current transformers shall be brought to approved easily accessible link boards to facilitate change of ratio, and an approved clear engraved plate describing the linking arrangement shall be fixed to the link board.

The secondary wiring earth leads shall be brought to marked, easily accessible links for insulation resistance testing purposes. All secondary fuses shall have approved spring type fuse holders and cartridge fuses with spare fuses mounted on approved racks.

The marking of conductors and terminals of power and secondary circuits to show phase sequences shall comply with BS 158:1961.

(3) The main incoming switches, fuse-switches and any feeder fuse-switches shall be mounted so that their operating handles are exposed at the front of the board. The operating handles shall move in a downward direction to open the switches or fuse-switches and provision shall be made to lock the handles in the off position only.

(4) HRC fuse-links and fuses shall comply with requirements of SANS IEC 60269. The category of duty shall be AC4 as defined in Table III of SANS IEC 60269. HRC fuses shall be provided wherever necessary, whether specified or not.

(5) Each lighting circuit shall be protected by means of a single pole moulded case circuit breaker of 10 A rating. Each socket circuit shall be protected by means of a single pole moulded case circuit breaker of 15 A rating. In addition, earth leakage protection shall be provided for socket outlet circuits and shall have a sensitivity of 20 mA and be sealed in a case with no de-sensitizing device.

(6) Moulded case circuit breakers shall comply with SANS 156.

(7) Starters for electric motors shall comply with BS 587 for motor starters and SANS 60947 for contactors. The starters and contactors with their associated interconnections, isolating switches and HRC fuses shall be suitable for operation under normal, overload and fault conditions in the 380/400 V, 3 Ph, 50 Hz system with a solidly grounded neutral and having a symmetrical fault capacity of 20 MVA.

(8) The power rating of the starters and contactors shall be either equal to or in excess of the rating of the motors and shall comply with the requirements of BS 587 for a duty rating in service of up to 20 starts per hour.

All contacts for both contactors and relays shall be solid or sintered silver alloy or equal and approved electrical contact material.

(10) The contacts shall be securely fixed to the contact carriers either by welding or the sintering process. The contact carriers shall be robustly constructed and suitably reinforced to minimise the effects of contact bounce. Contacts which are either riveted or soldered to the contact carriers are not acceptable. Contacts which are made from either plain copper or plain copper which is silver plated are not acceptable. Indicating instruments shall be contained in approved metal cases and shall be of the dead band type to the requirements of BS 89 Grade 1. They shall have long, clearly divided and indelibly marked scales and the full load current of the circuit shall be indicated by a red line. Means shall be provided for zero adjustment without dismantling the instrument. Ammeters associated with starters shall indicate at least seven times the full load current of the motor, the full load current of the motor being at least two thirds of the full scale deflection.

(11) Where necessary for protection of instruments against short circuit faults, current transformers shall be provided whether specified or not.

(12) All instruments, relays and other panel devices shall be back connected and all metal parts of the front and back of the panel shall be effectively earthed.

(13) The wiring and power connections to devices in the panels shall be carried out by means of PVC insulated copper conductors. The minimum conductor size shall be 1,5 mm2 unless otherwise approved. Solid copper connections may be employed, if necessary, for power connection only.

(14) The colours to be used for the wiring and power connections to the devices shall be as follows:

Red	-	Phase 1
Yellow	-	Phase 2
Blue	-	Phase 3

Black - Neutral
Green - Earth

(15) In the case of the internal wiring of the devices themselves, the details of the manufacturer's standard insulated conductors and colour code shall be referred to the Supply Authority for approval.

(16) Where the connection arrangements or special types of control circuit equipment present difficulties in complying with the colour code detailed above, the proposed alternative colour code shall be referred to the Supply Authority for approval.

(17) All pilot lights shall be of the transformer operated type with 6-8 V, 2,5 watt, long life bulbs accessible from the front of the pilot light and removable shatter-proof glass colour caps to give an indication when illuminated, which is clearly visible through an arc of 180° with respect to the mounting panel under both natural and artificial lighting.

(18) Panel wiring shall have numbered ferrules brought out to approved terminal strips with numbered terminals conveniently located in relation to the main gland plate which shall be situated not less than 225 mm from the bottom of the panel. The panel wiring and the stranded power connections shall be made by the use of crimped cable lugs using an AMP crimping tool or approved equivalent.

(19) The power connections whether stranded or solid shall be conveniently located to the main gland plate. All ferrule and terminal numbering shall correspond with the wiring diagram to be provided by the Contractor.

(20) All the necessary mechanical armour grip type glands similar to "Pratley" or equal and approved type and manufacture for both the control circuit cables and the outgoing cables to equipment shall be provided. These cables shall be PVC insulated, single wire armoured PVC. Space shall be allowed on the main gland plate and the gland plate shall be drilled for the reception of the main incoming PVC SWA PVC cables and glands.

(21) The panels shall be labelled as specified or required by the Engineer. Clearly lettered, engraved, plastic or approved labels and legend plates shall be provided. All labels and legend plates shall be fixed by screws or other approved means. Glued labels and legend plates are not acceptable.

(22) All relays controlling either the operation or the tripping and re-closing of AC contactor coils shall have making and breaking VA rating at least 50% in excess of the inrush and sealed VA ratings of the associated contactor coils. Where the VA rating of the relay contacts are insufficient to meet this requirement, separate reinforcing relays shall be provided.

(23) All electrodes required to sense water, sewage or effluent levels for the automatic control of plant shall be of 20 mm diameter stainless steel tube and shall operate at voltage not exceeding 32 volts. Such electrodes shall be firmly mounted with provision for not less than 500mm vertical adjustment. All parts of mountings and all fittings shall be of stainless steel or other non-corrodible materials. All electrodes shall be sheathed (insulated) over their full length by means of heat-shrink plastic with only the ends bare.

(24) Except where otherwise specified, the overload relays, or releases, or tripping devices shall be of the thermal melting alloy type to approval and ambient temperature compensation is not required. They shall be mounted in a position such that they cannot be affected by the heat from the contactor contacts under either normal or arduous operating conditions. In those cases

where they are incorporated in the contactor block as a unit, they shall be mounted at the bottom of the contactor block assembly.

(25) Isolators shall be of the quick-make and quick-break type suitable for operating on load. A mechanical interlock shall be provided between the isolating switch operating handle and the panel door which normally prevents the panel door from being opened without firstly opening the isolating switch. The isolating switch handle shall move in a downward direction to open the isolator and provision shall be made to lock the handle in the "off" position only. A special arrangement which will allow authorised personnel to open the cubicle door when the isolating switch is closed so as to examine the equipment when alive would be an advantage. This arrangement shall require a special tool for its operating and not an ordinary screwdriver. In addition, the arrangement shall be effectively rendered inoperative when the isolating switch is locked in the "off" position to prevent any person from opening the cubicle door under these conditions.

(26) In the event of it being the manufacturer's standard practice to include an electrical interlock between the isolating switch and the contactor, this is acceptable. Nevertheless, this shall not relieve the manufacturer from providing quick-make quick-break on-load isolating switches as specified above.

(27) The required switchgear is to be installed in rigidly steel framed 2 mm thick sheet steel clad or approved tough durable plastic clad, firmly mounted, back to wall, front access, multi-panelled, cubicle type distribution switchboards complete with a totally enclosed air insulated busbar chamber containing four busbars of suitable section. All sides and doors shall be perfectly flat and free from both blemishes and weld marks and all metal surfaces shall be finished in best quality light grey baked enamel. Internal mounting arrangements shall be provided such that the board is neat in appearance and has not external mounting lugs. A sufficient number of suitably placed conduit knock-outs shall be provided at the top and bottom of the board.

(28) The panels of all the distribution switchboards required under this Contract shall house equipment listed in the appropriate clause of this Specification relating to each section of the Contract.

(29) Capacitors shall be suitable for a 400 volt, 3 phase, 50 Hz supply and shall comply with BS 1650 and IEC 70 as amended and suitable for operating in an ambient temperature of 40°C at altitudes as specified in Clause 1.2.1.16.

The capacitors shall be totally enclosed and resistors shall be fitted directly across the terminals to reduce the terminal voltage to 50 volts within one minute of disconnection.

The impregnant shall be non-inflammable, non-toxic with optimum qualities of viscosity and stability and possessing a high dielectric constant and low losses.

Each capacitor shall comprise a number of internal elements each made of highest quality low loss capacitor tissue and high purity aluminium foil and each element shall be separately fused internally.

Admissible overloads shall be 10% excess voltage continuously, 15% excess voltage for six hours in 24 hours, 30% excess current continuously and 35% excess kVAr continuously.

Losses shall be limited to 0,5 watt/kVAR and an earth terminal shall be provided.

To reduce the effects of harmonics in the supply system at the Site, the capacitors shall have a rated voltage, as defined in BS 1650, of 500 V. Accordingly, they shall be de-rated for use with their associated 380/400 V motors so that the power factor of these motors is corrected to not less than 0,95 lagging at the mean motor operating voltage of 400 V.

The cable from the switchboard to the capacitor shall be rated at one and a half times the kVA rating of the capacitor. The capacitor rating shall not exceed 0,85 times the no-load kVA of the motor.

(30) All ammeters, including those on starter panels serving motors equipped with capacitors, shall be so connected as to register the actual current in motors, not the current as reduced by the power factor correction capacitors.

(31) The flow switch type protection devices required for pumps in terms of Clause 1.2.1.20 shall be of robust design and securely mounted. The Tenderer shall state at the time of tendering the type and arrangement of protection equipment he offers to fulfil this function and the tendered prices shall include for mounting and cabling of this equipment in positions where it will not be vulnerable to corrosion.

(32) All control equipment shall comply with the foregoing stipulations with regard to electrical equipment and it shall be robust and reliable and it shall comply with all the requirements of the Local and all Statutory regulations pertaining to the use of such equipment. Furthermore, the tendered prices shall include allowance for everything involved in arranging compliance with such requirements and regulations, including registration of the equipment if so required in terms of the regulations and for providing all fixings, lightning protection devices, weatherproof housings, cabling and everything necessary for completing the control equipment, handing it over in perfect working order, providing operating instructions and maintaining the equipment until the end of the period of maintenance.

(33) Proving tests shall be carried out in the manufacturer's works to establish that all relay panels, starters, circuit breakers and protective devices, switchgear and remote control equipment correctly perform the functions required.

The tests to be carried out on all switchboards at works after assembly shall include the following:

(i) The insulation resistance to earth of all power and secondary circuits shall be measured by means of a 2 000 V insulation resistance tester and results recorded.

(ii) Power frequency high voltage tests shall be carried out in accordance with SANS 61000 of main and secondary circuits.

(iii) Primary current injection tests shall be undertaken on all power circuits to check operation of tripping devices and accuracy of ammeters connected to CTs.

(iv) Operational test of all switchgear, instruments and control circuits.

The prices tendered for electrical work shall include for all testing and everything necessary for compliance with the operating requirements of the Works whether specifically scheduled as separate items or not.

In the case of motors situated more than 4 m on a direct line of visibility, or in the case of those not clearly visible from their respective starters, lockable isolating switches shall be provided

within 2 m of motors, with all necessary cabling, for the safety of maintenance personnel. The prices tendered for plant shall be deemed to include provision for compliance with this requirement whether isolating switches are separately scheduled or not.

Where called for in Part C.3.3, a distribution board complete with approved electrical meter shall be provided to record power utilized at the pumpstation. The installation shall comprise of current transformers, a KVA-kilowatt hour meter (Enermax Meter or similar approved) and any other equipment to enable the power supplied to the pumpstation to be correctly measured.

Cables

The cabling between and in the various structures and plant units included in the electrical power installation shall be carried out by means of PVC insulated, steel wire armoured and PVC sheathed cables. Cable glands similar to "Pratley" or of equal and approved type and manufacture, shall be used.

Cables shall be rated in accordance with the Supply Authority's Regulations provided that no cable having a core cross sectional area less than 4 mm² shall be used and the voltage drop measured between the incoming terminals of the supply and the terminals of the equipment being connected when carrying full rated load shall not exceed 1 V plus 2% of the voltage at the supply terminals.

The Contractor shall draw in, lay, thread through pipes, ducts or channels, fix in position, clamp to walls, cable trays, supports or switchgear to approval, the cables to be provided taking care to avoid twisting, ensuring that cables are not bent to a radius less than 12 times their overall diameter and providing overlap for joints and terminations. The cable shall be drawn directly off the drums, the inner end having been loosened to permit slack to be released through the flange hole. The cables shall be paid off steadily onto cable rollers or manually supported at regular intervals during laying.
The electrical power installation will comprise the electric motors, the electric motor control gear, the special controls, such as pump control valves, together with all other devices included in the contract works for the operation and control of all the plant as required for its proper operation as described in the Schedule of Quantities.

The Contractor shall be responsible for the complete electrical power installation from the Employer's points of supply.

The Contract work will include the terminating, connecting, testing and setting to work of all cables and associated electrical equipment.

Cables shall be selected by the Contractor in accordance with the requirements of the Standard Regulations for the Wiring of Premises, due allowance being made for the climatic conditions, and the sizes selected and the current rating of each cable shall be stated on the numbered cable schedule required in terms of the following paragraph.

The Contractor shall prepare a numbered cable schedule indicating the route, length where important, sectional area and number of cores of the power and control circuit cables. The cables themselves shall be labelled to indicate the cable number, sectional area and number of cores. Labels similar to "Dymo" stainless steel punched tape or of equal and approved type shall be used. The labels shall be attached to the cables in an approved manner.

When laying the cables, an allowance shall be made to provide a sufficient degree of slack and the cable tails shall be long enough to facilitate making the terminations and re-arranging the connections when necessary.

Approved concrete cable markers are to be provided and installed at intervals along the routes of all cable trenches. Markers shall be clearly inscribed 'ELECTRIC CABLE" in letters not less than 50 mm high and shall preferably be of precast concrete. Two such markers shall be set at each change of direction approximately 1,0 m from the point of intersection of the adjacent lines of the cable. Thereafter the markers shall be provided at uniform intervals not exceeding 20,0 m along each straight cable run. Care is to be taken to ensure that the markers have been erected over the cable and the methods adopted shall be to the approval of the Engineer. Markers should be of minimum dimensions 75 mm x 1 200 mm and shall be steel reinforced.

The Contractor shall be responsible, where cables enter or leave switchgear, or other circuit controlling equipment, for the provision of approved measures for the prevention of the ingress of rats, mice, spiders and other vermin.

All work in connection with the termination and jointing of cables shall be carried out to approval and in accordance with good modern practice.

All insulating materials and each length of cable shall be examined for damage before being installed. An insulation test with a 500 V megger and a test of each core in turn with the remaining conductors connected to the armouring shall be carried out before jointing is commenced.

Where necessary the Contractor shall provide and fix to approval to walls, columns, beams and ceilings of buildings approved perforated metal cable trays, racks and cleats necessary for the support of cables. Such trays, racks and supports shall be thoroughly cleaned after installation and shall be painted to approval with an undercoat and two coats of approved non-inflammable paint before the installation of cables. All cables shall be cleated or clipped neatly to approval to racks or trays at intervals not exceeding 750 mm. The design and general arrangements of all cable trays and the cables secured to them shall be to approval.

The cores shall be rung through, provided with numbered ferrules corresponding to the wiring diagram of the plant to be connected, fitted with crimped lugs crimped by AMP crimping tool or approved equivalent and made off neatly and securely on to the terminals of the equipment.

Correctly selected dies for the crimping tool and lugs for the cable cores shall be used. The crimping tools shall be of a type that will not release the lug, once the action has been started until the lug has been crimped on to the core properly and completely. The types of crimping tools and lugs shall be the best that can be made available.

Any locking arrangements provided on the terminals of plant supplied by others shall be used to the approval of the Engineer.

To the extent that the required data and drawings are timeously supplied by the Contractor in terms of Clauses 1.1.5 and 1.1.6 of this specification, the new civil works will incorporate suitable ducts for the main power cables and pipes for control circuit cables between these ducts. When the installation has been completed, tested and commissioned to the satisfaction of the Engineer, such ducts in new works are to be filled with clean, fine builders sand and covered neatly with a thin layer of sand-cement mix to match the adjacent floor surfaces.

The tendered prices for cabling shall include for everything involved in connecting both ends of the switchboards earth-bar to the earth point using 70 mm 2 stranded copper conductor and for meeting the requirements of Clause 1302 (E) of the Standard Wiring Regulations and the supply Authority's requirements providing for the earthing of the housings of all motors, units of electrical control equipment, loose motor starters, stop/start buttons etc, through the cable armouring supplemented where required in order to reduce the resistance of the earth path to less than 0,2 ohms, by stranded

copper earth conductors connected direct to the earth terminal bars (conduiting shall not be used as an earth connection) and providing for earthing all building metal work as laid down in Clause 1313 of the Regulations including ladders, handrails, etc.

The cables are to be laid in trenches excavated by the Contractor under this Contract if so stated in the Schedule of Quantities. The laying of cables and installation of concrete markers and everything necessary for compliance with this Clause shall be included in the tendered prices for cables and other electrical work.

Earthing

All motors, switchgear, control gear, cable armouring and every metallic part of the plant and equipment supplied under this contract are to be connected to earth by means of bare copper conductors of adequate size for each circuit, but not smaller than No 8 SWG run, alongside cables.

Earthing conductors are to be fitted with sweated lugs at ends and are to be solidly bonded to each other and to the earth plate.

The Contractor under this Contract shall provide earth plates wherever necessary to achieve proper earthing.

An earth plate consisting of a 6 m length of 25 mm x 3 mm copper strip coiled into a 900 mm OD spiral shall be provided and shall be buried 2 m deep adjacent to each building. The earthing lead from the earth plate is to consist of a 70 mm² copper conductor. The earth plate is to be covered with a 100 mm layer of fine wood charcoal, and a 38 mm diameter galvanised steel pipe shall be laid from this charcoal to the surface and capped at its upper end.

The cost of earthing, including the supply and installation of all earth plates (for which no special item is included in the Schedule) will be deemed to be spread over and included in the prices tendered for the supply and installation of electrical equipment.

Site Conditions

All the equipment and material shall be rated for both the expected and extreme site conditions.

Quality Standards, Regulations and By-Laws

All workmanship, material and equipment supplied and installed under this contract, shall be new, undamaged and of the best quality and shall be to the satisfaction of the Engineer.

All workmanship, materials and equipment shall comply with the requirements as laid down in the latest editions and amendments of the relevant SANS, BS and IEC standards.

Materials of local manufacture and with the SANS mark will receive preference.

Unless otherwise specified the earthing shall comply with the AMEU and/or Local Supply Authority standards.

The work shall be also be carried out in strict accordance with the following:

The latest issue of the “SANS 10142: Code of Practise for the Wiring of Premises” hereafter called the “Wiring Code”.

The Occupational, Health and Safety Act of 1993 as amended to date and hereafter called the "Act".

The Municipal By-laws and other special requirements of the local Supply Authority.

The local Fire Office Regulations.

Drawings

Contract Drawings

The drawings accompanying this Specification are as stipulated in 1.2.6 hereof. The working drawings of the Contract shall, however, consist of:

- The Civil Engineer's drawings, as applicable
- The Engineer's drawings of other disciplines, as applicable
- The drawings of other service installations that are relevant for co-ordination and installation purposes
- The installation drawings of other sub-contractors, where applicable

All drawings and layouts shall be regarded as diagrammatic and all positions and dimensions shown on drawings shall be verified on site.

The Contractor shall check with the Principal Contractor before putting work in hand on any section of the work that he is in possession of the latest drawings. Should any discrepancy be found between the Contractor's drawings as issued by the Engineer and those in possession of the Principal Contractor, the matter shall be referred to the Engineer for clarification. No extra compensation shall be allowed for alterations or making good resulting from lack of verification.

Shop Drawings for Approval

Three copies of all shop drawings shall be submitted to the Engineer for approval.

Shop drawings are any drawings, diagrams, schedules, performance charts, and other such data, which are prepared by the Contractor, or his supplier, manufacturer or distributor, and which illustrate some portion of the sub-contract works.

Approval of shop drawings by the Engineer does not relieve the Contractor of his responsibility for compliance with the Specification, nor does it relieve him of his responsibility for errors or omissions in shop drawings.

As- Built Drawings

The Contractor shall ensure that any deviations from Construction drawings are noted on a set of drawings specially kept for that purpose, and return those marked up to the Engineer for updating of originals.

Project Time Schedule

The entire project shall be completed within the construction time as specified for the Principal Contractor.

Critical Path Schedule

The successful Tenderer shall, within 14 days after having been informed of the acceptance of his tender, submit to the Engineer a critical path schedule (CPS) indicating the programme of his work in order to complete the work by the specified completion date.

Other Trades on Site

The Contractor shall note that other Contractors will occupy the site at the same time and the closest co-operation with any of these Contractors shall be maintained.

Visit to Site

It shall be assumed that the Contractor is familiar with all conditions on the site and no claims resulting from ignorance of the conditions of the site shall be entertained.

Inspection and Hand-Over Procedure

The Certificate of Compliance shall be handed over to the Engineer within 7 (seven) days of acceptance by the Local Supply Authority.

When the Works have passed the acceptance inspection, the Engineer shall issue an Acceptance Certificate. The Engineer and the Contractor shall sign the Acceptance Certificate. A punch list of outstanding item/s to be rectified shall be attached.

No retention monies shall be released before the Acceptance Certificate as well as the Certificate of Compliance signed by all parties has been submitted.

Should the Engineer, in his opinion, find that the Contractor did not check the Work himself before requesting the hand-over inspection, then the Engineer shall reject the inspection and claim any time and cost incurred from the Contractor.

The guarantee period of the installation shall commence on the date that the installation passes the final handing over inspection and the Certificate of Compliance has been handed over to the Engineer subject to the item/s listed in the punch list.

At the end of the guarantee period a final inspection shall be conducted by the Employer, Engineer and the Contractor to determine if any deficiencies, faults or defects had manifested itself during this period which are then to be rectified within 7 (seven) days by the Contractor.

Interchangeabilty

All parts of similar rating and/or function shall be made to gauge and shall be interchangeable through the contract work.

Tests and Inspections

The Contractor shall arrange for all necessary installation tests and inspections required by the relevant Authorities. The Contractor shall allow for fees and charges payable to these authorities for such tests and inspections excluding the electrical connection and consumption fees.

The Contractor shall inform the Engineer of all equipment inspections and shall advise the Engineer in good time (minimum of 7 days) of the proposed completion such that the equipment may be inspected prior to installation. All tests and inspections by the Engineer shall be to his satisfaction.

Existing Installation

Where the Works involves alterations and/or additions to existing works, these works, where operational shall be kept in full continuous operation throughout the period of the Contract. The Contractor shall make arrangements for all the necessary temporary connections. The Contractor is to make due allowances for this in his tender prices.

Should the Contract form part of an existing installation the Contractor shall visit the site to acquaint himself with all aspects of the installation prior to submitting a price.

Requests for Electrical Power

Where the Principal Contractor requests the Contractor to provide a temporary power supply other than that called for in the specification and any other such electrical work for the building operations, then all such work shall fall outside the Scope of this Contract. The cost of such work shall be a matter between the two parties involved.

Materials Tools and Equipment

All materials and equipment used in the electrical installation shall be of recent design and manufacture and of the best quality available and shall, wherever possible, carry the latest mark of the South African Bureau of Standards.

Where called for by the Engineer, samples shall be submitted of all materials to be used on the project.

The Contractor shall make all his own arrangements regarding the transport of labour and materials and shall provide his own plant and tools.

Materials and equipment on site shall be suitably stored to avoid any possible deterioration or damage through any cause whatsoever. Any replacement or rectification required, due to non-compliance in this regard, will be for the Contractor's account.

All conduits, outlet boxes, distribution board trays, etc., shall be fixed in position by the Contractor, and built in by the Builder. Where, in exceptional cases, this is not possible, chasing will be permitted.

The Contractor shall do chasing with power driven chasing machines or sharpened hand tools.

The Contractor shall seek written permission, from the Structural Engineer through the Principal Contractor, timeously of the requirements for all chases and openings in building work.

Chases for conduit installation shall be so executed that, after installation, outer face of conduit is not less than 12mm from finished plastered surface.

It will not be permitted to chase into walls where mortar and/or bricks have not properly cured. Chasing into sandstone, facebrick or plastered walls, as well as concrete structure, will not be permitted without prior consent. The Contractor shall be held responsible for any damage due to non-compliance in this regard.

Electricity Supply

Application

The Employer will make an application for the upgrading of the electrical supply. The Contractor shall do the co-ordination with the local Supply Authority at the date and time when the electrical supply will be required.

Connection of Supply

The Contractor shall allow for attendance on the Supply Authority when the supply is connected and ensuring that the service connection is not delayed.

Supply Authority's Metering

Unless otherwise specified, the Supply Authority's metering panel and equipment shall be incorporated in the Main Board, or other boards as applicable. The Contractor shall ascertain and establish the correct space and all other requirements from the Supply Authority for the accommodation of their meter panel or equipment. The Contractor shall provide the necessary links in busbars or any other requirements for metering CT's, and shall provide all necessary cables, jumpers and connections between such metering equipment.

Low Voltage Distribution Boards and Motor Control Centres (MCC's)

General

All distribution boards shall be supplied by a specialist manufacturer who shall install and fit the switchgear and equipment and carry out all internal wiring. The boards shall be installed and connected by the Contractor in the positions as indicated on the drawings. Unless otherwise specified, all distribution boards shall be manufactured by the same company.

It shall be the responsibility of the Contractor to ensure that all distribution boards fit into and can be installed in the spaces set aside for them. The Contractor shall also ensure that the distribution boards can be moved through doors and access routes on the site.

All distribution boards shall be supplied complete with all internal wiring to terminal blocks, labels, earth bars, statutory notices, holding down bolts, fixing brackets, and everything necessary for satisfactory operation of the board.

Outer fittings of all boards shall be kept protected against damage and defacement, until immediately before final testing and commissioning. Any damage to paint work shall be made good by the Contractor.

General Construction and Finish

All distribution boards shall be of totally enclosed sheet steel construction, free of distortion, and, unless otherwise specified, fully front accessible and ventilated.

Sheet steel shall be bent and braced, as necessary, to provide a rigid square frame support for all components. All corners shall be suitably welded. All steelwork shall be ground smooth, shall be free of rust, scale, slag, burrs and grease, and shall be suitably rustproof, primed, and finished in powder coating, colour to approval. Interiors of boards shall be White, and plinths shall be Black.

Equipment shall be neatly and accessibly set out, and shall be adjustable chassis-mounted, flush behind readily removable rigid sheet steel panels of 1,6mm minimum thickness, with close-fitting cut-outs to toggle surrounds, push button surrounds, etc. Indicator lamps shall be similarly mounted, with coloured glass only fixed to the panel. Instruments shall be flush mounted on hinged panels. Time switches shall be mounted behind flat hinged doors, with catches and perspex windows, and meters shall be mounted behind 3mm thick, flat perspex windows. All reset buttons shall be accessible from the panel front.

Readily removable panels, with returned edges, shall be accurately fitted and secured to the frame by means of locating pins and indicating turn-catches, or with dome nuts and welded studs. Suitable chromed handles shall be provided to facilitate panel removal.

Doors, where called for, shall be readily removable, flush type of rigid construction, with concealed hinges, sliding bolts and flush-type lockable catches to approval, all locks being master-keyed. Two keys shall be provided for each lock. A single door width shall not exceed 700mm.

Where future equipment is pre-fitted for, this shall include pre-drilled chassis plates installed stalled, cut-outs in the panel, with suitable blanking plates, and adequate busbar extension.

Non-combustible barriers shall be provided to separate sections of boards which are fed from different transformers or sources of supply and to isolate each main incoming circuit breaker where the fault current exceeds 15kA.

A group of three phase and neutral busbars or conductors crossing a ferrous metal barrier shall do so through a common opening. Under no circumstances shall a single conductor be surrounded by a continuous ferrous metal.

On completion of the installation, the Contractor shall supply and mount, behind a suitable panel of each and every distribution board, the wiring diagram for that respective board.

All distribution boards with terminating cables shall be provided with suitably sized, rigid gland plates, top and or bottom. These gland plates shall be bonded to the framework or earth conductor.

Joints in busbars where necessary shall be by means of bolted fish plates. Bolts used for jointing or supporting busbars shall be of high tensile phosphor bronze or high tensile plated steel minimum 9,5mm diameter, and shall be used in conjunction with flat and spring washers.

Neutral bars shall have the same cross sectional area as the phase bars up to a maximum of 160 mm^2. The earth bars shall be effectively bonded to the metal framework of the board.

All busbars and any other un-insulated connecting links shall be taped or sleeved by the board manufacturer except at joints and take off's which shall be taped after the installation of boards and cables thereto. Correct colour coding shall be maintained.

Wiring

All distribution boards shall, unless otherwise specified, be fully wired internally by the board manufacturer, with colour coded, single core copper, PVC insulated cables, 600/1000 volt grade.

Wiring shall be neatly done, suitably laced, fixed clear of exposed terminals, and run square to the sides of the board.

Wiring shall be rated to suit the capacity of associated switchgear.

Where aluminium cables are to be terminated at circuit breakers, fuse switches, etc., suitable connecting studs shall be provided to facilitate connection.

Circuits on multiphase distribution boards shall be balanced over the phases.

Pre-fitted Space and Spare Fuses

Unless otherwise specified, space only and mounting facilities shall be provided for 30% future expansion of isolators, MCB's, CFS, time switches, and meters, and 60% future expansion for contactors and relays.

100% spare fuses shall be supplied, unless otherwise specified, and mounted behind a hinged panel, inside the distribution board, specially marked as such.

Labels

All labels shall be of the engraved, laminated plastic board type, black letters on white background, with 6mm minimum height letters, in sans-serif capitals. Labels shall be inserted into slotted holders and held in position by a soft glue.

Each distribution board shall be provided with a label stating name and size and origin of feeder cables e.g. "Sub Main Board. D – Fed from Main Board with 240mm2 x 4 core copper SWAPVCSWA cable".

All distribution board sections, main switches, isolators, MCB's, meters, etc., shall be labelled with individual labels as per specification, e.g. circuit breaker labels shall state type of circuit, location, and number, and time switches shall be labelled as to times of
operation, meters shall be labelled as to multiplication factor, etc. In addition an index card shall be mounted inside the door behind clear plastic.

All equipment, situated inside the board, e.g. contactors, relays, etc shall be clearly marked as to their function corresponding with circuit numbers on relevant drawings.

Shop Drawings

As soon as is practicable after the contract has been awarded, the Contractor shall submit dimensioned layout drawings of all distribution boards to the Engineer for approval; such approval to be obtained, in writing, prior to the commencement of distribution board manufacture. Approval by Engineer, of drawings, shall not relieve the Contractor of his responsibility for any deviation from the requirements of this Specification.

Drawings shall show elevations and sections and shall be fully dimensioned. Equipment layout, with labelling thereof, drawings shall be fully annotated to indicate compliance with the specification. Wiring diagrams shall be included.

Inspection and Approval

All distribution boards shall be inspected by the Engineer, on completion of manufacture, but only after inspection and acceptance by the Contractor and prior to despatch from the manufacturer's works. The Contractor shall advise the Engineer in good time of such completion and acceptance. Distribution boards shall only be delivered to site after inspection and approval by the Engineer. Such approval, however, shall not relieve the Contractor of his responsibility for any deviation from the requirements of this Specification.

All distribution boards shall be to the approval of, and shall comply with, the regulations of the Supply Authority, and it shall be the responsibility of the Contractor to establish and provide such requirements, and obtain approval where necessary.

Cables

Paper Insulated Cables

Paper insulated cables, unless otherwise specified, shall have high conductivity stranded copper conductors and shall be 600/1000 volt grade, paper-insulated, oil-impregnated and drained, lead covered, double steel tape armoured and served to SANS Specification 97.

Cables shall be terminated in approved compound filled end-boxes with glands, and screwed filler plugs. The lead sheath shall be effectively bonded to gland by means of a wiped solder joint. Conductors shall be cut inside the box, and connected to outgoing tails by means of solid-centre ferrules or solid connection studs and/or rods. Tails shall be taped first with varnished cambric tape and finally with one layer of PVC tape in phase-distinguishing colours. Cable terminations shall generally be carried out only by qualified cable jointers, in accordance with best practice.

PVC Insulated Cables

PVC insulated cables, unless otherwise specified, shall have high conductivity stranded copper, or solid aluminium Conductors (if specified) shall be 600/1 000 Volt grade, PVC insulated and bedded, steel wire or aluminium strip armoured, and PVC sheathed to SANS Specification 150.

Cables shall be terminated in approved mechanical clamping glands with shrouds.

The armouring of PVC insulated cables shall not be acceptable as an earth conductor, and stranded copper earthwire shall be run with each cable in compliance with the Regulations for the Wiring of Premises, whether or not specific reference is made thereto in Part Two of the Specification. The earth wire shall be neatly strapped to cable at 600mm intervals, shall be bonded to the armouring at both terminations, and shall be bolted to earth terminals of equipment at both ends.

Mineral Insulated Copper Covered Cable

Mineral insulated, copper covered cable (MICC or Pyrotenax) and accessories, where called for in the Specification, shall be 600 Volt grade, to BS 3207.

Cables shall be terminated in pot seal glands to manufacturer's recommendations and cable tails shall be served with maker's neoprene sleeving. The Contractor shall take all necessary precautions to prevent ingress of moisture into mineral insulating materials of the cable. MICC cable shall indicate a minimum insulation resistance of 1 megohm immediately prior to pot seal termination thereon.

Where MICC cable enters a motor, or any other appliance that is likely to move or vibrate, a 360o expansion loop shall be formed in the cable immediately prior to point of entry.

Installation of Cables

Cables shall be supplied by the Contractor, and shall be installed by him in positions as indicated in the Specification and/or the Drawings, in a workmanlike manner, and generally in accordance with accepted standards, and shall have a radius and fixed as prescribed in the Standard Regulations for the Wiring of Premises.

Where cables are installed side by side, there shall be a minimum spacing of 60mm between cables, unless otherwise specified. All cable routes shall be confirmed with the Engineer, prior to commencement of installation. No joints in cables will be permitted, unless approved by the Engineer. Jointing shall be done with acceptable jointing kits, by a qualified cable jointer.

Cables required to be fixed horizontally, shall be supported on suitable cable trays, installed level, and shall be strapped thereto in such a manner that any cable may readily be removed without interference with other cables.

Cables required to be fixed vertically, shall be clamped with approved clamping devices to adequate cable ladder or “Unistrut” supports, mounted against vertical surfaces.

Low and High voltage cable installed in ground shall be buried at 600mm and 1000mm respectively below finished ground level. Cables shall be bedded in river sand or sifted soil (free of clay), from 75mm below to 75mm above cable, prior to backfilling of trenches. 50mm thick pre-cast concrete slabs, measuring approximately 300mm x 600mm and engraved “Danger-Gevaar”, shall be laid over 75mm soil bed covering HT cables along the entire route of such cables.

Suitable cable markers shall be installed above all underground cable routes. Such markers shall be positioned at each change in direction of cable, at both ends of sleeves crossing roads or tracks, at entry or exit from buildings, and at 30m intervals on straight runs.

M.I.C.C. cable shall be installed on surface only, unless otherwise specified, run square to finished surfaces, and neatly and adequately saddled thereto.

Cable Trays and Racks

Cable trays unless otherwise specified, shall be of 1,6mm minimum thickness, slotted, galvanised sheet steel construction, with 25mm minimum returned edges, supported by means of rigid “L” or “T” galvanised angle brackets, at intervals to suit width of tray and weight of cables to be supported, and at both ends of each length. Cable trays shall be installed straight and level and adequate supports shall be provided to avoid sagging of tray.

Cable racks shall be of ladder configuration, made up of galvanised angle iron, slotted angle or roll formed steel sections to approval. Rung spacings shall correspond to the shortest saddle fixing centres required for the supported cables. Cable racks shall be installed thereto with suitable clamp.

The racking cross rungs shall be provided with facilities for the application of U-clamps (Cabstrut) and cable ties for the purpose of securing the cable. The cable bearing surface shall be flat, minimum 50 mm, the cross section of the cable rung to extend the full width of the rack. The rung spacing shall be 375 mm.

The minimum structural length for straight lengths of cable racking shall be determined by the vertical displacement measured at mid-span (deflection) with a uniform loads detailed below along a complete single span of 3 000 mm. The measured deflection shall not exceed 5 mm.

Width of Racking	Loading in kg
150 mm	150
300 mm	100
450 mm	150
600 mm	200
800 mm	270
1 000 mm	300

Accessories such as bends, tees, elbows and crosses shall have a minimum radius of 450 mm and shall have the same cross sectional design as the straight sections and of the same material and finish.

The rung spacing for tees and crosses shall be the same as for the straight lengths.

The rung spacing for horisontal bends shall be as follows:

Width of Racking	No of Rungs
100 – 200 mm	3
300 – 600 mm	4
800 – 1 000 mm	7

Splice plates shall adapt to the contours of the side rails with a possible wrap around feature to permit mid-span splicing without weakening of the section. Splice plates shall be manufactured from the same material as the cable ladder. All splices shall use M6x16 bolts and nuts.

The cable racking and accessories shall be so constructed that the provisions of SANS 0142, in terms of earthing shall be complied with.

The support hangers and brackets shall be similar and equal to Cabstut P 1000.

Conduits

General

Unless otherwise specified, all conduits shall be black enamelled heavy gauge steel, welded or solid drawn with a minimum of 20mm external diameter and to the latest SANS Specification. All joints shall be screwed and only steel couplings will be accepted. Where accepted by the Local Authorities, innovative systems, e.g. “Easilok” or “Bosal” may be used.

Conduit boxes and fittings shall be black enamelled, malleable iron, while switch boxes, plug boxes and draw boxes shall be galvanised heavy gauge pressed steel.

If specified in Part Two of the Specification, PVC tubing may be used. Such tubing and its accessories shall also comply with the latest SANS specification.

Where conduit and conduit fittings are installed in positions exposed to the weather or in moist surroundings, then they shall be galvanised. Exposed threads shall be suitably protected.

Flexible conduit may be used only when specified in Part Two and may be either plain hot-dip galvanised PVC. In all cases an earth wire shall be run internally with the flexible conduit and secured to the terminations at each end.

Conduit Installation

Conduits shall be carefully examined, before installation, to ensure that there are no defects or internal obstructions. Conduit shall be installed generally in accordance with the Standard Regulations for the Wiring of Premises, and outlet boxes securely bonded to earth, with joints, terminations, etc. internally bevelled, smooth and free of burs.

Conduit threads shall be cut clean, and of sufficient length to permit fitting entries being butted.

Where bending of conduits is necessitated, this shall be carried out with standard conduit bending tools, care being taken to ensure that conduit cross-section is not distorted, and that sufficient radius is allowed so as not to subject conductors to undue mechanical stress when drawing-in of wiring.

Termination of conduit shall be terminated by means of locknuts, on both ends of the termination boxes and bushing on inside of box or appliance, or press-fitted into the sockets in the case pre-socketed boxes. Alternatively conduit may be terminated by means of a coupling and brass male bush. Solid brass bushes, only, shall be used.

Conduit crossing expansion joints shall do so at right angles to expansion joint, shall be cut and separated, and provided with an outer sleeve extending 150mm either side of the joint, and suitably taped to prevent ingress of cement/water. An earthwire shall be run across the expansion joint, and shall be bonded to the first conduit box on either side of the joint.

Draw boxes or draw trays shall be installed only where absolutely necessary, and shall be positioned as inconspicuously, but accessibly, as possible, to the Engineer's approval.

Conduit in dividing walls between offices, floors, etc, and conduit to light switches on office floors, shall only be installed as vertical drops, via back-entry boxes flush with ceiling unless otherwise specified.

Conduit for future requirements shall be terminated in boxes with overlapping cover plates, and fitted with stout galvanised draw-wire. Where such conduit is, however, required to project from wall or slab, it shall be galvanised, fitted with coupling and lugs, and sealed with waterproofing compound.

The Contractor shall ensure that all conduit work is timeously completed, so as not to delay building operations, and shall advise the Engineer, in good time, of such intended completion, that it may be inspected prior to being covered up. The Contractor shall attend on the Engineer during all such inspections.

Prior to building finishes being applied, such as plastering, screeding, painting, etc., the Contractor shall ensure that all conduit runs are continuous and clear of obstructions. Damage to building finishes, resulting from non-compliance in this regard, will be to the Contractor's account.

Flush and Surface Conduit Installation

All conduit and conduit fittings, unless otherwise specified, shall be installed flush, concealed in concrete, walls, ceiling spaces etc.

Conduit in concrete shall be timeously installed, spaced well apart, and firmly secured, with joints suitably sealed against ingress of cement/water, and outlet and draw boxes installed level, and adequately secured to shuttering. Installation of large diameter conduits or sleeves, or installation of large concentrations of conduits, shall be carried out to the Structural Engineer's approval; such approval to be obtained prior to commencement of work.

Conduit in concrete surface beds shall be installed well clear of any surface, by utilising suitable spacer pieces. Conduits installed below surface beds, or in ground, ash fill etc., shall be galvanised, and shall be encased by the Builder in 75mm concrete all round. It shall be the responsibility of the Contractor to advise the Builder timeously of this requirement, and to ensure that such requirement is duly executed. Any additional work resulting from non-compliance in this regard, will be for the Contractor's account.

Conduit in brick walls shall be timeously built in.

Conduit in roof spaces shall be run parallel and square to roof trusses. Conduit in roof/ceiling spaces shall be run in a horizontal plane, directly above ceiling support members, and shall be adequately supported, independently of ceiling support members, unless otherwise specified.

Conduit installed on surface, where specified, shall be installed generally in a neat and workmanlike manner, run square to finished surfaces, and shall be neatly and adequately saddled thereto.

Wire Trunking

Galvanised sheet metal or plastic wiring trunking, the types and sizes of which will be specified, shall be supplied and installed by the Contractor in the position indicated on the drawings.

The wiring channels shall generally be 2500mm long complete with junction pieces, end pieces, corners, T-pieces, brackets and supports and snap-in covers etc.

Wiring channels shall unless otherwise specified, be installed level and parallel to or perpendicular to finished surfaces. Covers shall be accurately cut to fit squarely and neatly at joints, corners, partitions, etc., and shall not be installed prematurely.

Conduit feeders to and links between wiring channels shall terminate directly into the channel at accessible outlets using screwed or bushed entries. Care shall be taken to ensure that wiring does not pass over any rough edges.

Unless otherwise specified, channels shall be installed with the open side facing upwards. Suitable supports shall be provided to support the wiring when channels are mounted open end downwards.

Suitable hangers shall be provided where channels are suspended. For concealed flush mounted channels, snap-in covers shall overlap the open face of the channel. Liaison with the Builder shall be maintained where channels are to be flush mounted in ceiling slabs or in suspended ceilings.

An earthwire shall be installed in each run of ceiling channel and bonded to each section of metallic channel. Crimped jumpers shall be taken from this main earthwire to whatever equipment is being installed on the channel.

Wiring

All wiring shall be carried out in accordance with the Standard Regulations for the Wiring of Premises SANS 10142 and using stranded PVC insulated stranded single core copper conductors bearing the SANS mark. Wiring shall be delivered to site in sealed coils with the labels intact.

No joints will be allowed in the wiring other than at junction boxes, outlet points and distribution boards and all wiring shall be carried out using the “loop-in loop-out” system. Where outlets are wired for future equipment, sufficient tail lengths or loops shall be provided.

Unless otherwise specified, the following, minimum standard PVC insulated conductors and earthwire sizes shall be used for various types of circuits.

Circuit Type/Three Single Phase	PVC Conductor phase size (mm2)	Earthwire size (mm2)
Lighting	2,5	2,5
16A switched sockets	4,0	2,5
Geysers	4,0	2,5
Console air-conditioners	6,0	4,0
Stoves	10	6,0
General connections up to 15A	2,5	2,5
Pylons & signage	2,5	2,5
Clocks & bells	1,5	-
Motors up to 1,5kW	2,5	2,5
Motors up to 3kW	2,5	2,5
General connections up to 4kW	2,5	2,5

For lighting circuits, an earthwire may be called for by the Supply Authority. For wiring in non-metallic conduit a separate 2,5mm earthwire shall be provided.

Luminaires

Outlets

Unless otherwise specified all lighting outlets for surface mounted fittings shall be terminated in standard round conduit boxes to which the fitting shall be screwed. Outlets shall be installed in the positions as indicated on the drawings and shall be accessible at all times for wiring.

Outlets for recessed luminaires shall, unless otherwise specified, be 100mm x 50mm heavy gauge pressed steel galvanised boxes fitted with 5A, 3 pin, single phase un-switched sockets with overlapping cover plates. These outlets shall generally be fixed hard up against the ceiling slab over or to roof truss members and in positions adjacent to the fittings. The fittings will be provided with flexible cords and plug tops.

Installation

The fittings shall be mounted in the positions as indicated on the drawings and, where surface-mounted, should be mounted asymmetrically in relation to ceiling panels and building features. Should it be that

the fittings cannot be mounted in the positions as indicated for whatever reason, then the matter should be referred to the Engineer.

Surface-mounted fittings shall be installed with their mounting bases or hanging strips flat against the ceiling or wall fixed directly to the conduit box. Additional supports for heavier type fittings shall be to the approval of the Engineer.

Surface fluorescent fittings mounted directly to ceilings shall be mounted hard up against the ceiling and secured in the middle and near both ends. Fittings longer than 2400mm and wider than 200mm shall have double fixings at each point.

Fluorescent fittings installed in continuous rows shall be close coupled by means of lock-nuts and bushes or nipples. For fittings mounted on wiring channels, approved adapters shall be used.

Where fluorescent fittings are suspended on pendants these shall consist of 20mm diameter conduit pieces of the required length which may be used for wiring to the fitting. At least two pendants are required per fitting.

Recessed fluorescent fittings shall be dropped into the openings provided and plugged into the socket outlets.
Recessed down lighters shall be secured within openings in the ceilings with mounting brackets supplied with the fittings.

Type	Description/Specification	Typical Fitting
TYPE A	Surface mount 40W LED luminaire with 4000lm and dimensions of (LxWxH) 1270 x 86 x 90 mm shall consists of an injection-moulded, flame-retardant polycarbonate housing and prismatic diffuser. A powder coated white reflector and control gear tray upon which all electrical components shall be mounted and secured by means of multiple twist lock latches to secure the reflector to the housing. Silicon sponge seal shall be moulded into the housing to ensure an optimal seal between the housing and the prismatic diffuser. Two of the stainless-steel latches shall facilitate the hinging of the diffuser and ensure correct alignment when closing the diffuser. It shall be designed to operate LEDs of up to 65W.The luminaire shall come complete with constant current driver,1.7 to 2.3kg weight, mains tolerance of ± 10% at 230V voltage supply, line frequency of 50Hz, Class I electrical safety class, 10kV/10kA surge protection,	

	power factor of ≥ 0.95, operating temperature of -30 to +35° C, enclosure tightness of IP 65 and mechanical withstand impact of IK07.	
TYPE B	Surface mount 13W LED luminaire with 2000lm and dimensions of 280mm diameter shall have base and trim ring manufactured from of high pressure die-cast marine grade, the trim ring casting shall be mounted onto the base casting by means of stainless steel M5 Allen head screws located outside the lamp compartment. The base and trim shall be finished with epoxy powder coating. An opal non-discolouring high impact acrylic injection molded diffuser shall be used and shall offer excellent vandal resistance, be highly translucent and shall not discolour even when subjected to the harshest UV environments. A silicon sponge gasket shall be fitted into a special groove in the diffuser to prevent damage to the gasket during installation and to achieve the certified ingress protection rating of IP65, It shall be designed to operate LEDs of up to 13W.The luminaire shall come complete with 300mm supply lead, constant current driver, mains tolerance of ± 10% at 230V voltage supply, line frequency of 50Hz, Class I electrical safety class, 10kV/10kA surge protection, power factor of ≥ 0.95, operating temperature of -20 to +35° C, and mechanical withstand impact of IK08.	
TYPE G	Wall mount (flood mounting) 55W 24LED luminaire with 7012lm and dimensions of (LxWxH) 3396mm x 249mm x 63mm shall have body manufactured from marine grade aluminium, high-impact polycarbonate protector and painted finish, housing shall be corrosion-resistant high- pressure die-cast and shall provide access to photometric engine and electronic assembly in	

	case of upgrading or replacing components. The luminaire shall have certified ingress protection rating of IP66, It shall be designed to operate LEDs of up to 55W.The luminaire shall come complete with constant current driver, mains tolerance of ± 10% at 230V voltage supply, line frequency of 50Hz, Class I electrical safety class, 10kV/10kA surge protection, power factor of ≥ 0.95, operating temperature of -20 to +60° C, and mechanical withstand impact of IK10.	

Light Switches

Light switches shall be supplied, installed and connected by the Contractor in the positions as indicated on the drawings. These switches shall be rated for 16A, 250V and shall comply with the latest SANS Specification. They shall be mounted at 1400mm above the finished floor level, measured to centre.

Where flush-mounted, the switches shall be installed in 100 x 50 x 50mm pressed steel, galvanised boxes with oversized cover plates, the colour of which shall be specified in Part 5. Where located in walls with dual finishes e.g. tiled, it shall be the responsibility of the Contractor to ensure that cover plates fall completely within one or the other finish, but not on the junction line. Special narrow units shall be provided where switches are mounted directly into partition mullions. Surface-mounted switches shall be of the metal clad type.

Where switches are exposed to the atmosphere or situated in damp, moist conditions, then watertight switches shall be used.

A maximum of 3 switches shall be allowed in a 100 x 50 x 50mm switch box.

Bell Pushes

Except that these shall be rated for 5A 250V, even where used for low voltage bell installations, the installation of bell pushes can be treated as for lighting switches above.

Switched Socket Outlets (SSO's)

All SSO's shall be supplied and installed by the Contractor in the positions and heights as indicated on the drawings and specified in Part Two.

Unless otherwise specified, single phase SSO's shall consist of 16A, 250V, 3-pin shuttered sockets to the latest SANS Standards.

Where flush-mounted, the switch sockets shall be installed in 100 x 100 x 50mm pressed steel, galvanised boxes with oversized cover plates, the colour of which will be specified in Part Two.

Surface-mounted SSO's shall be of the metal clad type.

Where SSO's are exposed to the atmosphere or situated in damp, moist conditions, then weather-proof sockets shall be used, e.g. "York" type or similar and approved.

Where not specified or indicated on the drawings, SSO's shall be mounted at 300mm above the finished floor level in offices, shops and bedrooms, at 1400mm in factories, workshops and garages and at 1200mm in kitchens and laundries, all measured from finished floor level, to centre of outlet.

Balancing of Loads

Once the total electrical has been completed and in full operation then the Contractor shall by means of suitable testers ensure the electrical loading of the 3 phase in each LV panel and distribution board is balanced to within 15 % of the maximum reading.

Telemetry

The Contractor will be responsible for the supply, installation, and commissioning of a new telemetry system. The Telemetry units will be wall mounted on enclosures manufactured from 3CR12 and finish with baked enamel. All Telemetry radios are to operate on the 433.05 - 434.79Mhz licence free bandwidth. All telemetry shall be 12 VDC operated with battery backup. A minimum standby time of 24 hours is required.

Location of Telemetry Stations

- Raw Water Pump Station
- Water treatment plant
- Operator's Office within the hospital grounds (SCADA Room)

Telemetry Equipment

System Overview

The telemetry system supplied will be used for remote monitoring and control to various designated sites.

The system shall not only allow for units that accept direct I/O (e.g. digital, analogue, pulses) but also gateway units that allow direct interfacing to common industrial protocols (e.g. Modbus, Modbus Plus, Ethernet/IP, Profibus, DF1) commonly employed by various PLC vendors as well as third party equipment manufacturers.

It shall therefore be possible to have a combination of both wireless I/O and wireless gateways in a single telemetry system that can scale as the system requirements dictates. The system aims for easy setup and maintenance (by the supplier as well as end-user if necessary). The software to configure and maintain the radios shall be made freely available with this system.

It is strongly advised that radio path testing is undertaken where uncertainty lies on the reliability of the radio signal strength. The radio telemetry system shall operate in the 430 – 450MHz range with a software- adjustable RF transmit power level of up to 5W.

Principle of Operation

Radio transmissions must occur when an input signal changes (change-of-state). That is, when a digital (e.g., switch contact) input turns off or on, or when the value of an analogue input changes by a pre-configured amount (delta-change), a radio transmission should occur. There should also be regular

update transmissions (configurable) to check the value of the input signals and to ensure the integrity of the communications signal. The communications status shall be made available as an alarm output. In the event of a communications failure, it shall be possible to reset digital and analogue outputs to zero.

Input signals should be transmitted in a data frame which shall include the address of the transmitting module (and repeaters if used), the address of the destination module, and a CRC error check. The error check will be used to ensure that there is no corruption of the data frame during transmission. The same radio module shall have digi-peating (digital repeating) capabilities as well. It shall also be possible to have peer-to-peer communications between modules – this means that wireless units can transmit directly to any other wireless unit, and can also transmit to multiple wireless units. There are no master units and no slaves and it shall be possible for all input signals to be transmitted to multiple destinations.

Each module should have handshaking capabilities over the air so that if transmitting module is suppose to receive an acknowledgment from the receiving module, and the transmitting module does not receive this acknowledgment, it should have retry capabilities. It must be possible to flag a communications failure via a digital output on the unit.

General Specifications

Power Supply:

The unit should incorporate an internal switched-mode power supply design that will accept an input voltage of 230V +-10% tolerance supply. The unit should also have a built-in battery charger to allow for an uninterrupted power supply and internally automatically switch to 12V battery backup in the event of a power failure. On return of main supply, the unit must switch back to mains operation, and charge the battery. It must also be possible to power the unit directly from a 12V battery at the battery terminals. The unit should have the ability to communicate its current state in real time to the RTU, giving the operator the ability to monitor and log voltages and currents as well as battery and AC state. The radios power circuit must have built-in intelligence and should be able to automatically alarm on loss of mains supply, loss of solar charging or low battery voltage and it should be possible to transmit these alarm signals to remote modules as digital output signals.

Inputs / Outputs Description:

See the technical specifications table below to a description of the I/O capabilities of the radio modules.

RS232 Port:

The serial port must be a 9 pin DB9 female and should provide a connection to a terminal or to a PC for configuration and testing. The port should not be used for radio data communications except in the case of wireless gateways where it could be used for interfacing to a host device such as a PLC.

RS485 Port: All telemetry modules will have I/O expansion capability via the RS485 port if outstations I/O count needs to be expanded. The units must be expandable with up to 31 remote I/O units on the RS485 bus and mounting distances of up to 1200m from the radio should be achievable. The expansion I/O should consist of several options that include Digital, Analogue and Pulse input / output variations.

Software Configuration:

The units should be easy to configure via standard Windows-based software. Programming the units can be done via a straight serial cable to the RS232 serial port. It must also be possible to extract the software configuration from the module. The configuration software should be project-based, and a

single project file shall be used for the complete telemetry installation. There shall be password protection facilities for the project file to prevent unauthorized use. There software shall log, and store data as required by the client for future use or reference.

Diagnostics and Testing:

The unit should provide diagnostic and test functions by connecting a PC terminal to the module. It should be possible to test both I/O and communication functions. The unit will include a radio strength measurement, which provides an indication of background noise as well as received radio strength. This feature shall allow radio paths to be tested without any additional specialized test equipment. In the case of wireless Gateways, it should be possible to read and write to the actual units data registers for testing and diagnostic purposes.

Summary of Minimal Technical Specifications for Radio Telemetry Equipment.

Item	Minimum Specification
Communication	Data Radios, Cell SMS, Cell GPRS, RS232/485 and Ethernet etc
Features	Real-time I/O device, Intelligent Data Logger, Remote time stamping of event and logged data, Configurable and programmable from the Picasso Configuration Toolbox, modular and easily expandable, EMI Protection, Programmable with PLC Languages, Industrial standard high speed processor, On-Board 1Meg-Word Flash and Gig-Word non-volatile RAM, On-Board Real-time clock and watch-dog timer , On-Board LED's indicating the Digital Input and Digital Output Status , Communication Orchestrator, Build to ISO 9000 Standards, 24 I/O's on the main processor board, DIN,8 AIN,8DOT,connects to interface modules such as I/O lightning protection units, galvanic isolation units for AIN's and 10A Interposing relay module
Analog Inputs (AIN)	8 Inputs, 12 Bit Resolution, 0.1 % Accuracy, Single ended, Additional AIN on expansion modules
Digital Inputs (DIN)	8 Inputs, with LED status display, Opto-Isolated, 5 kV isolation and Additional DIN on expansion modules to accommodate all I/Os

ELECTRICAL EQUIPMENT: PARTICULAR SPECIFICATIONS

Training and maintenance during defect liability period

The Contractor shall inform the Engineer on the completion of the project and provide training to the person(s) responsible for the operation and maintenance of the project. The training shall be conducted for a period equivalent to 8 hours, starting with the basic information and getting into detail as time progresses. The training will be scattered into a minimum of 2 days. Training shall not be conducted unless materials and planned procedure is approved by the Engineer and the client representative. The number of personnel to attend the training shall be determined by the Client and contractor to ensure they all have training material as may be required.

During the defect liability period, the Contractor shall be responsible for the complete maintenance of equipment and plant according to the suppliers/manufacturer's specifications. Maintenance of the installation shall mean the regular servicing, lubrication, repairing, cleaning, and adjustment of the installation as recommended by the manufacturers as well as the free of charge replacement of any defective components during this period.

A suitably qualified and trained person shall routinely and regularly examine and test the installation once every 3 months and shall also perform all the necessary maintenance tasks to ensure smooth and faultless operation. A quarterly report shall be submitted to the Engineer.
The Contractor shall immediately, on the day of first call-out, attend to breakdown/emergency calls. In the
event of non-performance by the Contractor in this respect, the employer shall be entitled to make such other arrangements as are necessary, the cost of which shall be for the Contractor's account or deductible from any outstanding retention monies.

A logbook shall be kept, and all servicing and repairs shall be recorded in this logbook with meticulous care. The logbook shall always be put at the disposal of the Engineer. The Contractor shall issue the logbook with full record of all services and repairs to the employer after the defect liability period has expired.

Operation and Maintenance Manuals

Three (3) sets of comprehensive operating instructions and maintenance procedures shall be provided on
completion of the commissioning of the installation One draft copy shall be submitted for scrutiny PRIOR to any commissioning.

Fire Extinguishers

Portable fire extinguishers containing liquefiable gaseous halons for Class S, B, C and E fires shall be installed in pump station and blower room. Areas with a room floor area not exceeding 50m² shall be equipped with a 2.5kg unit and rooms bigger than 50m² shall be equipped with a 4kg unit and equivalent mass of smaller units. In structures where more than one room is incorporated, housing different hazardous points, each room shall be equipped with appropriate extinguishers, e.g., a generator room with a separate fuel store.

Portable extinguisher shall comply with SANS 0105. Fire extinguishers shall be installed near exits or along exit routes in conspicuous and unobstructed positions and marked with conspicuous signboards. The extinguisher must be so installed that the carrying handle is 1.25m above floor.

Extinguishers that are to be mounted outside and adjacent to the main entrance door shall be mounted with a suitable cupboard.

Planning and Programing

The Contractor shall provide and maintain a detail construction program indicating duration of all manufacturing processes, transportation, delivery and installation dates.
There are no constraints on the execution of the work. However, any disruption of the normal working of the plant must be planned and co-ordinated in conjunction with the Engineer and Client.

Sequence of Work

The electrical works shall be coordinated with the mechanical and civil works to ensure smooth execution.

Identification of Cables

Cables shall be identified at all terminations by means of punched metallic bands or marked with labels or
tags. (Refer also to SANS 10142). The use of PVC tape with punched characters is not acceptable. The identification numbers of cables shall be shown on "as built" drawings of the Installation.