

GREATER TZANEEN MUNICIPALITY



**BID DESCRIPTION: REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT
TARENTAALRAND SUBSTATION.**

BID NUMBER: SCMU 26/2026

NAME OF THE BIDDER:.....

BID AMOUNT: R..... (VAT Incl.)

AMOUNT IN WORDS:
.....

CLOSING DATE: 10 SEPTEMBER 2026 @ 12H00

A Green, Healthy, Prosperous and United Municipality that Provides Quality Services to All

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GREATER TZANEEN MUNICIPALITY
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MASEPALA WA TZANEEN

SUPPLY CHAIN MANAGEMENT UNIT
DEPARTMENT: ENGINEERING SERVICES

BID DESCRIPTION: REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.

BID NO: SCMU 26/2026

Bids are hereby invited from interested service providers for REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION. Bid documents are obtainable at the Municipal website (www.greatertzaneen.gov.za), Etenders and Supply Chain Offices; Agatha Street, **upon a non-refundable fee of R2000.00 or deposited to the following banking details: Greater Tzaneen Municipality; Absa Bank; Acc no:4051444332 reference number please write the name of the company and bid Number.**

Stage-1 Mandatory requirements

NB: BIDDERS MUST PROVIDE PROOF OF THE FOLLOWING TO AVOID DISQUALIFICATION:

- Proof of purchase for tender document, including downloaded tender documents (attach receipt) EFT or Manually
- Bidders work experience Attach : Appointment letters ,Completion certificates , Stamped and signed reference letters by respective institutions in relation to the project.
- Key personnel and Qualifications
- Proof of Plant and Equipment
- Proof of CIDB Grading 7EP or Higher
- Proof of Registration as an Electrical Contractor with the Department of Labour
- Company's recent Audited 3 years Annual Financial Statements signed off by an Accountant/Registered Auditor with a practice number.
- The Bidder must submit a Original Tender Guarantee issued by a registered South African bank in terms of the Banks Act 94 of 1990 for a minimum amount of **R 3,000,000.00 (Three Million Rand)** as proof of financial capacity. The guarantee must be issued on the bank's official letterhead, duly signed by authorised bank representatives, and be payable on demand. The guarantee shall be based on the sample form included in the tender documents. The Municipality reserves the right to verify the authenticity of the guarantee with the issuing bank, and failure to submit a valid bank guarantee shall render the bid non-responsive.
- Fully completed Schedule A&B for the transformer found under section 4.1 of the bid document
- Fully completed schedule A&B for the Neutral Earthing Compensator with Neutral Earthing Resistor and

Auxiliary Transformer (NECRT) found under section 4.2 of the bid document

- Compulsory briefing session

Stage- 2 Administrative requirements:

NB: FAILURE TO SUBMIT ADMINISTRATIVE REQUIREMENTS MAY LEAD TO DISQUALIFICATION:

- Copy of company registration certificate/ documents from CIPC
- Certified ID copies of all directors
- Latest CSD registration summary report
- Copy/ printed Tax compliance status Pin or certificate.
- Municipal rates and taxes for both company and directors appearing in CK (not older than 3 months)) if the statement of water and lights is not on your names, please attach affidavit commissioned by oath from SAPS supporting your residential addresses as per attached statement or copy of Lease Agreement with 3 Months proof of payment only (No statements); Certified copies of Permission to Occupy (PTO's) land for bidders residing in Tribal Authority's areas of jurisdiction; proof of residence from Traditional Authority
- Joint Venture Agreement signed off by both parties (In case of a Joint Venture)

Completed bid documents with attachments (supporting documents) must be wrapped in a sealed envelope and be deposited into Greater Tzaneen Municipality bid box, Civic Centre, Agatha Street, marked as Bid No: SCMU 26/2026, Postal Address and contact details of the bidder.

Bid document will be available at www.greatertzaneen.gov.za, Etenders and Supply chain Management office on the date of advert.

Advert Publication date: 7 August 2026, Advert Number of days: 32 days. Compulsory Briefing session will be held on 18 August 2026 @10h00 Old fire hall, Greater Tzaneen Municipality. Closing date: 10 September 2026 @ 12:00. Public bid opening will take place.

EVALUATION OF BIDS

The Evaluation of the bid will be conducted in two stages; first stage will be assessment on functionality: Relevant company experience – 30 Points; Key Personnel and Qualifications – 55 Points; Proof of Plant and equipment – 15 Points; Only bidders that obtain 70 points will be subjected to 80/20 Preference point scoring system, where 80 points will be allocated for price only and 20 points will be allocated based on the specific goals points scored.

Bidders shall take note of the following bid conditions:

- a. Greater Tzaneen Municipality Supply Chain Management Policy will apply on this bid.
- b. Specific goals in terms of the preferential procurement regulations 2022 will apply on this bid.
- c. Greater Tzaneen Municipality does not bind itself to accept the lowest or any bid and reserves the right to accept the whole or part of the bid.
- d. Contract period: 36 Months
- e. CIDB grading for this bid is 7EP or higher.
- f. Council reserves the right to negotiate further conditions with the successful bidder.
- g. Council reserves the right not to appoint.
- h. No bidder will be appointed if not registered on Central Supplier Database.
- i. Late, incomplete, unsigned, faxed, or emailed bids will not be accepted.

Technical enquiries should be directed to Mr B.M Sengwayo @ 015 307 8155 and administrative enquiries relating to the tender be directed to Mrs. Z Ramothwala @ 015 307 8199 or Mr Misunwa MT @matimu.misunwa@tzaneen.gov.za/8157

Mr. F Mthetwa
Acting Municipal Manager
Greater Tzaneen Municipality

PART B.1 Form of bid

Bid for contract number: SCMU 26/2026

I/We, the undersigned:

Bid for an amount (vat inclusive) and.

- a) Bid to supply and deliver to the Greater Tzaneen Municipality all or any of the supplies of goods described in both Specification and Scheduled of this Contract.
- b) Agree that we will be bound by the specifications, prices, terms and conditions stipulated in those Schedules attached to this bid document, regarding delivery and execution.
- c) Further agree to be bound by those conditions, set out should this bid be accepted in whole or in part.
- d) Confirm that this bid may only be accepted by the Greater Tzaneen Municipality by way of a duly authorized Letter of Acceptance; and,
- e) Declare that we are fully acquainted with the Preferential Procurement Forms and Schedules, and the contents thereof and that we have signed the Schedule of Prices – PART “O” and completed the Preference Points claim Forms attached in Part I, J, K, L and M; N; O”
- f) Declare that the relevant authorised person thereto will initial each page of the bid document and amendment.
- g) Declare that all information provided in respect of the bidder as well as the bid documents submitted are true and correct.
- h) Declare that documentary proof regarding aspects of the bid process or accidental thereto will, when required, be submitted to the satisfaction of the Municipality.

Signed atthis Day of20.....

_____ Signature Name of Firm: _____ Address:

As Witness:

- 1. Name _____ Date ____ / ____ / ____ Signature: _____
- 2. Name _____ Date ____ / ____ / ____ Signature: _____

State in cases where the bidder is a Company, Corporation of Firm by what authority the person signing does so, whether by Articles of Association, Resolution, Power of Attorney or otherwise. I/We the undersigned am/are authorized to enter into this contract on behalf of:

By virtue of _____

Dated _____ a certified copy of which is attached to this bid. Signature of authorized person:

Name of Firm: _____

Postal Address: _____

As witness:

1. Name: _____ Date ____/____/____ Signature: _____

2. Name: _____ Date ____/____/____ Signature: _____

Please Note: The prices at which bids are prepared to supply the goods and materials or perform the services must be placed in the column on the form provided for that purpose. Failure to sign the form of bid and initialling each page of the bid document will result in disqualification of the bidder. Bidders must sign this Form of Bid as well as PART “F,” attached to this bid document and on acceptance of a bid by the Greater Tzaneen Municipality the Conditions of Contracts, Special Conditions, Specifications and Scheduled of prices, attached hereto shall be deemed to be the conditions of Contract between the parties.

Failure to complete all blank spaces in the forms and to attend to the other details mentioned herein will render the bid liable to rejection.

Bank account details of Bidder:

Bank: _____

Branch: _____

Branch Code: _____

Account Number: _____

Type of Account: _____

Proof that municipal account is paid in full to be attached (arrangements made with council will be taken into consideration).

PART B. 2 Bidding Information

Details of person responsible for bidding process Name: _____

Contact number: _____

Address of office submitting bid: _____

Telephone: _____

Fax no: _____

E-mail address: _____

Authority for signatory Signatories for close corporation and companies shall confirm their authority by attaching to this form a duly signed and dated copy of the relevant resolution of their members or their board of directors, as the case may be. An example for a company is shown below:

“By resolution of the board of director(s) passed on ____/____/20____

Mr/ Mrs. _____

Has been duly authorized to sign all documents in connection with the bid for

Contract _____

No _____

And any contract, which may arise there from on behalf of Signed on behalf of the company:

In his capacity as: _____ Date: ____/____/____

Signature of signatory as witness:

1. Name _____ Date ____/____/____ Signature: _____

2. Name _____ Date ____/____/____ Signature: _____

PART C General undertakings by the bidder

1.1 Definitions

1.1.1 “Acceptable bid” means any bid, which in all respects, complies with conditions of bid and specifications as set out in the bid document, including conditions as specified in the Preferential Procurement Policy Framework Act (Act 5 of 2000) and related regulations.

1.1.2 “Chairperson” means the chairperson of the Greater Tzaneen Municipality Bid Adjudication Committee.

1.1.3 “Municipal Manager” means the Accounting Officer or Municipal Manager of the Municipality.

1.1.4 “Committee” refers to the Bid Adjudication Committee.

1.1.5 “Council” refers to Greater Tzaneen Municipality.

1.1.6 “Equity Ownership” refers to the percentage ownership and control, exercised by individuals within an enterprise.

1.1.7 “HDI equity ownership” refers to the percentage of an enterprise, which is owned by individuals, or in the case of a company, the percentage shares that are owned by individuals meeting the requirements of the definition of a HDI.

1.1.8 “Member” means a member of the Bid Adjudication Committee.

1.1.9 “Historically Disadvantaged Individual (HDI)” means a South African citizen- (i) Who, due to the apartheid policy that had been in place, had no franchise in national elections prior to the introduction of the 1983 and 1993 Constitutions; and/or (ii) Who is a female; and/ or (iii) Who has a disability?

1.1.10 “Service providers” refers to the bidders who have been successful in being awarded Council contracts.

1.1.11 “SMMs” (Small, medium and Micro Enterprises) refers to separate and distinct business entities, including co-operative enterprises and NGOs, managed by one owner or more, as defined in the National Small Business (Act 102 of 1996).

1.1.12 “Contract” refers to legally binding agreement between Greater Tzaneen Municipality and the service provider.

1.1.13 “Bid” means a written offer in a prescribed or stipulated form in response to an invitation by the Municipality for the provision of services or goods

1.1.14 “Contractor” means any natural or legal person whose bid has been accepted by the Council.

1.1.15 “Closing time” means the date and hour specified in the bid documents for the receipt of bids.

1.1.16 “Order” means an official written order issued for the supply of goods or the rendering of a service in accordance with the accepted bid or price quotation.

1.1.17 “Written” or “in writing,” means handwritten in ink or any form of mechanical writing in printed form.

1.1.18 Functionality” means technical capability, financial and other resource availability that the service provider needs, to successfully and efficiently render the service and/or deliver in accordance with the specifications.

1.2 INTERPRETATION:

1.2.1 In this agreement clause headings are for convenience and shall not be used in its interpretation and, unless the context clearly indicates a contrary intention: -

1.2.2 An expression which denotes: -

1.2.3 Any reference to any statute, regulation or other legislation or official policy shall be a reference to that statute, regulation or other legislation or national policy as at the signature date, and as amended or re-enacted from time to time.;

1.2.4 When any number of day is prescribed, such shall be reckoned exclusively of the first and inclusively of the last day, unless the last day falls on a day which is not a business day, in which case the last day shall be the next succeeding day which is a business day;

1.2.5 Where any term is defined within a particular clause, other than the interpretation clause, that term shall bear the meaning ascribed to it in that clause wherever it is used in this agreement.

1.3 I/we hereby Bid:

1.3.1 To supply all or any of the supplies and/or to render all or any of the services described in the attached documents {Forms, Schedule(s) and/or Annexure(s) to the Greater Tzaneen Municipality.

1.3.2 On the terms and conditions and accordance with the specifications stipulated in the bid documents (and which shall be taken as part of and incorporated into, this bid);

1.3.3 At the prices and on the terms regarding time for delivery and/or execution inserted therein.

2.1 I/we agree further that: The offer herein shall remain binding upon me/us and open for acceptance by the Greater Tzaneen Municipality during the validity period indicated and calculated from the closing time of the bid. This bid and its acceptance shall be subject to the terms and conditions contained in the Forms, Scheduled(s)

and/or Annexure(s) attached hereto with which I am /we are fully acquitted. notwithstanding anything to the contrary in the Form(s), Schedule(s) and /or Annexure(s) attached hereto:

2.1.1 if I/we withdraw my/our bid within the period for which I/we have agreed that the bid shall remain open for acceptance or fail to fulfil the contract when called upon to do so, the Greater Tzaneen Municipality may, without prejudice to its other rights, agree to the withdrawal of my/our bid or cancel the contract that may have been entered into between me/us and the Municipality.

2.1.2 In such event, I/we will then pay to the Municipality any additional expenses incurred by the Municipality for having either to accept any less favourable bid or, if new bids have to be invited, the additional expenditure incurred by the invitation of new bids and by the subsequent acceptance of any less favourable bid.

2.1.3 The Municipality shall also have the right in these circumstances, to recover such additional expenditure by set-off against monies which may be due or become due to me/us under this or any other bid or contract or against any guarantee or deposit that may have been furnished by me/us or on my/our behalf for the due fulfilment of this or any other bid or contract.

2.1.4 Pending the ascertainment of the amount of such additional expenditure the Municipality may retain such monies, guarantee, or deposit as security for any loss the Municipality may sustain, as determined hereunder, by reason of my/our default.

2.1.5 Any legal proceedings arising from this bid may in all respects be launched or instituted against me/us and if/we hereby undertake to satisfy fully any sentence or judgment which may be obtained against me/us as a result of such legal proceedings, and I/we undertake to pay the Greater Tzaneen Municipality legal costs on an attorney and own client.

2.1.6 if my/our bid is accepted that acceptance may be communicated to me/us by letter or email and that proof of delivery of such acceptance to SA Post Office Ltd or the production of a document confirming that a fax has been sent, shall be treated as delivery to me/us. The law of the Republic of South Africa shall govern the contract created by the acceptance to this bid.

2.1.7 I/we have satisfied myself/ourselves as to the correctness and validity of this bid, that the price(s) and rate(s) quoted cover all the work/items(s) specified in the bid documents and that the price(s) and rate(s) cover all my/our obligations under a resulting contract and that I/we accept that any mistakes regarding price(s) and calculations will be at my/our risk

2.1.8 I/we accept full responsibility for the proper execution and conditions defaulting on me/us under this agreement as the principal(s) liable for the fulfilment of this contract. I/we declare that I/we have participation/no participation in the submission of any other bid for the supplies/services described in the attached documents.

If your answer here is yes, please state the names(s) of the other Bid(s) involved.....

PART D: CONTRACT DATA

Contract Data

Contract Data for Replacement of 60MVA 132/66/33kV Transformer No.2 At Tarentaalrand Substation

Part 1 : Data provided by the Employer

Conditions of Contract

The General Conditions of Contract for Construction Works, Third Edition (2015) published by the South African Institution of Civil Engineering, Private Bag X200, Halfway House , 1685 is applicable to this Contract and is obtainable from www.saice.org.za.

Contract Specific Data

The following contract specific data, referring to the General Conditions of Contract for Construction Works, Third Edition (2015) **as amended** by the **special conditions of contract** herein are applicable to this Contract.

Data to be given	GCC 2015 Clause	Data
Defects Liability Period	1.1.1.13	12 months
Due Completion Date	1.1.1.14	36 months from the Commencement Date
Employer	1.1.1.15	The Employer is Greater Tzaneen Municipality
Delivery of Notices to the Employer	1.2.1.2	The address for the Employer is: Physical Address: Civic Centre, Agatha Street, Greater Tzaneen Postal Address: P.O. Box 24 Tzaneen 0850
Employer's Agent	1.1.1.16	The Employer's Agent is Reliant Consulting (Pty) Ltd
Delivery of Notices to the Employer's Agent	1.2.1.2	The address for the Employer's Agent is: Email address:admin@reliantconsulting.co.za
Pricing Strategy	1.1.1.26	Fixed Price Contract
Performance Penalties	Add Clause 1.1.1.35	<i>"Performance Penalties" means the penalties to be paid by the Contractor to the Employer, for the failure to achieve the guaranteed performance of the Plant and/or the Works or any part of the Works (as the case may be), as set out in the Employer's Requirements during the Defects Liability Period."</i>
Contractor's Documents	Add Clause 1.1.1.36	<i>"Contractor's Documents" means the documents prepared by the Contractor as described in Clause 4.1.3.2 [Contractor's Documents],including calculations, digital files, computer</i>

		<i>programs and other software, drawings, manuals, models, specifications and other documents of a technical nature.</i>
Employer's Requirements	Add Clause 1.1.1.37	<i>"Employer's Requirements" means the documents entitled "Part F: Employer's Requirements", including the project background, project objectives, scope of work, project specifications, performance criteria, health and safety specifications, as included in the Contract, together with any additions and modifications made in accordance with the Contract. Such document describes the purpose(s) for which the Works are intended, and specifies Key Personnel (if any), the scope, and/or design and/or other performance, technical and evaluation criteria, for the Works.</i>
No-objection	Add Clause 1.1.1.38	<i>"No-objection" means that the Employer's Agent has no objection to the Contractor's Documents, or other documents submitted by the Contractor under these Conditions, and such Contractor's Documents or other documents may be used for the Works.</i>
Review	Add Clause 1.1.1.39	<i>"Review" means examination and consideration by the Employer's Agent of a Contractor's submission in order to assess whether (and to what extent) it complies with the Contract including the Employer's Requirements and/or with the Contractor's obligations under or in connection with the Contract.</i>
Governing Law	1.3.2	The law of the Republic of South Africa
Language of the Contract	1.3.3	The language for the Contract shall be English
Contractor's right to claim- Adverse Physical Conditions	2.2.4	"Add the following to Clause 2.2.4": <i>'In making his ruling in terms of Clause 10.1.5 on such claim, the Employer's Agent shall take into account any foreseeable sub-surface conditions submitted by the Contractor with his tender, but shall make his own interpretations thereof and deductions therefrom.'</i>
Ambiguity or discrepancy	2.4.2	The Clause is not applicable.
Extent of Contractor's Obligations	4.1.1	Add the following to Clause 4.1.1: <i>"When completed, the Works (or Section or Part or major item of Plant, if any) shall be fit for the purpose(s) for which they are intended, as defined and described in the Employer's Requirements (or, where no purpose(s) are so defined and described, fit for their ordinary purpose(s))</i> <i>The Contractor shall provide the Plant (and spare parts, if any) and Contractor's Documents specified in the Employer's Requirements, and all Contractor's Personnel, Goods, consumables and other things and services, whether of a temporary or permanent nature, required to fulfil the Contractor's obligations under the Contract.</i>

		<i>The Works shall include any work which is necessary to satisfy the Employer's Requirements stated in the Employer's Requirements, Contractor's Proposal and Schedules, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.</i> <i>The Contractor shall be responsible for the adequacy, stability and safety of all the Contractor's operations and activities, of all methods of construction and of all the Works.</i> <i>The Contractor shall, whenever required by the Employer's Agent, submit details of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works. No significant alteration to these arrangements and methods shall be made without this alteration having been submitted to the Employer's Agent."</i> <i>For the avoidance of doubt, the Works shall include, but not be limited to, the design, manufacture, supply, delivery, offloading, installation, erection, testing, commissioning, protection and control integration, civil and structural works, and all associated ancillary works necessary to achieve full operational readiness of the transformer and associated plant</i>
General Design Obligations	"Add Clause 4.1.3"	"Add Clause 4.1.3: General Design Obligation
General Design Obligation	Add Clause 4.1.3.1	<i>The Contractor shall carry out, and be responsible for, the design of the Works. Design shall be prepared by designers who:</i> <i>(a) are engineers or other professionals, qualified, experienced and competent in the disciplines of the design for which they are responsible;</i> <i>(b) comply with the criteria (if any) stated in the Employer's Requirements;</i> <i>(c) are qualified and entitled under applicable Laws to design the Works.</i> <i>Unless otherwise stated in the Employer's Requirements , the Contractor shall submit to the Employer's Agent for consent the name, address, detailed particulars and relevant experience of each proposed designer/design Subcontractor.</i> <i>The Contractor warrants that the Contractor, the Contractor's designers and design Subcontractors have the experience, capability and competence necessary for the design. The Contractor undertakes that the designers and design Subcontractors shall be available to attend discussions with the Employer's Agent and/or the Employer at all reasonable times (on or off the Site), until the issue of the Final Approval Certificate.</i>

Contractor's Documents	Add Clause 4.1.3.2	<i>The Contractor's Documents shall comprise the documents:</i> <i>(a) specified in the Employer's Requirements;</i> <i>(b) required to satisfy all permits, permissions, licences and other regulatory approvals which are the Contractor's responsibility under Clause 4.3.1 [Compliance with applicable laws]; and</i> <i>(c) described in Clause 4.1.3.4 [As-Built Records] and Clause 4.1.3.5 [Operation and Maintenance Manuals].</i> <u>Clause 4.1.3.2.1[Preparation by Contractor]</u> <i>Unless otherwise stated in the Employer's Requirements, the Contractor's Documents shall be written in the language for communications defined in Clause 1.3.3 [Language].</i> <i>The Contractor shall prepare all Contractor's Documents, and any other documents necessary to complete and implement the design during execution of the Works and to instruct the Contractor's Personnel.</i> <i>The Employer and/or his Agents shall have the right to inspect the preparation of all these documents (including any investigation, modelling and testing), wherever they are being prepared.</i> <u>Clause 4.1.3.2.2 [Review by Employer's Agent]</u> <i>In this Clause 4.1.3.2.2:</i> - <i>"Review Period" means the period not exceeding 21 days, or as otherwise stated in the Employer's Requirements, calculated from the date on which the Employer's Agent receives a Contractor's Document and a Contractor's Notice;</i> - <i>"Contractor's Document" excludes any of the Contractor's Documents which are not specified in the Employer's Requirements or these Conditions as being required to be submitted for Review, but includes all documents on which a specified Contractor's Document relies for completeness; and</i> - <i>"Contractor's Notice" means the Notice which shall state that the relevant Contractor's Document is considered by the Contractor to be ready for Review under this Clause 4.1.3.2.2 and for use, and that it complies with the Employer's Requirements and these Conditions, or the extent to which it does not do so.</i> <i>If the Employer's Requirements or these Conditions specify that a Contractor's Document is to be submitted to the Employer's Agent for Review, it shall be submitted accordingly, together with a Contractor's Notice.</i> <i>The Employer's Agent shall, within the Review Period, give a Notice to the Contractor:</i> <i>(a) of No-objection (which may include comments concerning minor matters which will not substantially affect</i>
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		<i>the Works); or</i> <i>(b) that the Contractor's Document fails (to the extent stated) to comply with the Employer's Requirements and/or the Contract, with reasons.</i> <i>NB: The Employer and/or his Agent's review outcome does not relieve the Contractor of his obligation to ensure that the Works satisfy the performance criteria as specified in the Employer's Requirements.</i> <i>If the Employer's Agent gives no Notice within the Review Period, the Employer's Agent shall be deemed to have given a notice that the Contractor's Document does not comply with the Employer's Requirements and/or the Contract.</i> <i>If the Employer's Agent instructs that further Contractor's Documents are reasonably required to demonstrate that the Contractor's design complies with the Contract, the Contractor shall prepare and submit them promptly to the Employer's Agent at the Contractor's cost.</i> <i>If the Employer's Agent gives a Notice under sub-paragraph (b) above, the Contractor shall:</i> <i>(i) revise the Contractor's Document;</i> <i>(ii) resubmit it to the Employer's Agent for Review in accordance with this Clause 4.1.3.2.2, and the Review Period shall be calculated from the date that the Employer's Agent receives it; and</i> <i>(iii) not be entitled to an extension of time for any delay caused by any such revision and resubmission and/or by subsequent Review by the Employer's Agent.</i> <i>If the Employer incurs additional costs as a result of such resubmission and subsequent Review, the Employer shall be entitled to payment by the Contractor of the costs reasonably incurred.</i> <u>4.1.3.2.3 [Construction]</u> <i>Except for Contractor's Documents under Clause 4.1.3.4 [As-Built Records] and Sub-Clause 4.1.3.5 [Operation and Maintenance Manuals], for each part of the Works requiring Contractor's Documents to be submitted for Review:</i> <i>(a) construction of such a part shall not commence until a Notice of No-objection is given by the Employer's Agent for all the Contractor's Documents which are relevant to its design and execution;</i> <i>(b) construction of such a part shall be in accordance with these Contractor's Documents; and</i> <i>(c) the Contractor may modify any design or Contractor's Documents which have previously been submitted for Review, by giving a Notice to the Employer's Agent with reasons. If the Contractor has commenced construction of the part of the Works to which such design or Contractor's Documents are relevant:</i> <i>(i) work on this part shall be suspended;</i> <i>(ii) the provisions of Clause 4.1.3.2.2 [Review by Employer's</i>
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		<i>Agent/ shall apply as if the Employer's Agent had given a Notice in respect of the Contractor's Documents under subparagraph (b) of that Clause; and</i> <i>(iii) work on this part shall not resume until a Notice of No-objection is given by the Employer's Agent for the revised documents.</i>
Training	Add Clause 4.1.3.3	<i>Add the following to Clause 4.1.3.3</i> <i>The Contractor shall carry out training of employees of the Employer (and/or other personnel identified in the Employer's Requirements) in the operation and maintenance of the Works, and any other aspect of the Works, to the extent specified in the Employer's Requirements.</i> <i>If the Employer's Requirements specify training which is to be carried out before Practical Completion, the Works shall not be considered to be completed for the purposes of Practical Completion under Clause 5.14.2 until this training has been completed in accordance with the Employer's requirements.</i> <i>The timing of the training shall be as stated in the Employer's Requirements (if not stated, as acceptable to the Employer). The Contractor shall provide qualified and experienced training staff, training facilities and all training materials as necessary and/or as stated in the Employer's requirements</i>
As-Built Records	Add Clause 4.1.3.4	<i>Add the following to Clause 4.1.3.4:</i> <i>The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact as-built locations, sizes and details of the work as executed by the Contractor.</i> <i>The format, referencing system, system of electronic storage and other relevant details of the as-built records shall be as stated in the Employer's requirements (if not stated, as acceptable to the Employer's Agent). These records shall be kept on the Site and shall be used exclusively for the purposes of this Clause.</i> <i>The Contractor shall submit to the Employer's Agent:</i> <i>(a) the as-built records for the Works or Section (as the case may be) before the commencement of the testing for the purposes of Practical Completion; and</i> <i>(b) updated as-built records to the extent that any work is executed by the Contractor:</i> <i>(i) during and/or after the testing in terms of Clause 5.1.4.1, before the issue of Practical Completion Certificate; and</i> <i>(ii) after Completion in terms of Clause 5.14.4 under , before the issue of the Final Approval Certificate.</i> <i>The number of copies of as-built records to be submitted by</i>

		<i>the Contractor under this Clause shall be one paper-original, one electronic copy (in the form as specified in the Employer's Requirements or, if not stated, a form acceptable to the Employer's Agent) and additional paper copies (if any) as stated in the Contract Data.</i>
Operation and Maintenance Manuals	Add Clause 4.1.3.5	<i>Add the following to Clause 4.1.3.5:</i> <i>The Contractor shall prepare, and keep up-to-date, a complete set of operation and maintenance manuals for the Works (the "O&M Manuals" in these Conditions).</i> <i>The format and other relevant details of the O&M Manuals shall be as stated in the Employer's Requirements and, in any case, these manuals shall:</i> <i>(a) be in sufficient detail for the Employer to:</i> <i>(i) operate, maintain and adjust the Works to ensure that the performance of the Works, Section and/or Plant (as the case may be) continues to comply with the performance criteria specified in the Employer's Requirements and the Schedule of Performance Guarantees; and</i> <i>(ii) operate, maintain, dismantle, reassemble, adjust and repair the Plant; and</i> <i>(b) include an inventory of spare parts required for the Employer's future operation and maintenance of the Plant.</i> <i>Before commencement of the tests for the purposes of Practical Completion, the Contractor shall submit provisional O&M Manuals for the Works or Section (as the case may be) to the Employer's Agent under Clause 4.1.3.2.2 [Review by the Employer's Agent]</i> <i>If during the tests for the purposes of Practical Completion any error or defect is found in the provisional O&M Manuals, the Contractor shall promptly rectify the error or defect at the Contractor's risk and cost.</i> <i>Before the issue of any Practical Completion Certificate under Clause 5.14.2, the final O&M Manuals shall be submitted to the Employer's Agent under Clause 4.1.3.2.2 [Review by the Employer's Agent].</i>
Non- working & Special non-working days	5.1.1.1 & 5.8.1	The non-working days are: Sundays The special non-working days are: 1. Public Holidays 2. the year end break commencing on 15 December and ending on the Friday before the first working Monday in January during the Contract period.
Documentation required before commencing with the Works	5.3.1	The documentation required before commencing with the works is: 1. Health and safety plan- Refer to Clause 4.3

		2. Initial Programme-Refer to Clause 5.6 3. Performance Guarantee-Refer to Clause 6.2 4. Insurances-Refer to Clause 8.6 5. Professional Indemnity Insurance to the value of 10% of the Contract Sum
Time to Submit Documentation	5.3.2	The time required to submit the documentation required before commencement of the Works is 14 days
Site Access and Possession	5.4.2	Site access and possession shall not be exclusive to the Contractor. The Employer and/or his agents, Eskom personnel or Eskom other third parties, may require access to Site from time to time including for the purposes of maintaining existing infrastructure
Instructions	Delete Clauses 5.9.1 to 5.9.6	Replace Clauses 5.9.1 to 5.9.6 with: The Employer's Agent may issue to the Contractor (at any time) instructions which may be necessary for the execution of the Works, all in accordance with the Contract. The Contractor shall only take instructions from the Employer's Agent, or from the Employer's Agent's Representative (if appointed) or an assistant to whom the appropriate authority to give instruction has been delegated under Clause 3.3.4 [Employer's Agent's authority to delegate]. Subject to the following provisions of this Sub-Clause, the Contractor shall comply with the instructions given by the Employer's Agent or the Employer's Agent's Representative (if appointed) or delegated assistant, on any matter related to the Contract. If an instruction states that it constitutes a Variation, Clause 6.3.1 [Variations] shall apply. If not so stated, and the Contractor considers that the instruction: (a) constitutes a Variation (or involves work that is already part of an existing Variation); or (b) does not comply with applicable Laws or will reduce the safety of the Works or is technically impossible the Contractor shall immediately, and before commencing any work related to the instruction, give a Notice to the Employer's Agent with reasons. If the Employer's Agent does not respond within 7 days after receiving this Notice, by giving a Notice confirming, reversing or varying the instruction, the Employer's Agent shall be deemed to have revoked the instruction. Otherwise the Contractor shall comply with and be bound by the terms of the Employer's Agent's response.
Additional Payment Due to extension of Time	5.12.3	Delete the words in Clause 5.12.3 and replace with: <i>"An extension of time shall not in itself entitle the Contractor to additional payment. Additional payment shall be due only where the Contractor proves an entitlement under the Governing Law of the Contract."</i>

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Penalty for delay	5.13.1	The penalties for failing to complete the Works R10 000 per day excluding VAT. The maximum amount of penalties shall not exceed 10 % of the Contract Sum."
Penalty for Performance Failure	"Add Clause:5.13.2"	<i>"If during the Defects Liability Period, the Works fail to achieve the guaranteed performance stated in the Employer's Requirements, and such failure is due to the Contractor's default, the Contractor shall promptly remedy the failure and shall pay the Employer performance penalties of R25 000.00 per day excluding VAT, subject to a maximum of 10% of the Contract sum, until successful rectification."</i>
Requirements for achieving Practical Completion	5.14.1	1. Approval of Operating and Maintenance Manuals and As-Built Records 2. Completion of Site Acceptance testing (SAT) 3. Hot Commissioning: successful 30 Day Trial Operation/Reliability Run
Return of Performance Guarantee after Certificate of Completion	Delete Clause 5.14.5.1	Clause 5.14.5.1 is not applicable to the Contract
Latent Defects Period	5.16.3	The Latent Defects Period is 10 years from the date of issue of the Certificate of Completion
Return of Performance Guarantee	<u>"Add Clause 5.16.4"</u>	<u>Add Clause 5.16.4 as follows:</u> The Employer shall return the Performance Security to the Contractor: (a) within 21 days after the issue of the Final Approval Certificate and the Contractor has complied with Clause 5.15 [Clearance of Site]; or

		(b) promptly after the date of termination if the Contract is terminated in accordance with Clause 9.1 [No Fault Termination], 9.3 [Termination by Contractor] and 9.4 [Termination for Employer's Convenience]
Security	6.2.1	Delete the word "...selected..." and replace it with "...stated.." and add the following at the end of the last sentence" "The Performance Guarantee shall be issued by a bank registered in the Republic of South Africa in terms of the Banks Act 94 of 1990 to which the Employer gives consent and shall be in the form annexed to Appendix 3 of the General Conditions of Contract, or in another form agreed by the Employer (but such consent and/or agreement shall not relieve the Contractor from any obligation under this Clause)" The Contractor shall provide a Fixed Performance Guarantee of 10% of the Contract Sum plus retention of 10% of the value of the Works deducted from each and every progress payment certificate.
Contractor's failure to provide security	6.2.2	Delete the words in the Clause and replace with: <i>"The Employer may terminate the Contract in terms of Clause 9.2 [Termination by Employer] if the Contractor fails to provide the required security."</i>
Validity and Return of Performance Guarantee	Delete Clause 6.2.3	Delete the words in the Clause and replace with: <i>"The Contractor shall ensure that the Performance Guarantee remains valid and enforceable until the issue of the Final Approval Certificate and the Contractor has complied with Clause 5.15 [Clearance of Site]."</i> <i>If the terms of the Performance Guarantee specify an expiry date, and the Contractor has not become entitled to receive the Final Approval Certificate by the date 28 days before the</i>

		<i>expiry date, the Contractor shall extend the validity of the Performance Guarantee until the issue of the Final Approval Certificate and the Contractor has complied with Clause 5.15 [Clearance of Site] at the Contractor's cost"</i>
Advance Payment	Add Clause 6.2.4	Advance Payment shall be applicable only to the extent expressly provided in the Pricing Data for procurement of major raw materials and commencement of transformer manufacture and shall not exceed 20% of the Contract Sum. Payment shall be subject to submission of an Advance Payment Guarantee and satisfaction of the conditions stated in Clause 6.2.4. After receiving the Advance Payment Certificate, the Employer shall make an advance payment, as an interest-free loan for procurement of major raw materials and commencement of transformer manufacture. 6.2.4.1 Advance Payment Guarantee The Contractor shall obtain (at the Contractor's cost) an Advance Payment Guarantee in amounts and currencies equal to the advance payment and shall submit it to the Employer with a copy to the Employer's Agent. This guarantee shall be issued by a bank registered in the Republic of South Africa in terms of the Banks Act 94 of 1990 to which the Employer gives consent, and shall be based on the sample form included in the tender documents or on another form agreed by the Employer (but such consent and/or agreement shall not relieve the Contractor from any obligation under this Clause). The Contractor shall ensure that the Advance Payment Guarantee is valid and enforceable until the advance payment has been repaid and/or the value of the Works which are the subject of the Advance Payment have been delivered to Site.

		If the terms of the Advance Payment Guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days before the expiry date: (a) the Contractor shall extend the validity of this guarantee until the advance payment has been repaid; (b) the Contractor shall immediately submit evidence of this extension to the Employer, with a copy to the Employer's Agent; and (c) if the Employer does not receive this evidence 7 days before the expiry date of this guarantee, the Employer shall be entitled to claim under the guarantee the amount of advance payment which has not been repaid. When submitting the Advance Payment Guarantee, the Contractor shall include an application (in the form of a Statement) for the advance payment. 6.2.4.2 Advance Payment Certificate The Employer's Agent shall issue an Advance Payment Certificate for the advance payment within 14 days after: (a) the Employer has received both the Performance Guarantee and the Advance Payment Guarantee, in the form and issued by an entity in accordance with Clause 6.2.1 [Security] and Clause 6.2.4 [Advance Payment Guarantee] respectively; and (b) confirmation letter for the commencement of transformer manufacturing by the OEM. (c) the Employer's Agent has received a copy of the Contractor's application for the advance payment under Sub-Clause 6.2.4.1 [Advance Payment Guarantee]. 6.2.4.3 Repayment of Advance Payment
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		The advance payment shall be repaid through percentage deductions in Payment Certificates. Unless other percentages are stated in the Contract Data: (a) deductions shall commence in the Interim Payment Certificate (IPC) in which the total of all certified interim payments in the same currency as the advance payment (excluding the advance payment and deductions and release of retention moneys) exceeds ten percent (10%) of the portion of the Contract Sum payable in that currency less Provisional Sums; and (b) deductions shall be made at the amortisation rate of one quarter (25%) of the amount of each IPC (excluding the advance payment and deductions and release of retention monies) in the currencies and proportions of the advance payment, until such time as the advance payment has been repaid. If the advance payment has not been repaid before the issue of the Practical Completion, or before termination under Clause 9.2[Termination by Employer], Clause 9.3[Termination by Contractor] or Clause 9.1 [Termination due to external and/or internal events] (as the case may be), Clause 9.4 [Termination for Employer's Convenience], the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Employer.
Overhead charges	6.5.1.2.3	Not applicable
Measurement of Works	6.7.1	Delete the words in the Clause and replace with: “The Works shall be measured and paid in terms of the Pricing Data.” Payment for the Transformer shall be milestone based, while the remainder of the Works shall be paid in accordance with Activity Schedule in the Pricing Data.”

Contract Price Adjustment (CPA)	6.8.2	<i>Contract Price Adjustment is applicable for this Contract, provided that CPA shall not be applicable during the first twelve (12) months from the Contract Commencement Date.</i> <i>The Contract Price Adjustment Factor shall be calculated using the relevant Steel and Engineering Industries Federation of Southern Africa. (SEIFSA) Indices and Formulae stated below as applicable.</i> <i>Add the following to Clause 6.8.2:</i> <i>“Notwithstanding the provisions and/or anything to the contrary in Clause 6.8.2, Application of Contract Price Adjustment Factor, of the General Conditions of Contract, and to the extent that the relevant SEIFSA Indices and Formulae are applicable and may be applied, such indices and formulae shall be used to determine the amount of the variation of the Contract Price, in terms of the above-mentioned Clause.</i> <i>The following material and labour percentages and prices shall be used:</i> Contract Price Adjustment Mechanism: a) <i>65% of the Contract Price shall be adjusted in accordance with the price indices applicable in Table J-1(B), "SEIFSA Small Power Transformers < 63 MVA Composite Index", applicable at the closing date of the tender and two months prior to order placement date with the manufacturer as per the Approved Programme of Works.</i> <i>This component shall be applicable to the complete transformer package, including the 60 MVA power transformer, the NERCT, the marshalling kiosk, the on-load tap changer (OLTC), the cooling equipment, the transformer oil, all transformer accessories, and all associated equipment supplied as part of the transformer package.</i> b) <i>10% of the Contract Price shall be adjusted in accordance with the price indices applicable in Table M-6, "Construction Input Price Index (CIPi): Material Purchases for the Whole Industry", applicable at the closing date of the tender and two months to order</i>
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placement date with the manufacturer as per the Approved Program of Works.

This component shall be applicable to all materials not included in the transformer package, including transformer protection panels, aluminium busbars, earthing materials, structural steelwork, civil construction materials, control cables and other associated materials.

c) 10% of the Contract Price shall be adjusted in accordance with the price indices applicable in Table C-3(a), "SEIFSA Index | Actual Labour Cost (Field Force) where a subsistence allowance is paid", applicable at the closing date of the tender and two months prior to start work execution date as per the Approved Program of Works. This component shall be applicable to labour associated with civil works, erection, installation, testing, commissioning, supervision and project management activities.

d) 5% of the Contract Price shall be adjusted in accordance with the price indices applicable in Table L-1(B), "SEIFSA Index | Road Freight Costs", applicable at the closing date of the tender and two months prior to start work execution date as per the Approved Program of Works. This component shall be applicable to fuel, abnormal-load transportation, escort services, lifting equipment, logistics, delivery and handling costs.

e) 10% of the Contract Price shall be adjusted in accordance with Table U-3(A), "SEIFSA Exchange Rates – Rand per United States Dollar (USD)", for exchange-rate fluctuations after the closing date of the tender, provided that the adjustment shall apply only where the official exchange rate between the United States dollar (USD) and the South African rand (ZAR) varies by more than twenty per cent (20%) between the tender closing date and the applicable adjustment date.

Contract Price Adjustment formula

$$P_n = P_o (1 + P)$$

$$P = 0.9 \times [0.65 \times ((J_t - J_o) / J_o) + 0.1 \times ((M_t - M_o) / M_o) + 0.1 \times ((L_t - L_o) / L_o) + 0.05 \times ((R_t - R_o) / R_o) + 0.10 \times ((X_t - X_o) / X_o)]$$

		<i>Where:</i> • <i>P</i> = percentage adjustment factor applicable to the contract price. • <i>P_n</i> = adjusted contract price. • <i>P_o</i> = original contract price at the tender closing date. • <i>J</i> = SEIFSA Small Power Transformers (< 63 MVA) Composite Index (Table J-1(B)). • <i>M</i> = Construction Input Price Index (CIPI): Material Purchases for the Whole Industry (Table M-6). • <i>L</i> = SEIFSA Actual Labour Cost Index (Field Force) (Table C-3(a)). • <i>R</i> = SEIFSA Road Freight Costs Index (Table L-1(B)). • <i>X</i> = SEIFSA USD/ZAR exchange-rate index (Table U-3(A)). <i>and</i> • <i>J_o</i>, <i>M_o</i>, <i>L_o</i>, <i>R_o</i> and <i>X_o</i> represent the indices at the tender closing date. • <i>J_i</i>, <i>M_i</i>, <i>L_i</i>, <i>R_i</i> and <i>X_i</i> represent the applicable indices prevailing two months before the dates specified under clauses (a), (b), (c), (d) and (e).
Payment	6.10.1.1 and 6.10.1.2	Replace words in Clauses 6.10.1.1 and 6.10.1.2 with: “For purposes of Clause 6.10.1.1 and 6.10.1.2, payment shall be assessed in accordance with the payment mechanism stated in the Pricing Data up to the date of the Contractor statement.”
Payment for off -site material	6.10.1.5	Applicable. Payment is subject to the Contractor providing an Off-Site Material Guarantee at his own cost. This guarantee shall be issued by a bank registered in the Republic of South Africa in terms of the Banks Act 94 of 1990 to which the Employer gives consent, and shall be based on the sample form included in the tender documents or on another form agreed by the Employer (but such consent and/or agreement shall not relieve the Contractor from any obligation under this Clause)

Limit of Retention	6.10.3	The limit of the retention to be provided is 10% of the Contract Sum.
Value of Plant and material supplied by the Employer	8.6.1.1.2	Not required
Professional Fees not included in the Contract Data	8.6.1.1.3	The amount to cover professional fees for repairing damage and loss to be included in the insurance is 10% of the Contract Sum
Third Party Liability Insurance	8.6.1.3	The limit of indemnity for liability insurance is R5 000 000.00
Termination for Convenience	Add Clause 9.4	Add the following to Clause 9.4 The Employer shall be entitled to terminate the Contract at any time for the Employer's convenience, by giving a Notice of such termination to the Contractor (which Notice shall state that it is given under this Clause 9.4). After giving a Notice to terminate under this Clause, the Employer shall immediately: (a) have no right to further use any of the Contractor's Documents which shall be returned to the Contractor, except those for which the Contractor has received payment or for which payment is due under a Payment Certificate; (b) make arrangements to return the Performance Guarantee to the Contractor. Termination under this Clause shall take effect 28 days after the later of the dates on which the Contractor receives this Notice or the Employer returns the Performance Guarantee. Unless and until the Contractor has received payment of the amount due under Clause 9.5 [Valuation after Termination

		for Employer's Convenience], the Employer shall not execute (any part of) the Works or arrange for (any part of) the Works to be executed by any other entities.
Valuation after termination for Employer's convenience	Add Clause 9.5	After termination under Clause 9.4 [Termination for Employer's Convenience] the Contractor shall, as soon as practicable, submit detailed supporting particulars (as reasonably required by the Employer's Agent) of: (a) the value of work done, which shall include: (i) the matters described in Clause 9.1 [Termination due to External and Internal Events], and (ii) any additions and/or deductions, and the balance due (if any) NB: The Contractor shall not be entitled to any loss of profit or other losses and damages suffered by the Contractor as a result of this termination. The Employer's Agent shall then proceed under Clause 3.2.2 [Agreement or Ruling] to agree or rule on the matters described in sub-paragraph (a) above. For the purpose of Clause 10.1.5 [Employer's Agent's ruling on Contractor's claims], the date the Employer's Agent receives the Contractor's particulars under this Clause shall be the date of commencement of the time limit for agreement under Clause 10.1.5). The Employer's Agent shall issue a Payment Certificate for the amount so agreed or determined, without the need for the Contractor to submit a Statement.
Payment after Employer's termination for convenience	Add Clause 9.6	The Employer shall pay the Contractor the amount certified in the Payment Certificate under Clause 9.5 [Valuation after Termination for Employer's Convenience] within 30 days after the Employer's Agent issues the relevant Payment Certificate under Clause 9.5.

Number of Adjudicators	10.5.3	The number of Adjudication Board Members to be appointed is one (1).
Arbitration	10.7.1	The final determination of disputes shall be arbitration.

Part 2: Data Provided by the Contractor

Data to be given	GCC 2015 Clause	Data
Contractor	1.1.1.9	The name of the Contractor is:
Delivery of Notices to the Contractor	1.2.1.2	The address for the Contractor is: Physical Address: Postal Address: Email address:
Security	6.2.1	Refer to Clause 6.2.1 under Part 1 of the Contract Data

FORM A: PROFORMA FORM OF TENDER GUARANTEE

Guarantee No.: _____ [insert guarantee reference number]

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letterhead]

Name of Contract/Contract No.: _____ [insert reference number or other information identifying the contract with regard to which the tender is submitted]

The Beneficiary (the “Employer”): _____ [insert name and address of the Beneficiary]

We have been informed that _____ [insert name and address of the Tenderer] (hereinafter called the “Applicant”) is submitting an offer for such Contract in response to your invitation, and that the conditions of the tender document require his/her offer to be supported by a tender guarantee.

At the request of the Applicant, we _____ [insert name of Guarantor] hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ [insert in figures and words the maximum amount payable and the currency in which it is payable] upon receipt by us of your demand in writing and your written statement (in the demand) that:

- (a) the Applicant has, without your agreement, withdrawn his/her offer after the latest time specified for its submission and before the expiry of its period of validity, or
- (b) the Applicant has refused to accept the correction of errors in his/her offer in accordance with such conditions of tender, or
- (c) you awarded the Contract to the Applicant and he/she has failed to enter into the Contract in terms of Clause 1.1.1.20 of the Conditions of Contract, or
- (d) you awarded the Contract to the Applicant and he/she has failed to comply with Clause 6.2.1 of the Conditions of Contract

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office *[insert address of office]* on or before _____ *[insert the date 35 days after the expiry of the validity of the Letter of Tender]*, when this guarantee shall expire.

The party liable for the payment of any charges: _____
_____ *[insert the name of the party]*.

This guarantee shall be governed by the laws of the Republic of South Africa and shall be subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

SIGNED by: _____ SIGNED by (1): _____
(signature) (signature)

(name) (name)

Date: _____

FORM B: PROFORMA FORM OF ADVANCE PAYMENT GUARANTEE

Guarantee No.: _____ [insert guarantee reference number]

The Guarantor: _____
_____ [insert name and address of place of issue, unless
indicated in the letterhead]

Name of Contract/Contract No.: _____
_____ [insert reference number or other information
identifying the contract between the Applicant and the Beneficiary on which the guarantee is based]

The Beneficiary (the “Employer”): _____
_____ [insert name and address of the Beneficiary]

We have been informed that _____
_____ [insert name of the Contractor and address]

(hereinafter called the “Applicant”) is your Contractor under such Contract and wishes to receive an advance payment, for which the Contract requires him/her to obtain a guarantee.

At the request of the Applicant, we _____ [insert name of Guarantor] hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ [insert in figures and words the maximum amount payable and the currency in which it is payable] (the “Guaranteed Amount”) upon receipt by us of your demand in writing and your written statement that:

- (a) the Applicant has failed to repay the advance payment in accordance with the Conditions of Contract, and
- (b) the amount of the advance payment which the Applicant has failed to repay.

This guarantee shall become effective upon receipt [of the first instalment] of the advance payment by the Applicant. The Guaranteed Amount shall be reduced by the amounts of the advance payment repaid to you, as evidenced by interim payment certificates issued under Clause 6.10 of the Conditions of Contract. Following receipt of a copy of each interim payment certificate, we shall promptly notify you of the revised Guaranteed Amount accordingly.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office [insert address of office] on or before _____ [insert the date 70 days after the expected Due Completion Date] (the “Expiry Date”), when this guarantee shall expire.

The party liable for the payment of any charges: _____ [insert the name of the party].

This guarantee shall be governed by the laws of the Republic of South Africa, and shall be subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

Signed by: _____

(signature)

(name)

Date: _____

PART E GENERAL PROCEDURES

1. General Directives

1. The following general procedures contained in this document have been laid down by the Council and are applicable to all bids, orders, and contracts, unless otherwise approved by the Council prior to the invitation of the bids.
2. Where applicable, special conditions or procedures are also laid down by the Council to cover specific supplies or services.
3. Where such special conditions or procedures are in conflict with the general conditions and procedures, the special conditions or procedures shall apply.
4. The bidder shall satisfy himself/herself with the conditions and circumstances of the bid. By bidding, the bidder shall deem to have satisfied himself/herself as to all the conditions and circumstances of the bid.
5. Formal contract are concluded with the contractors only where this requirement is stated in the bid invitation.
6. All bids with regard to the bidding of a service e.g., materials, cleaning services; professional services, etc. shall be subject to the negotiation of a Service Level agreement between the successful contractor and the Municipality. The acceptance of this Service Level Agreement is subject to the approval by the Council of the Municipality.
7. The written acceptance of bid shall be posted to the bidder or contractor concerned by registered or certified mail.
8. Process for competitive bidding Following are procedures for a competitive bidding process for each of the following stages:

8.1 Compilation of bidding documentation

- (a) Take into account – ♣ The general conditions of contract; ♠ Any Treasury guidelines on bid documentation; and ♣ The requirement of the Construction Industry Development Board, in the case of a bid relating to construction, Replacement or refurbishment of buildings or infrastructure.
- (b) Include evaluation and adjudication criteria, including any criteria required by other applicable legislation.
- (c) Compel bidders to declare any conflict of interest they may have in the transaction for which the bid is submitted as MBD 4
- (d) Require the bidders to furnish the following if the value of the transaction is expected to exceed R10 million (VAT included):
 - ♣ If the bidder is required by law to prepare annual financial statements for auditing, their audited annual financial statement – * For the past three years; or * Since their establishment if establishment during the past three years
 - ♣ A certificate signed by the bidder certifying that the bidder has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payments is overdue for more than 30 days

♣ Particulars of any contracts awarded to the bidder by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract

♣ A statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality is expected to be transferred out of the Republic (e) Stipulate that disputes must be settled by means of mutual consultation, mediation (with or without legal representation), or, when unsuccessful, in a South African court of law.

8.2 Issuing of bid documents

on the date that the advertisement appears in the Municipality's Bid Bulletin, and or media, prospective bidders may request copies of the bid documentation. The Supply Chain Unit will keep a register and potential bidders should sign for receipt of the bid documentation. If a fee is payable, an official receipt must be issued before the bid document is handed to the bidder. No bid responses from any Bidder should be accepted if sent via the Internet, e-mail or fax.

Only the Supply Chain Management Unit will have direct communication between the potential bidders and will facilitate all communication between potential bidders and the Municipality with regard to any advertised bid. No line function staff should be allowed to communicate with potential bidders without the approval by the Chief Financial Officer: Supply Chain Management Unit. The Supply Chain Management Unit will only consider request for the extension of the closing dates of advertised bid if the postponed date can be advertised in the media used to advertise before the original closing date. The closing time may be postponed only if all potential bidders can be advised of the postponed time, in writing, before the original closing time. The decision to extend the closing date or time rests with the Chief Financial Officer: Supply Chain Management Unit, who must ensure compliance with all relevant rules and regulations and must confirm prior to the action being taken.

8.3 Payment of bid documents

To ensure that only bona fide bidders collect documentation, and to recover printing costs, bid documents will be issued only after payment of the following amounts to the cashier:

Category Contract	Contract Value	Bid Payment
Micro	R30 000 – R200 000	R200.00
Small	R200 001 – R1000 000	R700.00
Medium	R1000 001 – R2 Million	R1500.00
Large	Above	R2000.00
Professional Services		R5000.00

8.4 Public Invitation for Competitive bids

the following are procedures for the invitation of competitive bids:

- (i) Invitation to prospective providers to submit bids must be by means of a public advertisement in newspapers commonly circulating locally, the website of the municipality or any other appropriate ways (which may include an advertisement in the Government Bid Bulletin) and
- (ii) Public advertisement must contain the following: The closure date for the submission of bids, which may not be less than 30 days in the case of transactions over R10 million (Vat included), or which are of a long term nature, or 14 days in any other case, from the date on which the advertisement is placed in a newspaper; subject to (iii) below; and
- (iii) Accounting officer may determine a closure date for the submission of bids which is less than the 30 or 14 days' requirement, but only if such shorter period can be justified on the grounds of urgency or emergency or any exceptional case where it is impractical or impossible to follow the official procurement process
- (iv) Bids submitted must be sealed.
- (v) The following information must appear in any advertisement:

- * **Bid number,**

- * **Description of the requirements**

- * **Closing date and time.**

- * **The name and telephone numbers of the contact person for any enquiries.**

8.5 Inspection on loco A fully explanatory site inspection will be conducted.

8.6 Handling of bids submitted in response to public invitation

(a) Closing of bids

All bids will close at **12H00** on a date as stipulated on the advertisement, which must be reflected in the bid document. Bids are late if they are received at the address indicated in the bid documents after the closing date and time. A late bid should not be admitted for consideration and where practical should be returned unopened to the bidder accompanied by and explanation.

(b) Opening of bids

Bids are opened in public as soon as possible after the closure in the presence of the Senior Supply Chain Officer: Supply Chain Management or his/her delegate. The official opening the bids should in each case read out the name of the bidder and the amount of the bid. The bid should be stamped with the official stamp of the Municipality and endorsed with the signatures of the person opening it and of the person in whose presence it was opened. Bids should be recorded in a register kept for that purpose.

8.7 Validity of the bids

The validity periods should not exceed 90 (ninety) days and is calculated from the date of bid closure endorsed on the front cover of the bid document. Should the validity period expire on a Saturday, Sunday or Public holiday, the bid must remain valid and open for acceptance until the closure on the following working date.

8.8 Consideration of bids

The Council takes all bids duly admitted into consideration. The Council reserves the right to accept the lowest or any bid received. The decision by the Municipality regarding the awarding of a contract must be final and binding.

8.9 Evaluation of bids

The following are criteria against which all bids' responses will be evaluated:

- i) Compliance with bid conditions
 - ☐ Bid submitted on time
 - ☐ Bid forms signed and each page initialled
 - ☐ All essential information provided
 - ☐ Certified ID copies
 - ☐ Proof of work experience (attach CV)
 - ☐ Submission of an original Tax Clearance Certificate, MBD 2
 - ☐ Submission of Company Registration Certificate
 - ☐ Submission of a Joint Venture Agreement, properly signed by all parties
 - ☐ Payment of Municipal RatesAnd all requirements as per advert
- ii) Meeting technical specifications and comply with bid conditions.
- iii) The number of points scored for achieving Government's Broad-Based Black Economic Empowerment objectives, points scored for price and / or points scored for functionality if applicable.

2.10 Evaluation of bids on functionality and price

- (i) Greater Tzaneen Municipality must in the bid documents indicate if, in respect of a particular bid invitation that bids will be evaluated on functionality and price.
- (ii) The total combined points allowed for functionality and price may, in respect of bids with an estimated Rand value above R1, 000,000.00, not exceed 90 points.
- (i) When evaluating bids contemplated in this item, the points for functionality must be calculated for each individual bidder
- (ii) The conditions of bid may stipulate that a bidder must score a specified minimum number of points for functionality to qualify for further adjudication.

- (iii) The points for price, in respect of a bid which has scored the specified minimum number of points contemplated in sub-regulation (v) above, must, subject to the application of the evaluation system for functionality and price contemplated in this regulation, be established separately and be calculated in accordance with the provisions of regulations c and d.
- (iv) The number of points scored for achieving Government's Broad-Based Black Economic
- (v) Empowerment Objectives must be calculated separately and must be added to the points
- (vi) Scored for functionality and price.
- (vii) Only bid with the highest number of points be selected.

2.11 Acceptance of bids

Successful bidders must be notified at least by registered post of the acceptance of their bids, but that acceptance, however, will only take effect after completion of the prescribed contract form. Unsuccessful bids should not be returned to bidders but should be placed on record for audit purposes. A register or records should be kept of all bids accepted

2.12 Publication of bid information

The particulars of the successful bidders should be published in the Municipality's Bid Bulletin as well as the website

2.13 Cancellation and re-invitation of bids

- (i) In the event that in the application of the 80/20 preference point system as stipulated in the bid documents, all bids received exceed the estimated Rand Value of R50 million, the bid invitation must be cancelled.
- (ii) In the event that, in the application of the 90/10 preference point system as stipulated in the bid documents, all bids received are equal to or below R50 million, the bid must be cancelled. (iii) In the event that the Municipality has cancelled a bid invitation as contemplated in sub regulations (i) and (ii) must re-invite bids and, must, in the bid documents stipulate the correct preference point 30 system to be applied.
- (a) A bid may be cancelled before award if:
 - ☐ Due to changed circumstances, there is no longer a need for the goods, works or services offered, or
 - ☐ Funds are no longer available to cover the total envisaged expenditure, or
 - ☐ No acceptable bids were received



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PART F: EMPLOYER'S REQUIREMENTS

1. PROJECT BACKGROUND

Greater Tzaneen Municipality ("the Employer") owns and operates Tarentaalrand Substation, a 132/66/33kV outdoor air-insulated substation in Tzaneen, Limpopo. The substation is supplied at 132kV from an Eskom overhead feeder line and is a critical supply point for the municipal distribution network.

Transformer No. 2, a 60MVA 132/66/33kV step-down unit, had an internal fault and is permanently out of service. The existing substation infrastructure including, but not limited to, the transformer plinth, bund wall, 132kV and 66kV primary plant, cable trenches, earthing system, and associated civil works, is proposed to be reused. The Successful Bidder shall be responsible for assessing and confirming fitness for purpose of the existing infrastructure prior to its incorporation into the Works.

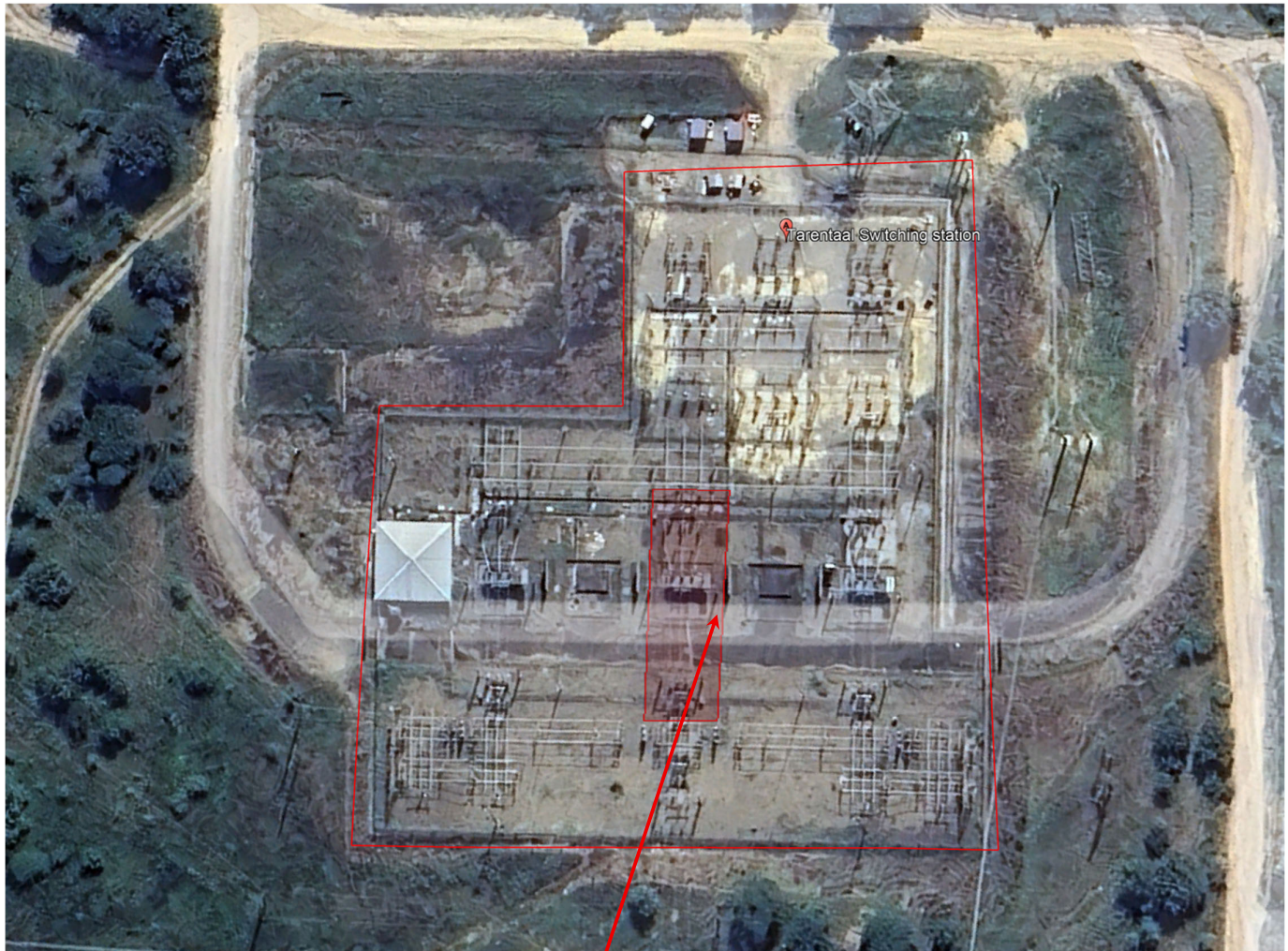
The purpose of this **Employer's Requirements** is to define all works required by Bidder that includes design, manufacture, supply, deliver, install, test, cold and hot-commission the replacement transformer and associated equipment to restore Tarentaalrand Substation to full operational capacity.

NOTE: *The existing plinth, bund wall, 132kV and 66kV bay equipment, cable trenches, earthing system, and civil infrastructure are intended for reuse. The Successful Bidder/Contractor shall be required, upon appointment, to carry out all necessary testing to confirm the integrity and suitability of the existing infrastructure. The Contractor shall be fully responsible for undertaking all inspections, investigations, and testing required to verify the condition and fitness for purpose of the works prior to commencement. The Contractor shall further conduct detailed visual inspections to confirm that the site is fit and ready for installation. The Contractor shall not be relieved of any liability in respect of the civil, structural, or electrical works and shall bear full responsibility for ensuring that all existing infrastructure is suitable for the intended purpose.*

The existing plinth is assumed suitable for reuse, on the basis that the replacement transformer shall be of equivalent size, weight, and footprint to the existing unit. Notwithstanding this assumption, the Contractor shall appoint a competent Professional Engineer to inspect and assess the existing plinth and certify its suitability for reuse prior to commencement of erection. Should the Contractor procure a transformer with different dimensional or weight characteristics that renders the existing plinth unsuitable, all associated modification or replacement civil works shall be carried out at the Contractor's own cost and risk.

2. SITE INFORMATION

The GPS coordinates for Tarentaalrand Substation are 23°49'27.34"S; 30°18'36.95"E



Replacement Transformer Bay

3. SCOPE OF WORK

The Works comprise the complete design (where applicable), manufacture, supply, delivery, offloading, storage, installation, erection, testing, commissioning, and handover of a 60MVA 132/66/33kV power transformer and all associated plant and infrastructure at Tarentaalrand Substation, including all ancillary works necessary to achieve full operational readiness. Without limiting the generality of the above, the Contractor's obligations shall include all work required for a complete and functional installation, whether expressly stated or reasonably inferred from the Contract, including the following:

- The design, manufacture, factory testing (including Factory Acceptance Tests), supply, and delivery of the power transformer, complete with on-load tap changer, marshalling kiosk, control panels, protection relays, and all specified accessories in accordance with IEC standards and the Employer's Requirements.
- All civil and structural works required for the installation, including demolition (where required), construction or modification of transformer plinths, bund walls, oil containment systems, cable trenches, drainage systems, foundations, and any strengthening or rehabilitation of existing infrastructure.
- All electrical works including, installation of the new transformer, connection to existing busbars, switchgear, and overhead lines, provision and installation of cables, terminations, glands, earthing and bonding systems, and integration with the existing substation network.
- All protection, control, and automation works, including the supply, configuration, installation, testing, and commissioning of protection relays, interlocking systems, signal wiring, and interface with existing protection schemes to ensure full coordination and selectivity.
- All testing and commissioning activities, including routine, type (where applicable), and site acceptance testing (SAT), functional testing, energisation, and a reliability run, demonstrating compliance with performance requirements prior to Practical Completion.
- Provision of all Contractor's Documents, including design calculations, drawings, technical submissions, method statements, quality plans, factory test reports, commissioning procedures, as-built drawings, and operation and maintenance manuals.
- Provision of training to the Employer's personnel in the operation and maintenance of the installed equipment, as specified in the Employer's Requirements.
- Provision of all temporary works, construction plant, equipment, supervision, labour, transport, and all resources necessary for the execution and completion of the Works.
- Compliance with all applicable legislation, standards, and regulations, including occupational health and safety requirements, environmental management requirements, and applicable electrical and construction standards.

The Contractor shall be deemed to have allowed for all ancillary, incidental, and supplementary works necessary for the proper completion of the Works, whether or not such works are explicitly described in the Contract. The Works shall be delivered as a complete, fully functional, and operational system, ready for continuous service at the required performance levels.

3.1 Scope of Work Summary

The Contractor shall be responsible for the complete execution of the following work items:

Item	Work Package	Brief Description
1	Power Transformer Supply	Design, manufacture, supply, deliver, install, test and commission a 60MVA three winding Power Transformer rated 132/66/33kV with the specified vector group (YNa0d1), ONAN/ONAF cooling, complete with automatic On Load Tap Changer (OLTC) on the 132kV winding. The transformer shall comply with IEC 60076 and Eskom Standards 240-68973110 and shall include the following accessories: • Buchholz relay • Automatic OLTC complete with Automatic Voltage Regulator (AVR) panel • Tap changer position indicator • Magnetic oil level gauge • Pressure relief device • Winding temperature indicator with minimum of 4 contacts • Oil temperature indicator • Online dissolved gas analyser • Marshalling kiosk with IEC61850 communication interface • Silica gel breather • Conservator tank with diaphragm • Oil surge relay • 132kV and 66kV Surge arrestors complete with counters • 132kV, 132kV (Neutral Bushing), 66kV and 33kV Bushings • Current Transformers (CTs) in bushings • Radiator Tanks complete with cooling fans • Transformer base frame / skid compatible with existing plinth, jacking pads, hauling eyes, lifting lugs and earthing terminals. The transformer shall come with the following spares: • 10% of Virgin Insulating Oil • 1 * Gaskets of all sizes for the entire transformer where required. • 2 * Butterfly valve • 1 * 132kV HV Bushing • 1 * 132kV HV Neutral Bushing • 1 * 66kV MV Bushing • 1 * 33kV LV Bushing • 1 * Breather Set • 1 * Cooling Fan • 1 * 50kg Silica Gel
2	Civil works	Refurbishment of the existing transformer oil bund wall and preparation of the existing plinth for installation of the replacement transformer
3	Transport and Delivery	Route survey and Road transport of the transformer and all associated equipment from the point of manufacture or Contractor's store to Tarentaalrand Substation

Item	Work Package	Brief Description
4	Offloading and Erection of transformer	Offloading, positioning on the existing certified plinth, mechanical erection, and making all primary and secondary connections.
5	Earthing	Connect the transformer and all new equipment to the existing substation earth mat and conduct earth continuity testing to confirm effective bonding.
6	NECRT Supply and Installation	Design, manufacture, deliver supply, install , test and commission a 100kVA 33/0.4kV NECRT Dyn11 with Short time current rating of 360A/10s, 15A Continuous current, Zero sequence impedance of 78.2 ohms, Resistance at 100 degree Celsius = 53,3 ohms including a 33kV cable and terminations of the NECRT to the 33kV bushing of the Main Power Transformer. The NECRT shall come complete with a mounting steel structure and core balancing CTs.
7	Transformer Protection Panel	Design, manufacture , supply, deliver, install, test and commission a Transformer protection panel consisting of main protection relay, backup protection relay, and OLTC voltage regulator and tap changer control relay, complete with all associated auxiliary relays, measuring instruments, control switches, indication lamps, wiring, termination facilities, busbars and panel wiring in accordance with the project specification and applicable IEC standards.
8	HV/MV Connections	Supply and installation of all clamps, connectors, conductors, and hardware to connect the transformer to the existing 132kV and 66kV bays
9	Factory Acceptance Tests (FAT)	Witnessed FATs in accordance with IEC standards for the transformer and all supplied equipment at the manufacturer's works prior to dispatch from manufacturing point.
10	Site Acceptance Tests (SAT)	SAT in accordance with IEC standards of all equipment supplied under this Contract after installation
11	Hot Commissioning and Reliability run test.	Energisation of the transformer and all associated equipment, load testing, reliability run test, and handover to the Employer
12	Substation Yard Rehabilitation	Removal of all weeds in the substation and application of herbicides.
12	Documentation	Provide drawings, specifications, as-builts, OHS file, commissioning reports
13	OHS Management	Provide OHS agent, health and safety plan, site audits, legal compliance

3.2 POWER TRANSFORMER – DESIGN, MANUFACTURE, DELIVER, SUPPLY, INSTALL, TEST AND COMMISSION

Design, manufacture, supply, deliver, install, test and commission a 60MVA three winding Power Transformer rated 132/66/33kV with the specified vector group (YNa0d1), ONAN/ONAF cooling, complete with automatic On Load Tap Changer (OLTC) on the 132kV winding. The transformer shall comply with IEC 60076, IEC60214 and Eskom Standards 240-68973110. The transformer shall be a complete, fully equipped unit ready for installation as described below.

The Bidder shall fill in full Transformer Technical Schedule A & B to demonstrate compliance of the offered transformer to the required specifications.

3.2.1 Principal Technical Requirements

See section on Transformer Technical Schedule A & B for detailed technical requirements of the transformer. The contractor shall fill out Schedule B to indicate compliance of the offered transformer.

3.2.2 On-Load Tap Changer (OLTC)

The transformer shall be equipped with a fully operational OLTC designed for 132kV service in accordance with IEC 60214. The OLTC shall include:

- The OLTC shall be housed in a separate oil compartment isolated from the main transformer tank, complete with its own conservator, Buchholz relay, oil surge relay, and associated protection devices.
- A motorised drive mechanism suitable for local, remote, and automatic operation
- Local control switch (raise / lower / auto) on the marshalling kiosk
- Mechanical tap position indicator visible from ground level
- Electrical tap position transmitter (4–20 mA analog output (ideal for SCADA or PLCs) or Binary Coded Decimal (BCD) digital output) for remote indication to the protection panel and SCADA
- OLTC operation counter with contact output for maintenance alarm
- Mechanical end-stop limiters to prevent over-travel at maximum and minimum tap positions
- Anti-pumping protection to prevent repeated consecutive tap operations
- Manual emergency operation capability from ground level
- The OLTC shall be of vacuum switching type.
- 17 discrete tap positions (1 nominal + 16 steps).
- All OLTC indications, alarms, and status signals shall be wired to the marshalling kiosk and made available for SCADA integration via both hardwired and IEC 61850 interfaces.

Technical Standards

- **Technology:** Vacuum-switching type to ensure carbon-free insulating oil and reduced maintenance.
- **Performance:** Minimum 300,000 operations before the first required maintenance; total service life of 600,000+ operations switching under full load rating
- The OLTC shall be rated for full-load tap changing and comply with IEC 60214 duty requirements.
- **Protection:** Must include a dedicated oil surge relay (e.g., RS2001) and an independent pressure relief device.

3.2.3 Transformer Accessories and Fittings

The transformer shall be supplied complete with all accessories and fittings listed below as a minimum. All devices shall be factory-wired to the marshalling kiosk:

3.2.3.1 Conservator and Breather

- Main oil conservator tank with oil level gauge (magnetic type) and low oil level alarm contact
- Separate OLTC oil conservator with oil level gauge and low oil level alarm contact
- Silica gel breather on main conservator (minimum 5 kg capacity)
- Silica gel breather on OLTC conservator
- Oil filling and drain valves on the main tank with lockable isolating valves

3.2.3.2 Protection Devices

- Main tank Buchholz relay (two-float type): alarm contact (slow gas) and trip contact (surge / rapid gas accumulation)
- OLTC Buchholz relay (surge type): trip contact
- Pressure Relief Device (PRD) on main tank: trip contact and visual flag indicator
- Pressure Relief Device on OLTC compartment: trip contact

3.2.3.3 Temperature Monitoring

- Oil temperature indicator (OTI): both (local dial) analogue output, and digital output
- Winding temperature indicator (WTI): both (local dial) analogue output, and digital output

3.2.3.4 Cooling Equipment

- Forced cooling radiator banks with motor-driven fans suitable for outdoor installation
- Cooling fan control panel (integral to marshalling kiosk) with manual/auto selection, running indication, and fan failure alarm for each fan group
- Fans shall start automatically on a WTI temperature signal and shall also be capable of being started manually or by a load-dependent relay in the protection panel
- All cooling equipment rated for continuous outdoor operation at site ambient conditions

3.2.3.5 Bushings

- 132kV HV bushings: Resin Impregnated Synthetic (RIS) type with grey composite sheds, rated for the full HV insulation level; compliant with IEC 60137
- 66kV MV bushings: RIS type with grey composite sheds, rated for the full MV insulation level
- 33 kV LV bushings (as required for NECRT connection and tertiary winding)
- Bushing current ratings shall exceed the maximum continuous and short-circuit current at each voltage level
- Bushings shall be suitable for mounting of bushing CTs.

3.2.3.6 Surge Arresters

- Station class metal-oxide surge arresters compliant with IEC 60099-4 shall be installed on all three phases of the 132 kV HV terminals
- Station class metal-oxide surge arresters compliant with IEC 60099-4 shall be installed on all three phases of the 66 kV MV terminals
- Station class metal-oxide surge arresters compliant with IEC 60099-4 shall be installed on all three phases of the 33 kV MV terminals
- Surge counters with leakage current monitoring shall be fitted to each arrester
- Transformer surge arresters shall be mounted on top of the transformer tank next transformer, connected to the bushing terminals via the shortest practicable lead
- All arrester earth leads shall be earthed via mounting bracket to tank.

3.2.3.7 Marshalling Kiosk

- A tank-mounted marshalling kiosk shall be supplied, housing all terminal blocks, control switches, and auxiliary equipment
- Minimum IP54 enclosure rating, powder coated steel construction, with anti-condensation heater and thermostat
- Segregated terminal strips for: protection trip and alarm circuits; OLTC control and indication; temperature monitoring outputs; cooling control; SCADA analogue and digital outputs
- All wiring shall be ferrule-numbered at both ends and connected to labelled, shrouded terminal blocks with loop-test facilities
- A single multi-core armoured control cable shall be used for the interface between the marshalling kiosk and the protection panel in the control room; the Contractor shall supply and install this cable

3.2.3.8 Additional Fittings

- Earthing pads (minimum four) on tank body for connection to the substation earth mat
- Jacking pads and lifting lugs rated for the full transformer mass
- Drain valve with sampling point at the bottom of the main tank
- Pressure equalising pipe between main conservator and OLTC conservator (where required by design)
- Rating plate (stainless steel, engraved) fixed to the tank in a visible location, showing all IEC 60076 nameplate data
- Transport pressure relief device (if transformer is transported gas-blanketed)
- Dehydrating breathers with moisture indicator for transport and storage
- Any other fittings required to fulfil the tender requirements.

3.4 NECRT

Design, manufacture, deliver, supply, install, test and commission a 100kVA 33/0.4kV NECRT Dyn11 with Short time current rating of 360A/10s, 15A Continuous current, Zero sequence impedance of 78.2 ohms, Resistance at 100 degree Celsius = 53,3 ohms including a 33kV cable and terminations of the NECRT to the 33kV bushing of the Main Power Transformer. The NECRT shall come complete with a mounting steel structure and core balancing CTs.

The Bidder shall fill in full NECRT Technical Schedule A & B to demonstrate compliance of the offered NECRT to the required specifications.

The Neutral Earthing Compensating Resistor Transformer (NECRT) arrangement shall be compatible with the existing substation earthing scheme. The Contractor shall design, manufacture, deliver supply, install, test and commission the NECRT as a separate item of plant, mounted adjacent to the replacement transformer. The NECRT shall include:

- A 33/0.4 kV NECRT rated 100 kVA, with vector group (Dyn11) and impedance to match the existing scheme
- A neutral earthing resistor (NERCT) connected in the secondary circuit, rated for minimum 15A continuous, short time current 360A for 10 seconds, Zero sequence impedance of 78.2 ohms, Resistance at 100 degree Celsius = 53,3 ohms consistent with the existing T1 and T3 NECRT ratings.
- All connections from the transformer LV neutral bushing to the NECRT primary, and from the NECRT secondary to the NER and earth mat, shall be designed, supplied, and installed by the Contractor
- Appropriate mechanical protection housing (IP44 minimum) for the resistor assembly
- Alarm and trip contacts from the NER or NECRT to the protection panel terminal blocks
- The NECRT shall come complete with a mounting steel structure and core balancing CTs
- Design and Installation of suitable concrete Plinth to mount the NECRT.

3.5 HV AND MV CONNECTIONS: CLAMPS, CONDUCTORS AND HARDWARE

The Contractor shall supply and install all conductors, clamps, connectors, insulated hardware, and associated fittings required to connect the replacement transformer into the existing 132 kV and 66 kV bay infrastructure. The existing primary plant (busbars, circuit breakers, isolators, CTs, and VTs) is proposed to be reused. The Contractor shall be responsible for assessing and confirming the fitness for purpose of the existing infrastructure prior to its incorporation into the Works. The Contractor's scope of connection works includes:

3.5.1 HV (132kV) Connections

- Supply of aluminium alloy ACSR Bull conductor and tubular bars of adequate current rating for the HV connections from the existing 132kV busbar droppers or isolator terminals to the transformer 132kV bushings
- Supply and installation of bi-metal or aluminium compression connectors, clamps, and hardware at all conductor-to-bushing and conductor-to-busbar junction points
- Aluminium tubular conductor from the 132kV transformer bushings to the post insulators, including all associated end caps, flange fittings, expansion joints where required
- All fittings shall be suitable for the conductor type, fully corona-free at 132kV operating voltage, and compliant with IEC 61284
- Stringing and tensioning of all HV conductors to the correct sag as per site conditions.
- Installation of surge arrestor connection leads from the arrester terminals to the 132kV bushing terminals (both transformer top mounted).
- Verification that all electrical clearances from live conductors to earthed structures comply with Eskom and IEC 61936 requirements after installation; any inadequate clearance shall be rectified before energisation

3.5.2 MV (66kV) Connections

- Supply of ACSR Bull conductor for the MV connections from the existing 66kV bus connections or isolator terminals to the transformer 66kV bushings
- Supply and installation of bi-metal or aluminium compression connectors, clamps, and hardware at all connection points
- Stringing and tensioning of all MV conductors
- Installation of 66kV surge arrester connection leads from the arrester terminals to the 66kV bushing terminals (both transformer mounted)
- Verification of all 66kV electrical clearances after installation

3.5.3 LV (33 kV) Connections

- Supply and installation of 95mm² XLPE copper cable and terminations from the transformer 33kV (LV/tertiary) bushing(s) to the NECRT primary terminals
- All 33 kV connections shall be insulated, rated, and installed to comply with IEC 61936 clearance requirements for 33 kV equipment

3.5.4 Earthing Connections

- The transformer tank body shall be connected to the substation earth mat using four independent copper conductors (minimum 70 mm² each), connected to the dedicated transformer earthing pads provided on the tank
- The NECRT enclosure and NER frame shall be bonded to the substation earth mat
- All earthing connections shall be made with approved bi-metal or copper compression lugs and bolted to the existing substation earth bar
- The Contractor shall not cut or disturb existing earth conductors without prior approval from the Employer's Agent.

3.5.5 Control Cabling

- Supply and installation of all multi-core armoured control cables between the transformer marshalling kiosk and the protection panel in the control room
- Cable routing shall follow existing cable trenches and duct routes; no cables shall be laid directly on soil
- All cables shall be armoured (SWA), XLPE insulated, rated for continuous outdoor use
- Cables shall be glanded, terminated, and labelled at both ends; all cores shall be ferrule-numbered
- Cable schedule to be submitted to the Employer's Agent for approval before installation

3.6 TRANSFORMER PROTECTION PANEL

The Contractor shall design, manufacture, deliver, supply, install, test and commission a new Protection Panel for the three winding power transformer, comprising a full protection scheme including one Main Protection Relay, one Back-Up Protection Relay and one OLTC Voltage Regulator & Tap Changer Control Relay, complete with all associated auxiliary relays, measuring instruments, control switches, indication lamps, wiring, termination facilities, busbars and panel wiring in accordance with the project specification and applicable IEC standards. The Contractor shall carry out detailed measurements and inspection of the existing control room and panel dimensions prior to design and manufacture to ensure the new panel dimensions are fully compatible with the existing control room constraints, panel arrangement and cable entry provisions. Any deviations from the required dimensions or incompatibilities identified after award that result in additional works or modifications shall be entirely at the Contractor's risk and cost, with no additional claims entertained by the Employer. The panel shall replace the existing Reyrolle static relay scheme with modern numerical IED-based protection and shall provide all functions described below.

3.6.1 Panel Construction

- Floor-standing, self-supporting cubicle, powder-coated steel, minimum IP42, suitable for indoor installation in a ventilated control room
- Panel dimensions to suit the available space in the existing control room (Contractor to measure and confirm before manufacturing)
- Anti-condensation heater and thermostat
- Internal fluorescent or LED lighting with door-operated switch
- Separate terminal sections for: HV protection with differential protection (IED 1), backup/OCEF protection (IED 2), tap changer control, OLTC indication, metering inputs, and SCADA/alarm outputs
- All current transformer secondary circuits shall include test links or plug-in test blocks to allow secondary injection testing without disconnecting CT wiring.

3.6.2 Main Protection Relay (IED 1 : SEL487) :Transformer Differential and Buchholz

A numerical IED shall be supplied to provide main transformer protection. Minimum protection functions shall include but not limited to:

- Percentage biased differential protection (87T) with variable slope characteristic
- Second and fifth harmonic restraint to prevent false tripping on magnetising inrush
- Through-fault stability confirmed by the relay manufacturer's application guide for the transformer impedance
- Restricted earth fault (REF) protection on the 132kV HV star winding (64REF)
- Hardwired binary inputs for all Buchholz relay contacts (main tank alarm and trip, OLTC surge trip), PRD trip, OTI trip, and WTI trip from the marshalling kiosk
- All above input signals shall initiate a trip of both the 132kV and 66kV circuit breakers and shall latch in the relay event log
- Integrated disturbance recorder: minimum 8 analogue channels and 16 binary channels, 100ms pre fault recording, records stored in the relay for retrieval via the relay front panel or communication port
- Event log: minimum 1 000 date and time stamped events
- LED indication on the relay front face for: differential trip, REF trip, Buchholz alarm, Buchholz trip, PRD trip, OTI alarm, OTI trip, WTI alarm, WTI trip
- IEC 61850 GOOSE and MMS communication interface (RJ45 or fibre), or IEC 60870-5-103 serial interface as a minimum, for future SCADA integration

3.6.3 Backup Protection Relay (IED 2 : SEL 451): Overcurrent, Earth Fault and Thermal Overload

A separate numerical IED shall be supplied to provide independent backup protection. Minimum protection functions shall include but not limited to:

- Three phase IDMTL overcurrent protection (51) on the 132kV side with selectable IEC standard or definite time characteristic
- Earth fault protection (51N/51G) on the 132kV side with IDMTL and definite time stages
- Three-phase overcurrent protection (51) on the 66kV side (definite time)
- Earth fault protection (51N) on the 66kV side
- Thermal overload protection (49) with biased thermal model, adjustable time constants, and pre-load memory; alarm and trip contacts; output to initiate forced cooling fans in the marshalling kiosk
- Negative sequence / unbalance detection (46) with alarm and trip
- Undervoltage (27) and overvoltage (59) protection stages on the 66kV side
- All overcurrent and earth fault settings shall be coordinated with the upstream Eskom protection and downstream municipal feeder protection per the approved protection settings schedule
- Integrated disturbance recorder: minimum 4 analogue channels and 16 binary channels
- Separate trip output contacts for 132kV circuit breaker and 66kV circuit breaker trip coils

3.6.4 OLTC Voltage Regulator and Tap Changer Control Relay (SEL 2414)

A dedicated tap changer control relay (AVR/VReg) shall be provided on the protection panel to control the OLTC in automatic voltage regulation mode. The relay shall include but not limited to:

- Automatic voltage regulation (AVR) mode maintains the 66kV secondary busbar voltage within the set-point deadband by initiating tap raise or lower commands to the OLTC motor drive
- Line drop compensation (LDC) to compensate for distribution feeder impedance where required
- Tap raise / lower / auto / manual control switches on the panel front face
- Tap position display on the panel front face (numeric LED or LCD)
- High and low voltage alarm outputs (visual and potential-free contacts for SCADA)
- OLTC blocked / run indication on panel front face
- Parallel transformer operation mode capability (circulating current or master-follower) compatible with T1 and T3 tap changer control relays, to allow load sharing between all three transformers
- Operation counter with alarm output for OLTC maintenance scheduling

3.6.5 General Panel Requirements

- All IEDs shall be from a reputable manufacturer with proven installations on the South African grid, all the relays shall be approved by the Employer's Agent before manufacturing of the Protection Panel.
- All relay settings shall be configured in accordance with the existing substation protection settings unless otherwise.
- Protection panel shall be provided with a mimic diagram on the front door showing the single-line arrangement of the transformer bay
- Panel shall include all necessary auxiliary relays, timers, trip relays, watchdog relays, and output relays required for a complete, functional protection system
- Trip circuit supervision (TCS) shall be provided for all circuit breaker trip coils to detect a trip circuit failure and generate an alarm
- Panel shall interface with the existing Battery Trip Unit (BTU) DC supply via dedicated circuit breakers or fuses; all panel fusing and MCB ratings to be designed by the Contractor
- The panel shall have a breaker fault trip counter for tracking breaker operations
- The panel shall have a Panel Not Healthy/Panel Healthy watchdog lamp

3.7. TRANSPORT AND DELIVERY TO SITE

The Contractor shall be responsible for the complete transportation of the transformer and all associated equipment from the manufacturer or Contractor's storage facility to Tarentaalrand Substation. The substation is accessed from the R71 public road via an existing gravel access road, with an internal substation concrete roadway available for transformer positioning. The Contractor shall:

- Arrange and be responsible for all abnormal load transport permits, police escorts, traffic management, and route clearance required by applicable legislation for the transportation of the transformer
- Confirm the transportation route and obtain all necessary permits before the transformer is dispatched from the factory
- Ensure the transportation vehicle and trailer are rated for the full transformer mass (including oil, if transported oil-filled) plus all temporary transportation fittings
- If the transformer is transported without oil (gas-blanketed), the Contractor shall be responsible for the supply of the correct grade and quantity of transformer oil and for all oil filling, filtration, and degassing onsite
- Notify the Employer's Agent not less than seven (7) days before the planned delivery date to allow the Employer to make arrangements for substation access and network outage coordination
- The Contractor shall conduct a visual inspection of the transformer immediately upon arrival at site, before offloading, and shall document any visible transit damage in a written delivery inspection report submitted to the Employer's Agent.
- The Contractor shall be solely responsible for any damage to the transformer or other equipment during transportation and offloading

3.8 CIVIL WORKS

Civil Works shall include:

- Inspection and repair of the existing concrete plinth including crack repair and surface levelling.
- Removal and replacement of damaged bund wall bricks and rebuilding of affected sections.
- Sealing of bund wall joints and application of oil resistant waterproof coating to bund walls and floor.
- Verification that the bund capacity is adequate for the oil volume of the replacement transformer.
- Installation or refurbishment of the oil drainage pipe connecting the bund to the existing oil containment dam.
- Cleaning and inspection of the existing oil dam prior to connection.
- Water tightness testing of the refurbished bund prior to commissioning.
- Design, supply, construct and install NECRT reinforced concrete plinth for substation equipment including excavation to required depth, formwork, steel reinforcement, concrete casting, embedded anchor bolts, earthing inserts, levelling, curing, backfilling and compaction.
- All Civil works shall be signed by ESCA registered Civil Engineer.

3.9 OFFLOADING, POSITIONING AND ERECTION

3.9.1 Lifting and Positioning

- The Contractor shall supply all lifting equipment (crane, rigging, slings, shackles, and spreader beams) required for offloading the transformer from the transport vehicle and placing it on the existing certified transformer plinth
- All lifting equipment shall have valid load test certificates (not older than 12 months) and shall be inspected by a competent rigger before each lift
- The crane shall be rated with an adequate factor of safety for the transformer mass at the required lift radius; the Contractor shall submit a written lift plan to the Employer's Agent for approval not less than seven (7) days before the planned lift
- Lifting shall only be performed using the dedicated lifting lugs and jacking pads provided on the transformer tank; lifting from any other point is prohibited
- The transformer shall be lowered onto the plinth and aligned to the anchor bolt pattern; anchor bolts shall be torqued to the transformer manufacturer's specified values
- A spirit level shall be used to verify that the transformer is level in both axes after positioning; out of level shall not exceed 1:500 in any direction

3.9.2 Mechanical Erection

- All transformer accessories removed for transport (conservator, cooling radiators, bushings, surge arrester structures, and external pipework) shall be reinstated in accordance with the manufacturer's erection manual
- All flanged connections shall be fitted with new gaskets; no reuse of gaskets from transport
- All pipework connections (conservator, OLTC, Buchholz, PRD) shall be leak tested before oil filling
- Cooling fans and fan control panel shall be installed and connected
- NECRT shall be installed on their foundation adjacent to the transformer and all LV connections made
- All earthing connections from the transformer and NECRT to the substation earth bar shall be made and tested before energisation

3.9.3 Oil Filling and Drying (if transported without oil)

- Where the transformer is transported without oil, the Contractor shall supply transformer oil conforming to IEC 60296 Class I and in a sufficient quantity to fill the transformer, conservator, OLTC compartment, and all external pipework, with a minimum 200 litre surplus retained on site
- Oil shall be filtered and degassed using a dedicated oil filtration and degassing plant before filling; filtration shall continue until oil quality meets IEC 60296 requirements for a new transformer (dielectric strength minimum 60kV at 2.5 mm gap; moisture content below 10 ppm; dissolved gas analysis within normal limits)
- Oil shall be filled under vacuum to eliminate air pockets in the windings and tank
- Oil quality test certificates from a SANAS accredited laboratory shall be submitted to the Employer's Agent before the transformer is energised

3.10 FACTORY ACCEPTANCE TESTS (FAT)

The Contractor shall arrange and conduct Factory Acceptance Tests on the transformer and all major equipment supplied under this Contract before dispatch from the manufacturer's works. The Employer's Agent reserves the right to witness all or part of the FAT. The Contractor shall give not less than four weeks' notice of the scheduled FAT date. No equipment shall be dispatched to site until the Employer's Agent has reviewed and approved all FAT test reports in writing.

3.10.1 Transformer FAT: IEC 60076 Routine Tests

The following mandatory routine, type and special tests shall be performed on the transformer at the manufacturer's works as a minimum, in accordance with the relevant IEC standards:

Mandatory Routine Electrical Measurements in accordance with IEC 60076-1

1. Winding resistance on all taps & phases
2. Voltage ratio & polarity verification on all tap positions, all three phases
3. Short-circuit impedance & load loss on principal tap and min. 2 other taps
4. No-load loss & excitation current at rated voltage
5. Zero-sequence impedance on HV/MV, HV/LV & MV/LV winding pairs

Mandatory Routine Dielectric & Insulation Tests in accordance with IEC 60076-3 and IEC 60137

6. Insulation resistance (Megger) on all windings to earth & between windings at 5 kV DC
7. Tan delta (dissipation factor) all windings and bushings (Not mandatory per IEC but recommended for this contract)
8. Bushing power factor & capacitance measurement
9. Separate source (applied voltage) AC withstand test on each winding
10. Induced AC overvoltage withstand test (twice rated voltage, 60 s)
11. **Partial discharge (PD) measurement during induced AC withstand mandatory at $U_m \geq 72.5$ kV**

Mandatory OLTC Routine Tests (IEC 60214-1)

12. OLTC mechanical operation test for full tap range cycling (min. 5 full cycles)
13. OLTC switching sequence verification
14. OLTC contact resistance measurement
15. OLTC dielectric tests

Mandatory Type Tests (Reports to be Submitted or Witnessed)

16. Temperature rise (heat run) at rated ONAF load with direct hot-spot measurement using fibre-optic sensors per IEC 60076-7, IEC 60076-2 and IEC 60076-7
17. Lightning impulse full wave & chopped wave on HV and MV line terminals per IEC 60076-3
18. Switching impulse test on HV terminals (mandatory for $U_m = 123$ kV class) per IEC 60076-3
19. Short-circuit withstand test (or analytical assessment with supporting calculations) per IEC 60076-5
20. Acoustic noise level measurement per IEC 60076-10 (Not mandatory per IEC but recommended for this contract)
21. Tank vacuum type test to 1.5 kPa per IEC 60076-1
22. Tank hydraulic pressure type test per IEC 60076-1

Mandatory Special Tests in accordance with IEC 60076-18 and IEC 61869

23. Sweep Frequency Response Analysis (SFRA) baseline fingerprint at FAT using Doble M5000 to be stored as reference record IEC 60076-18

24. SFRA repeated at each transport stage & on-site after installation using Doble M5000; formal comparison report against FAT baseline to be submitted

Mandatory Routine Oil Tests

26. Oil dielectric strength (breakdown voltage) per IEC 60156
27. Oil moisture content measurement per IEC 60814 and IEC 60422
28. Dissolved gas analysis (DGA) oil sample taken after heat run or immediately before dispatch per IEC 60567 and IEC 60599

Mandatory Protection, Control & Alarm Device Functional Tests in accordance with IEC 60076 -1

29. Buchholz relay functional operation test (alarm & trip)
30. Pressure relief device (PRD) functional test
31. Oil temperature indicator (OTI) calibration & alarm/trip setpoints
32. Winding temperature indicator (WTI) calibration & alarm/trip setpoints
33. Oil level gauge functional and visual inspection
34. Cooling fan controls — auto/manual operation, alarm & trip functions

3.10.3 Protection Panel FAT

Prior to dispatch of the protection panel, the Contractor shall carry out a Factory Acceptance Test (FAT) in accordance with IEC 62271-200 and IEC 60255-27. The FAT shall comprise mandatory routine tests on the assembled panel, mandatory routine test certificate submission for all individual relays, and witness tests as specified herein.

Test results shall be recorded on approved test sheets and signed by both parties. No panel shall be released for shipment until all FAT requirements have been satisfied and written acceptance issued by the Employer.

Relay Manufacturer Routine Test Certificates

Prior to the FAT, the Contractor shall submit IEC 60255-27 routine test certificates issued by the relay manufacturer for every protection and control relay on the equipment list, including as a minimum:

- Transformer differential protection relay
- Backup protection and control relay
- Automatic voltage regulator and tap change relay

Certificates shall confirm that each relay has passed the following routine tests at component level per IEC 60255-27:

- Visual inspection and workmanship verification
- Functional and operational test including pick-up, drop-off and output contact verification
- Power frequency voltage test 2 kVac for 1 minute
- Insulation resistance test minimum 100 MΩ at 500 Vdc
- Burden and power consumption verification

No relay shall be accepted into the panel build without a valid manufacturer routine test certificate. Certificates shall be included in the FAT documentation pack.

Panel Mandatory Routine Tests

The following mandatory routine tests shall be performed on the fully assembled panel in accordance with IEC 62271-200 and IEC 60255-27:

1) Visual Inspection (IEC 62271-200)

- Workmanship, labelling and build quality inspected against approved drawings
- Nameplate data verified against specification
- Enclosure ingress protection confirmed - minimum IP51 per IEC 60529
- Workmanship, labelling and build quality inspected against approved drawings

- Nameplate data verified against specification
 - Enclosure ingress protection confirmed - minimum IP51 per IEC 60529
- 2) Power Frequency Voltage (Dielectric) Test (IEC 62271-200 and IEC 60255-27)**
 - All control and auxiliary circuits - 2 kVac for 1 minute
 - CT secondary circuits - 500 Vdc with shorting links inserted
 - No flashover, breakdown or puncture permitted All control and auxiliary circuits 2 kVac for 1 minute
 - CT secondary circuits - 500 Vdc with shorting links inserted
 - No flashover, breakdown or puncture permitted
 - 3) Insulation Resistance Test (IEC 60255-27 Cl. 6.4 / IEC 61869-2)**
 - All circuits to earth 1 kVdc for 1 minute, minimum 100 MΩ
 - CT secondary circuits 500 Vdc, minimum 10 MΩ
 - 4) Wiring Verification (IEC 62271-200 Cl. 6.5 / IEC 60255-27 Cl. 6.2)**
 - CT secondary circuits 500 Vdc, minimum 10 MΩ
 - 100% point-to-point wiring continuity against approved schematic drawings
 - Correct termination of all conductors verified
 - DC auxiliary supply polarity confirmed at all relay terminals
 - 5) Functional Verification of Auxiliary Circuits (IEC 62271-200 and IEC 60255-27)**
 - Operation of all trip, alarm and indication output contacts verified
 - Correct operation of all panel-mounted switches, push-buttons and indicators
 - Auxiliary supply voltage confirmed within rated tolerance at all devices

Witness Tests

The following tests are required by the Employer over and above the mandatory routine tests and shall be performed at FAT in the presence of the Employer's representative:

- 1) Secondary Injection : Protection Relay Functional Tests (IEC 60255 series)**
 - All configured protection elements shall be verified using a calibrated secondary injection test set
 - Main relay functional testing of all protection elements
 - Back up relay functional testing of all protection elements
 - OLTC voltage regulator and tap changer control relay functional testing of all protection elements
- 2) AVR & Tap Changer Control Verification (IEC 60214-1, IEC 60255-181)**
 - AVR regulation function in auto mode voltage band, deadband and OLTC step response
 - Auto/manual changeover bumpless transfer confirmed
 - Tap-change lockout on protection operation interlock and indicator lamp verified
 - Supervisory isolating switch (SIS) and mechanism isolating switch (MIS) interlock logic
 - Tri-neutral close (TNC) selector switch logic verified
- 3) End-to-End Scheme Test (IEC 60255-27)**
 - Simulated fault injection correct trip output, correct indication, no spurious operations
 - All protection functions verified to drive and latch master trip indication
 - Panel-not-healthy (PNH) watchdog verified on DC supply failure and relay dropout
 - Auxiliary supply dip test no spurious trip during 20 ms supply interruption

Documentation

The following documentation shall be compiled by the Contractor and submitted to the Employer as part of the FAT pack:

- Relay manufacturer routine test certificates
- Completed and signed FAT test sheets for all tests
- As-built wiring diagrams marked up with any deviations from issued-for-construction drawings
- Relay configuration files and setting schedules as programmed and tested
- Communications configuration files and signal schedules as tested

3.10.4 NECRT FAT

The following Routine and Type tests will be mandatory:

Routine Tests (Mandatory) IEC 60076-1 & IEC 60076-6

- Winding resistance measurement
- Voltage ratio and vector group verification
- Short-circuit impedance and load loss
- No-load loss and no-load current
- Applied voltage withstand test
- Induced voltage test
- Zero-sequence impedance measurement
- Oil dielectric strength test (mandatory only if oil-filled)
- Tank leak test (mandatory only if oil-filled)

Type Tests (Mandatory) IEC 60076-1 & IEC 60076-6

- Temperature rise test
- Lightning impulse test (LI)
- Short-time current withstand (300 A / 10 s)

3.11 SITE ACCEPTANCE TESTS (SAT)

The Contractor shall conduct Site Acceptance Tests on all equipment after installation and before hot commissioning. No equipment shall be energised until all SAT items have been completed and the results reviewed and accepted in writing by the Engineer. The Contractor shall submit a detailed SAT procedure to the Engineer for approval not less than fourteen (14) calendar days before testing commences.

3.11.1 Transformer SAT

Site Acceptance Testing of the Power Transformer shall be performed upon completion of installation and prior to energisation, in accordance with IEC 60076 and the project commissioning specification, using calibrated test equipment operated by competent and experienced commissioning personnel. All test results shall be documented and submitted to the Employer in a comprehensive Site Acceptance Test report, comprising:

Electrical Measurement Tests

- Winding resistance on all three windings (HV, MV, LV) across all OLTC tap positions
- Voltage ratio on all taps and all phases
- Vector group and phase displacement verification
- Short-circuit impedance on all OLTC tap positions
- Zero sequence impedance measurement on all three winding pairs (HV-MV, HV-LV, MV-LV)
- Three-phase 380 V magnetising current measurement
- No-load loss and load loss cross-check against FAT results

Insulation Tests

- Winding insulation resistance (IR) and polarisation index (PI) at minimum 5 kV DC
- Core and core-clamp insulation resistance at 500 V DC for one minute
- Bushing and winding insulation integrity testing using Doble M4000
- Tank and frame earthing continuity verification
- Neutral earthing arrangement and continuity check

Transformer Oil Quality Tests

- Dielectric breakdown voltage (BDV) of insulating oil per IEC 60156
- Moisture content (water-in-oil) analysis per IEC 60814
- Dissolved gas analysis (DGA) pre-energisation baseline sample per IEC 60599

Sweep Frequency Response Analysis (SFRA)

- SFRA after final assembly and oil filling using Doble M5000/M5400 per IEC 60076-18, compared against factory FAT fingerprint to confirm no mechanical deformation or winding displacement during transport and installation

Current Transformer (CT) Tests

- CT polarity verification on all cores
- CT ratio and excitation (knee-point) test on all cores
- CT winding insulation resistance test
- CT secondary circuit continuity and burden check

Protection, Control and Alarm Functional Tests

- Buchholz relay float and surge element function tests and alarm/trip contact verification
- Sudden pressure relay (SPR) function and trip contact verification
- Pressure relief device (PRD) function and alarm contact verification
- Winding temperature indicator (WTI) calibration check and alarm/trip contact verification
- Oil temperature indicator (OTI) calibration check and alarm/trip contact verification
- Oil level gauge function and alarm contact verification
- All other alarm and trip contacts complete functional test and loop check
- Inter-trip and transfer trip scheme functional verification

On-Load Tap Changer (OLTC) Tests

- OLTC complete operation through all tap positions local and remote control
- OLTC drive motor insulation resistance and functional test
- OLTC contact resistance measurement across all tap positions
- OLTC tap position indicator verification local and remote

Cooling System Tests

- Fan motor insulation resistance test on each motor
- Pump motor insulation resistance test on each motor
- Functional test of all cooling fans automatic and manual operation
- Cooling control panel automatic staging, alarm and trip contacts
- Cooling system interlock and sequencing verification

All tests to be conducted using calibrated test equipment by competent and experienced commissioning personnel in accordance with IEC 60076 and the project commissioning specification.

3.11.2 Protection Panel SAT

All protection relay SAT tests shall be performed using a calibrated secondary injection test set. The protection engineer's approved relay settings schedule shall be used as the test reference document:

- Secondary injection of all three phases and earth on the differential relay (IED 1): operate and reset current verification at the set bias slope

- Harmonic restraint test: injection of second harmonic restraint to confirm the relay correctly restrains during simulated inrush conditions
- REF element injection test: operate and reset current verification
- Buchholz, PRD, OTI, and WTI trip binary input test: simulation of each input and confirmation of correct relay indication and trip output
- Secondary injection of IED 2 overcurrent and earth fault elements on both HV and MV sides: operate and reset current at the set pick-up values; timing verification at a multiple of the pick-up current
- IDMTL characteristic timing test at 2 x and 10 x pick-up current to verify the correct IEC characteristic is set
- Thermal overload element: injection at rated current; verification of alarm and trip thresholds and time constants
- Trip circuit supervision test: open-circuit simulation of each trip circuit and confirmation of TCS alarm
- End-to-end trip injection at the CT test links, confirmation of trip for usepath through the relay be *furnished* with the test reports of the tests done on the condition of the *existing equipment*. The *contractor will use his judgement* and to the circuit breaker trip coil (CB trip to be performed on the open, isolated CB)
- Tap changer control relay: injection of a voltage above and below the set-point; confirmation of automatic tap raise/lower commands to the OLTC
- All test results shall be recorded in a test register signed by the Contractor's Test Engineer and the Engineer's Representative

Site Acceptance Testing of the protection panel shall be carried out upon completion of installation and prior to energisation of the transformer. All tests shall be performed by competent and experienced protection commissioning personnel using calibrated test equipment with current calibration certificates traceable to national standards. The SAT shall be conducted in accordance with IEC 60255-27, IEC 62271-200, IEC 61869-2/3, IEC 60255-187-1, IEC 60255-187-3, IEC 60255-151 and IEC 60214-1, and the project commissioning specification.

The Contractor shall submit a SAT procedure for approval no less than 21 days prior to commencement of testing. No energisation of the transformer shall take place until all pre-energisation SAT tests have been completed satisfactorily and written acceptance issued by the Employer. All test results shall be documented and submitted to the Employer in a comprehensive SAT report within 14 days of test completion. All test records shall be retained for a minimum period of 10 years.

Visual Inspection & Installation Check (IEC 62271-200)

- Panel installation, earthing and cable entry inspected against approved as-built drawings
- All external cabling terminations and wiring verified for correctness and workmanship
- Confirmation that all FAT test links, shorting plugs and temporary wiring have been removed
- Nameplate and labelling verified against final as-built documentation
- Enclosure integrity and ingress protection confirmed

DC Supply Verification (IEC 60255-27)

- 110 V DC supply voltage and polarity from the existing Battery Trip Unit (BTU) confirmed at panel terminals and at all relay auxiliary supply inputs, within rated tolerance
- Correct fuse and MCB ratings confirmed throughout DC distribution
- DC earth fault detection system verified operational

Insulation Resistance Testing (IEC 60255-27 / IEC 61869-2/3)

- All CT secondary cables to earth 500 Vdc, minimum 10 MΩ (shorting links inserted)
- All VT secondary cables to earth 500 Vdc, minimum 10 MΩ
- All DC control cables to earth 1 kVdc for 1 minute, minimum 100 MΩ
- All AC auxiliary cables to earth 500 Vdc, minimum 10 MΩ

CT & VT Circuit Verification (IEC 61869-2 / IEC 61869-3)

These tests are mandatory prerequisites to all secondary and primary injection testing and shall be completed and accepted before injection testing commences.

- CT ratio, polarity and magnetisation curve verified at each installed CT
- CT secondary loop resistance measured and burden confirmed within rated capacity
- All CT secondary circuits confirmed earthed at one point only; no CT secondary circuit to be left open-circuited
- VT ratio, polarity and phase rotation confirmed correct at relay terminals
- VT secondary voltage magnitude confirmed correct under no-load conditions
- VT fuse and MCB ratings confirmed correct against burden

Secondary Injection Tests (IEC 60255 series)

- All configured protection elements shall be verified by secondary injection through the installed CT and VT circuits using a calibrated secondary injection test set, and confirmed correct against the approved relay settings:

Trip Circuit & Circuit Breaker Verification (IEC 60255-27 / IEC 62271-100)

- Complete trip circuit continuity verified from each relay output contact through to the associated HV and MV circuit breaker trip coils
- Each protection function verified to energise the correct trip coil
- Circuit breaker trip and close times measured and confirmed within manufacturer specification
- Breaker status and position indication
- Breaker auxiliary contact states verified correct in panel indication and interlock circuits
- Emergency trip push-button verified to trip associated breakers directly

OLTC, AVR & Tap Changer Control Testing (IEC 60214-1 / IEC 60255-181)

- Emergency trip push-button verified to trip associated breakers directly
- OLTC mechanical operation verified through full tap range in both raise and lower directions
- AVR auto-regulation function verified voltage band, deadband and step response confirmed against settings
- Manual tap change operation verified from panel and from remote
- Auto/manual changeover verified bumpless transfer confirmed

All OLTC interlock and lockout logic verified including:

- Auto/manual changeover verified bumpless transfer confirmed
- Tap-change lockout on protection operation
- Supervisory isolating switch (SIS) interlock
- Mechanism isolating switch (MIS) interlock
- Tri-neutral close (TNC) selector logic

Parallel operation settings verified where applicable

End-to-End Trip, Alarm & Indication Testing (IEC 60255-27)

- All protection functions verified end-to-end from relay operation through to associated circuit breakers and isolators
- All trip, alarm and indication output contacts verified correct at panel, RTU and control room
- Master trip operated indication (L1) verified to latch correctly on operation of any protection function
- Panel-not-healthy (PNH) alarm verified on DC supply failure and relay watchdog dropout
- All indication lamps, control switches, alarms and annunciators verified for correct operation and labelling
- Reset and lamp test function verified
- Auxiliary supply dip test no spurious trip or alarm during 20 ms supply interruption per IEC 60255-11

Primary Injection Tests (IEC 60255-187-1 / IEC 60255-187-3 / IEC 61869-2)

Primary injection shall be carried out by injecting current through the primary conductors of the installed CTs to verify the complete protection chain under realistic conditions. These tests are mandatory and shall not be substituted by secondary injection results.

- CT polarity and phase relationship confirmed correct into differential relay under primary injection
- Through-fault stability of differential scheme confirmed under primary injection
- Correct differential and restraint current magnitudes verified at relay terminals
- HV and MV REF scheme stability confirmed under primary injection through-fault conditions
- Correct operating and restraint current magnitudes verified for both REF schemes
- Current and voltage metering accuracy verified against primary injection values

Primary Energisation Checks (IEC 60255-187-1 / IEC 61869-2/3)

The following checks shall be performed immediately upon first energisation of the transformer and shall form part of the SAT:

- Correct voltage magnitude confirmed at all VT secondary terminals and relay inputs
- Phase rotation confirmed correct; transformer vector group confirmed from VT secondary measurements
- Differential relay confirmed stable during transformer energisation; inrush current waveform captured and reviewed from relay disturbance recorder
- All REF schemes confirmed stable on energisation
- Load current magnitude and phase angle confirmed correct at relay terminals under first load conditions
- All protection schemes confirmed stable under initial load; any anomalies to be investigated and resolved before the panel is declared in service

SAT Report

The SAT report submitted to the Employer shall include as a minimum:

- Completed and signed test sheets for all tests in Sections A through K
- Calibration certificates for all test equipment used
- Relay event and disturbance records captured during energisation
- As-built drawings marked up with any site deviations
- Relay configuration and setting files as commissioned
- Written confirmation that all protection schemes have been tested, are operating correctly against approved settings, and the panel is recommended for entry into service

3.11.3 NECRT SAT

Site Acceptance Testing of the NECRT and associated MV cable, upon completion of installation and prior to energisation, comprising:

- Insulation resistance testing of the NECRT windings and MV cable at minimum 5 kV DC, with results compared against factory baseline values;
- High voltage withstand testing of the MV cable and terminations using VLF AC (0.1 Hz) at $1.5 \times U_0$ for 60 minutes in accordance with IEC 60502-2;
- Zero sequence impedance measurement and verification against the specified value of 78.2 ohms;
- Winding resistance measurements on all windings, compared against factory acceptance test results;
- Voltage ratio check on all tap positions, within $\pm 0.5\%$ of the declared ratio;
- Vector group confirmation; and

- Functional testing of all alarm and trip contacts and monitoring devices,

All conducted using calibrated test equipment by competent and experienced commissioning personnel in accordance with IEC 60076-1, IEC 60076-3, and IEC 60502-2, with all test results documented and submitted to the Employer in a Site Acceptance Test report.

3.11.4 HV/MV Connection SAT

- Visual inspection of all conductor installations, connector tightness, and clamp condition
- Infra-red (thermographic) inspection of all bolted connections is recommended before energisation where ambient temperature allows; any hot joint detected shall be dismantled and remade
- Electrical clearance measurement from all live 132 kV and 66 kV conductors and fittings to all earthed structures; all clearances shall be recorded and shall meet or exceed the Eskom and IEC 61936 minimum values
- Surge arrester earth lead continuity test

3.12 HOT COMMISSIONING

Hot commissioning is the controlled energisation of the transformer and associated equipment under live network conditions, leading to full load operation and handover to the Employer. The Contractor shall prepare a detailed Hot Commissioning Procedure and submit it to the Engineer and the Employer (GTM Operations) for approval not less than fourteen (14) calendar days before the planned energisation date.

3.12.1 Pre-Energisation Checks

Immediately before energisation, the Contractor shall carry out and document the following final checks:

- Completion and sign-off of the pre-energisation checklist prior to first energisation of the power transformer, comprising verification and written confirmation that all installation, termination, testing and commissioning activities have been satisfactorily completed, all SAT reports have been reviewed and accepted by the Employer, all protection relay settings have been applied, verified and approved by Greater Tzaneen Municipality, all OLTC settings and limits have been configured and verified, all control and protection circuits have been tested and confirmed operational, all earthing and bonding connections are installed and tested, all oil systems are filled, processed and confirmed oil-tight, all access covers, inspection hatches and terminal box lids are fitted and secured, all temporary earths and safety grounds have been removed, all clearances from live equipment have been confirmed, and the transformer bay is clear of all personnel and equipment, with the completed and signed pre-energisation checklist submitted to the Employer prior to authorisation of first energisation, all in accordance with the project commissioning specification and applicable Greater Tzaneen Municipality switching and safety procedures.
- Sampling and dissolved gas analysis (DGA) of the transformer insulating oil prior to energisation, comprising extraction of an oil sample from the transformer drain valve or dedicated sampling point in accordance with IEC 60475 sampling procedures, submission of the oil sample to an accredited laboratory for full dissolved gas analysis in accordance with IEC 60567, measurement of all key fault gases including hydrogen, methane, ethane, ethylene, acetylene, carbon monoxide and carbon dioxide, measurement of oil dielectric breakdown voltage, water content, acidity and interfacial tension, interpretation of DGA results against IEC 60599 diagnostic criteria to confirm the absence of any active fault conditions or abnormal gas levels prior to energisation, and submission of the laboratory DGA report and interpretation to the Employer as part of the pre-energisation documentation pack, establishing a baseline fingerprint for future condition monitoring and trending of the transformer oil in service, all in accordance with IEC 60567, IEC 60599 and the project commissioning specification.
- Provision of first energisation procedure and supervision for the power transformer, including preparation and submission of a detailed first energisation procedure to the Employer for review and approval prior to energisation, coordination with the Greater Tzaneen Municipality for all necessary switching operations, outages and safety clearances, attendance of the Contractor's competent and experienced commissioning engineer and transformer manufacturer's representative during all first energisation activities, supervision of all switching operations and confirmation of correct transformer response upon energisation including verification of correct voltage levels on all windings, phase rotation, vector group and OLTC operation, monitoring of all protection relay indications, alarm and trip circuits during and immediately following energisation, confirmation of absence of abnormal noise, vibration or oil leakage following energisation, and submission of a first energisation report to the Client documenting all switching operations performed, observations recorded and confirmation of satisfactory energisation, all in accordance with the project commissioning specification and applicable Greater Tzaneen Municipality switching and safety procedures.

3.12.3 Post-Energisation Monitoring and Load Test

- The Contractor shall remain on site for a minimum of twenty four (24) hours after initial energisation to monitor the transformer and associated equipment
- Post-energisation checks and thermographic survey of the power transformer and associated equipment under load, comprising monitoring of all transformer parameters including oil temperature, winding temperature, load current and voltage levels on all windings during the initial loading period, verification of correct OLTC operation and voltage regulation under load, inspection of all bushing connections, clamp connections, cable terminations and tubular conductor connections for signs of overheating or abnormal temperature using a calibrated thermal imaging camera, thermographic survey of all HV, MV and LV connections, surge arresters, earth bonds and cooling equipment under load with all thermal images recorded and reported, inspection of all oil systems for leakage under load and thermal conditions, verification of correct operation of all cooling fans and pumps under automatic and manual control, monitoring and recording of all alarm and trip relay indications, and submission of a comprehensive post-energisation and thermographic survey report to the Employer including all thermal images, measured temperatures and identification of any hotspots or anomalies requiring remedial action, all conducted by competent and experienced commissioning personnel using calibrated thermal imaging equipment in accordance with the project commissioning specification and applicable IEC standards.
- Continuous monitoring shall be maintained of: HV and MV currents on all three phases, transformer oil temperature, winding temperature, and cooling fan status
- An oil sample for DGA analysis shall be taken after a minimum of 24 hours of loaded operation; the results shall be submitted to the Engineer within 48 hours of sampling; any gas levels outside normal limits shall be investigated and resolved before the transformer is accepted as handed over
- A thermographic (infra-red) inspection of all HV and MV connections, bushings, and connectors shall be carried out under load within 72 hours of initial energisation; any hot spot identified shall be investigated and remediated
- The transformer load shall be stepped up to not less than 80% of rated ONAF capacity (48 MVA) during the load test period and all temperatures and electrical parameters recorded
- The Contractor shall record all data from the hot commissioning in a commissioning log, which forms part of the handover documentation

3.12.4 Parallel Operation Verification

- Once the replacement transformer has been operating stably for a minimum of 24 hours, it shall be paralleled with the remaining in-service transformers (T1 and/or T3) to verify compatibility
- Load sharing between transformers shall be checked; any significant circulating current shall be investigated; minor adjustment of tap position or AVR set-point may be required to balance loading
- Parallel operation shall be confirmed stable before the Contractor demobilises from site

3.12.5 Hot Commissioning and Reliability Run

Successful completion of the 30-day trial operation and reliability run of the transformer and associated plant under normal operating conditions, demonstrating stable and satisfactory performance in accordance with the contract requirements. Upon successful completion of the 30-day reliability run, the Employer's Agent shall issue the Practical Completion Certificate for the Works.

3.13 HANDOVER AND DOCUMENTATION

The Contractor shall submit all documentation listed below to the Employer's Agent as a condition of practical completion. All documents shall be submitted in electronic format (PDF and native editable format where applicable) and as three (3) bound hard copy sets:

3.13.1 As-Built Drawings

- Updated substation single-line diagram showing the replacement transformer and all connections
- As-built general arrangement drawing of the transformer bay showing transformer position, NECRT position, conductor routes, and all equipment coordinates
- As-built protection panel schematic and wiring diagrams
- As-built cable schedule
- As-built earthing connection drawing for the transformer bay

3.13.2 Test Reports and Certificates

- Transformer FAT report (complete IEC 60076 routine test results, signed by the test engineer and the manufacturer's quality manager)
- Transformer type test certificates (temperature rise, impulse, short-circuit withstand)
- Protection panel FAT report
- NECRT FAT report
- All transformer SAT test result sheets
- All protection panel SAT test result sheets, including relay settings verification schedules
- Oil quality test certificates: pre-filling, post-installation (before energisation), and post-24-hour DGA sample
- OLTC condition and test reports
- Earthing continuity test results
- Thermographic inspection report (post-energisation)
- Crane and lift inspection certificate
- Transport and delivery inspection report

3.13.3 Manuals and Spare Parts

- Transformer operation and maintenance manual (original manufacturer's document)
- OLTC operation and maintenance manual
- IED 1 protection relay operation and settings manual
- IED 2 protection relay operation and settings manual
- Tap changer control relay operation and settings manual
- NECRT operation manual
- Spare parts list and recommended initial stock for the transformer, OLTC, and protection relays
- List of all consumables (filters, oil, gaskets, silica gel) required for the first 5-year maintenance cycle

3.13.4 Certificates and Compliance Documents

- OHS compliance declaration signed by the Contractor's OHS representative
- Waste disposal certificates for all oil, contaminated material, and construction waste removed from site
- Copy of all abnormal load transport permits

3.14 EMPLOYER-FURNISHED ITEMS AND INTERFACES

The following items are furnished by the Employer or are interfaces managed by the Employer. The Contractor shall coordinate with the Employer and his Agent on all interface matters:

- Existing substation infrastructure: certified plinth, bund wall, 132 kV and 66 kV primary plant, cable trenches, earthing system, and civil works all certified as fit for purpose and available for the Contractor's use
- Existing Battery Trip Unit (BTU): 110 V DC supply will be made available by GTM at the control room panel position; the Contractor shall connect the new protection panel to the existing BTU distribution board
- Substation access: GTM will provide access to the substation yard and control room during agreed working hours; the Contractor shall coordinate all site access requirements
- Network outage windows: GTM will arrange all necessary outage windows with GTM Maintenance and Operations Department for the Contractor to carry out work on live primary plant; the Contractor shall programme the works to fit within the outage windows provided
- Existing metering: the existing Landis and Gyr ZMD405 meters remain the Employer's responsibility; the Contractor shall confirm CT ratio compatibility advise the Employer's Agent if any metering changes are required

3.15 WORKS EXCLUDED FROM THIS CONTRACT

The following works are expressly excluded from this Contract and shall be carried out by others:

- Removal and disposal of the failed Transformer No. 2 – to be arranged separately by the Employer unless specifically priced as an additional item by the Contractor.
- Works on Transformer No. 1 (T1) and Transformer No. 3 (T3) bays
- Maintenance or replacement of the existing 132kV or 66 kV primary plant (circuit breakers, isolators, CTs, VTs) – these are deemed fit for purpose and are excluded unless a physical defect is discovered during installation and directed in writing by the Employer's Agent.
- Eskom switching operations on the 132 kV network – to be arranged by GTM
- SCADA master station works at the GTM control centre (local RTU provision may be included if specified as an optional item; see Bill of Quantities)
- Works on the 66 kV outgoing distribution feeders

13.16 APPLICABLE STANDARDS

All works shall comply with the latest applicable revisions of the standards listed. Where conflicts arise, Eskom Distribution Standards take precedence, followed by IEC standards, and SANS standards. Deviations require prior written approval from the Employer's Agent.

Standard	Subject
IEC 60076 (all parts)	Power transformers
IEC 60214	On-load tap changers
IEC 60099-4	Station class surge arresters
IEC 60137	Insulated bushings
IEC 60296	Insulating oils for electrical equipment
IEC 60599	Mineral oil-filled electrical equipment DGA interpretation
IEC 62271-100	AC circuit breakers
IEC 60255	Measuring relays and protection equipment
IEC 61850	Communication networks and systems for power utility automation
IEC 61936-1	Power installations exceeding 1 kV AC common rules
IEC 50522	Earthing of power installations exceeding 1 kV AC
IEC 61284	Fittings for overhead lines
IEC 60305	Insulators for overhead lines
Eskom Distribution Substation Design Standard	Substation layout, clearances, equipment
Eskom Earthing Standard (240-56226045)	Earth grid design and testing
Eskom Protection Standards	Protection settings and coordination requirements
NRS 048	Quality of supply
SANS 10142	Electrical installations (LV auxiliary systems)
OHS Act 85 of 1993 + Construction Regulations 2014	Health and safety
NEMA	Environmental management

13.17 CLOSING STATEMENT

This Scope of Work defines all works required of the Contractor under this Contract. The Contractor shall deliver a complete, safe, tested, commissioned, and documented installation that restores Tarentaalrand Substation to full transformer redundancy and complies with all applicable standards and the Employer's Requirements.

The Contractor shall visit the site before submitting a tender and shall satisfy itself regarding site conditions, access, existing infrastructure, and the interface with the civil and primary plant works. No claim for extra cost or time-based on-site conditions that could have been reasonably foreseeable during site inspection will be entertained after tender submission.

Tenderers shall direct all queries through the formal tender query process. Employer and or his Agent response/s will be issued to all registered Bidders as addendums.

— END OF SCOPE OF WORK —

4. PROJECT SPECIFICATIONS

4.1 TRANSFORMER TECHNICAL DATA SCHEDULE A & B

NOTE: Schedule A (column 2) contains the Employer's mandatory transformer technical specifications requirements. The Tenderer shall complete Schedule B (column 3) for every parameter listed. Blank cells in Schedule B will be interpreted as non-compliant. "Where the offered value differs from the Schedule A requirement, the deviation shall be clearly entered in Table B at the end of this schedule.

A1 – TRANSFORMER RATINGS

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Transformer Class	Class 1		
Number of Windings	Three (3) - HV / MV / LV Auto Transformer		
Connection	Three-phase, oil-filled, outdoor type.		
Conductor Material	Oxygen free copper		
Copper Cover Material	Thermally upgraded paper		
Vector Group	YNa0d1		
Manufacturer's name	Declare		
Insulating Oil	Virgin Oil, Non-corrosive sulphur type, compliant to IEC 60296 Class I and SABS 555		
Frequency	50 Hz		
HV Winding Voltage (kVrms)	Un =132 kV (Um = 145 kV)		
MV Winding Voltage (kVrms)	Un= 66 kV (Um = 72 kV)		
LV Winding Voltage (kVrms)	Un= 33 kV (Um = 36 kV)		
ONAN Power Rating HV & MV	36 MVA		
ONAF Power Rating HV & MV	60 MVA		
LV Power Rating (ONAN & ONAF)	10 MVA		
ONAN as % of ONAF (minimum)	60 %		
HV Rated Current @ Tap 5 (ONAF)	262.4 A		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
MV Rated Current @ Tap 5 (ONAF)	524.9 A		
LV Tertiary Rated Current	175.0 A		
Short-Circuit Withstand			
Short-Circuit Voltage Pre-fault	1.1 Un		
Short-Circuit Duration Fault	3 seconds		
Short-Circuit Impedance Source	Infinite bus		
Temporary Overvoltage Withstand			
Continuous	1.10 Un (145 kV)		
10 minutes	1.05 Um (152.3 kV)		
1 minute	1.25 Um (181.3 kV)		
5 seconds	1.50 Um (217.5 kV)		
1 second	1.75 Um (253.8 kV)		
Over fluxing Withstand			
Continuous	$1.10 \times V/Hz$		
1 minute	$1.25 \times V/Hz$		
5 seconds	$1.50 \times V/Hz$		
Max Core Flux Density (nominal tap)	≤ 1.75 T in limbs and yokes		
Geomagnetically Induced Currents (GIC)			
GIC Design Description	3 limb core preferred; declare mitigation strategy		
GIC Withstand	10A DC in neutral for 30 minutes Mandatory confirmation		
Temperature Rise Guarantees (ONAF 60 MVA)			
Guaranteed Top Oil Temperature Rise	≤ 50 K		
Guaranteed Average Winding Rise HV	≤ 55 K (Declare)		
Guaranteed Average Winding Rise MV	≤ 55 K (Declare)		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Guaranteed Average Winding Rise LV	≤ 55 K (Declare)		
Guaranteed Hot-Spot Rise HV Winding	≤ 78 K (Declare)		
Winding Arrangement	Core / TW / CW / RW / SW		

A2 – IMPEDANCE VALUES

Parameter	Schedule A – Required	Schedule B – Offered	Notes
HV/MV Impedance @ Tap 1 (+5 %)	10.3 % to be Matched with existing	10.3 %	
HV/MV Impedance @ Tap 5 (nominal)	10.4 % to be Matched with existing	10.4 %	
HV/MV Impedance @ Tap 17 (min, –15 %)	11.4 % to be Matched with existing	11.4 %	
HV/LV Impedance @ Tap 1	57.4 % to be Matched with existing	57.4 %	
HV/LV Impedance @ Tap 5 (nominal)	55.9 % to be Matched with existing	55.9 %	
HV/LV Impedance @ Tap 17	51.6 % to be Matched with existing	51.6 %	
MV/LV Impedance @ Tap 5 (nominal)	44.0 % to be Matched with existing	44.0 %	
Zero Sequence Impedance HV/MV pair	Manufacturer to declare		
Zero Sequence Impedance HV/LV pair	Manufacturer to declare		
Zero Sequence Impedance MV/LV pair	Manufacturer to declare		
Impedance Base MVA	60 MVA		

A2 (cont.) – TAPPING SCHEDULE

The Contractor shall strictly match the specified tapping schedule. No deviations will be permitted.

Tap Position	Tapping Switch Connects	HV Voltage (kV)	Max Rated Current (A)
1 (+5.0 %)	12–11 2–3	138.6	249.9
2 (+3.75 %)	12–11 2–4	137.0	252.9
3 (+2.5 %)	12–11 2–5	135.3	256.0

Tap Position	Tapping Switch Connects	HV Voltage (kV)	Max Rated Current (A)
4 (+1.25 %)	12–11 2–6	133.7	259.2
5 (NOMINAL)	12–11 2–7	132.0	262.4
6 (–1.25 %)	12–11 2–8	130.4	265.8
7 (–2.5 %)	12–11 2–9	128.7	269.2
8 (–3.75 %)	12–11 2–10	127.1	272.7
9A (–5.0 %)	12–11 2–11	125.4	276.2
9B (–5.0 %)	12–11 2–12	125.4	276.2
9C (–5.0 %)	12–3 2–3	125.4	276.2
10 (–6.25 %)	12–3 2–4	123.8	279.9
11 (–7.5 %)	12–3 2–5	122.1	283.7
12 (–8.75 %)	12–3 2–6	120.5	287.6
13 (–10.0 %)	12–3 2–7	118.8	291.6
14 (–11.25 %)	12–3 2–8	117.2	295.7
15 (–12.5 %)	12–3 2–9	115.5	299.9
16 (–13.75 %)	12–3 2–10	113.9	304.3
17 (–15.0 %)	12–3 2–11	112.2	308.7

A3 – INSULATION AND DIELECTRIC REQUIREMENTS

Parameter	Schedule A – Required	Schedule B – Offered	Notes
HV Winding (Um = 145 kV)			
HV Lightning/switching impulse voltage withstand level at sea level (BIL) / (SIL) (kV peak)	550 kV		
HV Lightning/switching impulse voltage withstand level at sea level (BIL) / (SIL) (kV peak) (fully graded)	110 kV		
HV 60 s power frequency voltage withstand level at sea level (60s 50Hz)	230 kV		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
MV Winding (Um = 72 kV)			
MV Lightning/switching impulse voltage withstand level at sea level (BIL) / (SIL) (kV peak)	350 kV		
MV Lightning/switching impulse voltage withstand level at sea level (BIL) / (SIL) (kV peak) (fully graded)	110 kV		
MV 60 s power frequency voltage withstand level at sea level (60s 50Hz)	140 kV		
LV Tertiary Winding (Um = 36 kV)			
LV BIL Line Terminal	200 kV		
LV 60 s power frequency voltage withstand level at sea level (60s 50Hz)	66 kV		
Bushing Creepage Requirements			
HV Bushing Creepage (31 mm/kV × 132 kV)	4 092 mm minimum		
MV Bushing Creepage (31 mm/kV × 66 kV)	2 046 mm minimum		
LV Bushing Creepage (31 mm/kV × 33 kV)	1 023 mm minimum		

A4 – SITE CONDITIONS

The Contractor shall take note that the transformer shall operate under the following site conditions and must meet these requirements

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Installation	Outdoor	Outdoor	
Altitude (maximum) Capable of filling oil under vacuum at this max Altitude	1 800 m a.s.l.	1 800 m a.s.l.	
Maximum Ambient Temperature	+40 °C	+40 °C	
Yearly Average Ambient (climate-adjusted)	+25 °C	+25 °C	
Minimum Ambient Temperature	−10 °C	−10 °C	
Average Relative Humidity	90 %	90 %	
Seismic Requirement	0.3 g (proof required)	0.3 g (proof required)	
Pollution Level	Very Heavy	Very Heavy	
THD	Up to 3 %	Up to 3 %	
Voltage Unbalance	Up to 2 %	Up to 2 %	

A5 ON-LOAD TAP CHANGER (OLTC) REQUIREMENTS

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Type	On-Load Tap Changer (OLTC) Declare Brand		
Preferred Technology	Vacuum type (resistance bridging)		
Tapping Range	+5 % to −15 %		
Number of Steps	16 × 1.25 %		
Total Tap Positions	17		
Principal / Nominal Tap	Tap 5 (132.0 kV)		
OLTC Location	HV & MV common connections winding		
Maintenance-Free Operations	300 000 operations minimum		
Motor Drive Supply	400 V AC, 3-phase, 50 Hz		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Control Coil Voltage	110 V DC		
Compliance Standard	IEC 60214		
Drive Cubicle	Ventilated, dust/weather/vermin-proof; anti-condensation heater; 25 mm drain hole		
Overcurrent Blocking Contactor	Self-resetting, DC coil, N/C contacts – inhibits tap operation during fault		
Raise / Lower Local Control Switch	Declare		
Step-by-Step Operation Contacts	Declare		
Parallel Operation Check Contacts	Declare		
Tap-in-Progress Indication	Contact closes during raise or lower operation		
Limit Switches (end-position)	Prevent overrun of Tap 1 and Tap 17		
Alarm Contact Rating	Declare		
Trip Contact Rating	Declare		
Tap Position Encoder	BCD 6-bit		
OLTC Oil Conservation	Separate conservator, dehydrating breather, oil level indicator – labelled		
OLTC Protective Device	Surge relay or pressure-sensitive trip for diverter/selector compartment		

A6 – COOLING SYSTEM

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Cooling Mode	ONAN / ONAF		
ONAN Minimum Rating	36 MVA (60 % of ONAF)		
ONAF Full Rating	60 MVA		
Number of Radiator Banks	Declare		
Fan Motor Supply	400/230 V AC, 3-phase, 50 Hz		
Fan Stop/Start Relay (DC coil)	110 V DC		
Auto-restart after Voltage Recovery	Staggered mode required		
Cooling Compliance	IEC 60076-2		

A7 – PROTECTION AUXILIARIES AND SPECIAL EQUIPMENT

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Buchholz Relay (GOR)	Required		
Pressure Relief Device (PRD)	Required		
Rapid Pressure Rise Relay (RPRR)	Std. 240-56063867 – separate from PRD		
Oil Temperature Indicator (OTI)	Required		
Winding Temp Indicator – HV Winding	Both Dial type & Digital type		
Winding Temp Indicator – MV Winding	Both Dial type & Digital type		
Winding Temp Indicator – LV Tertiary	Both Dial type & Digital type		
Oil Level Indicator – Main Tank	Dial type		
Oil Level Indicator – OLTC	Separate dial (labelled)		
Conservator Air Bag + Leak Detector	Bleed pipe to ground level		
Dehydrating Breather	Declare – silica gel type with indicator		
Anti-Condensation Heater (OLTC drive cubicle)	50 Hz supply, separately fused, withdrawable neutral link		
Bushing Type (all windings)	RIS type with grey composite sheds		
Oil Sampling Device	Needle valve at ~1.5 m height, brass/SS		
Valve Function Plate	Schematic of all valves, vent plugs, sampling points – valve positions shown		
Valve Padlocking	All valves pad lockable in open and closed position		
DGA Gas Analyser	Required		

A8 – BUILT-IN CURRENT TRANSFORMERS

The Contractor shall strictly match the specified CT characteristics below no deviations will be permitted:

C T	Terminals	Application	Output V A VK-Im		Class	ALF	IP or Ratio A	Turns ratio N / NT	Rs
1YN	1YNS1 – 1YNS2	Protection	15		10P	15	300	300/1	0.22
2YN	2YNS1 – 2YNS2	Protection		550/0.1	X		600	1/600	0.98
1-3A	1-3AS1 – 1-3AS2	Protection		550/0.1	X		1200	1/1200	1.76
1-3B	1-3BS1 – 1-3BS2								
1-3C	1-3CS1 – 1-3CS2								
2-3A	2-3AS1 – 2-3AS2	Protection	15		10P	15	100	100/1	0.93
	2-3AS1 – 2-3AS3						200	200/1	1.05
2-3B	2-3BS1 – 2-3BS2		15				100	100/1	0.81
	2-3BS1 – 2-3BS3						200	200/1	1.04
2-3C	2-3CS1 – 2-3CS2		15				100	100/1	0.81
	2-3CS1 – 2-3CS3						200	200/1	1.04
3-3A	3-3AS1 – 3-3AS2	Metering	10		1		100	100/1	1.93

	3-3AS1 – 3-3AS3				0.5		200	200/1	0.98
3-3B	3-3BS1 – 3-3BS2		10		1		100	100/1	0.58
	3-3BS1 – 3-3BS3				0.5	15	200	200/1	0.96
3-3C	3-3CS1 – 3-3CS2		10		1		100	100/1	0.87
	3-3CS1 – 3-3CS3				0.5		200	200/1	0.95
1A	1AS1 – 1AS2	Winding temperature	10		10P	15	300/2		0.49
1a	1aS1 – 1aS2		20		10P	15	750/5		0.18
1B	1BS1 – 1BS2		10		10P	15	300/2		0.47
4-3A	4-3AS1 – 4-3AS2		10		10P	15	200/2		0.38

A9 – TANK, MASS AND DIMENSIONS

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Mass and Oil Volume			
Core & Windings Mass	Manufacturer to specify (Existing is 36 330kg)		
Oil Volume	Manufacturer to specify (Existing is 20 255L)		
Total Mass (oil-filled)	Manufacturer to specify (Existing is 62 750kg)		
Mass (with oil)	Manufacturer to specify (Existing is 53 055kg)		
Mass (without oil)	Manufacturer to specify (Existing is 36 595kg)		
Transformer Dimensions			

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Maximum Height (including bushings)	Manufacturer to specify		
Maximum Width	Manufacturer to specify		
Maximum Length	Manufacturer to specify		
Tank Type Tests			
Tank Vacuum Withstand	1.5 kPa absolute for 1 minute		
Tank Hydraulic Pressure Test	70 kPa or max working + 35 kPa, 1 minute		
Mechanical Provisions			
Jacking Pads	4 symmetrically placed – Class 1: height 460–530 mm, overhang 115 mm		
Lifting Lugs	4 symmetrically placed – $FoS \geq 2$ at any single point		
Earthing Pads (tank body)	4 positions at ≥ 300 mm from base – SS pads, 50×3 mm flat copper strap connection		
HV Neutral Earthing Pad	Integral SS pad near neutral bushing – 800 mm interval studs		
Surge Arrester Earthing	Both via mounting bracket to tank, and via separate copper earth tails		
Permanent Ladder	Welded steel – unrestricted top access; safety harness anchor at landing		
Manholes	Min 600 mm $\varnothing$ – ≤ 500 mm from base; handholes for bushing access		
Centre of Gravity Marking	Clearly marked on all four sides of tank		
Partial Drain Level Mark	Welded sign on tank sidewall – minimum oil level without exposing cellulose		
Gasket Type	O-ring and groove (nitrile or better) – all gasketed joints		
Top Cover Paint	Non-slip paint on top cover – no obstructions to walking path		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Impact Recorders	2 units – 3-axis, calibrated – remain fitted throughout transport		
Insulating Oil Type	Virgin Oil, Non-corrosive sulphur type, compliant to IEC 60296 Class I and SABS 555		
Paint System	minimum C5M (highest corrosivity category under ISO 12944)		

A10 – QUALITY ASSURANCE AND TESTING

Test / QA Requirement	Schedule A – Required	Schedule B – Offered	Notes
Quality System	ISO 9001 certified		
FAT Notification	4 weeks minimum notice		
Manufacturing Schedule Submission	Within 4 weeks of PO award		

Factory Acceptance Tests (FATs)

Test / QA Requirement	Schedule A – Required	Schedule B – Offered	Notes
Winding resistance on all taps & phases	Routine – Required		IEC 60076-1
Voltage ratio & polarity verification on all tap positions, all three phases	Routine – Required		IEC 60076-1
Short-circuit impedance & load loss on principal tap and min. 2 other taps	Routine – Required		IEC 60076-1
No-load loss & excitation current at rated voltage	Routine – Required		IEC 60076-1
Zero-sequence impedance on HV/MV, HV/LV & MV/LV winding pairs	Routine – Required		IEC 60076-1

Insulation resistance (Megger) on all windings to earth & between windings at 5 kV DC	Routine – Required		IEC 60076-3
Tan delta (dissipation factor) all windings and bushings	Routine – Required		Recommended for contract (not mandatory IEC)
Bushing power factor & capacitance measurement	Routine – Required		IEC 60137
Separate source (applied voltage) AC withstand test on each winding	Routine – Required		IEC 60076-3
Induced AC overvoltage withstand test (twice rated voltage, 60 s)	Routine – Required		IEC 60076-3
Partial discharge (PD) measurement during induced AC withstand	Routine – Required		Mandatory for $U_m \geq 72.5$ kV
OLTC mechanical operation test for full tap range cycling (min. 5 full cycles)	Routine – Required		IEC 60214-1
OLTC switching sequence verification	Routine – Required		IEC 60214-1
OLTC contact resistance measurement	Routine – Required		IEC 60214-1
OLTC dielectric tests	Routine – Required		IEC 60214-1
Temperature rise (heat run)	Type – Required		IEC 60076-2 & IEC 60076-7
Lightning impulse full wave & chopped wave on HV and MV line terminals	Type – Required		IEC 60076-3

Switching impulse test on HV terminals (Um = 123 kV class)	Type – Required		IEC 60076-3
Short-circuit withstand test or analytical assessment	Type – Required		IEC 60076-5
Acoustic noise level measurement	Type – Required		IEC 60076-10 (recommended for contract)
Tank vacuum type test to 1.5 kPa	Type – Required		IEC 60076-1
Tank hydraulic pressure type test	Type – Required		IEC 60076-1
Sweep Frequency Response Analysis (SFRA) baseline fingerprint at FAT	Special – Required		IEC 60076-18
SFRA repeat at transport stages and site installation	Special – Required		IEC 60076-18
Oil dielectric strength (breakdown voltage)	Routine – Required		IEC 60156
Oil moisture content measurement	Routine – Required		IEC 60814 / IEC 60422
Dissolved gas analysis (DGA)	Routine – Required		IEC 60567 / IEC 60599
Buchholz relay functional operation test (alarm & trip)	Routine – Required		IEC 60076-1
Pressure relief device (PRD) functional test	Routine – Required		IEC 60076-1
Oil temperature indicator (OTI) calibration & alarm/trip setpoints	Routine – Required		IEC 60076-1

Winding temperature indicator (WTI) calibration & alarm/trip setpoints	Routine – Required		IEC 60076-1
Oil level gauge functional and visual inspection	Routine – Required		IEC 60076-1
Cooling fan controls — auto/manual operation, alarm & trip functions	Routine – Required		IEC 60076-1

Site Acceptance Tests (SATs)

Test / QA Requirement	Schedule A – Required	Schedule B – Offered	Notes
Electrical Measurement Tests – Winding resistance on all three windings (HV, MV, LV) across all OLTC tap positions	Required		
Electrical Measurement Tests – Voltage ratio on all taps and all phases	Required		
Electrical Measurement Tests – Vector group and phase displacement verification	Required		
Electrical Measurement Tests – Short-circuit impedance on all OLTC tap positions	Required		
Electrical Measurement Tests – Zero sequence impedance measurement on all three winding pairs (HV-MV, HV-LV, MV-LV)	Required		

Electrical Measurement Tests – Three-phase 380 V magnetising current measurement	Required		
Electrical Measurement Tests – No-load loss and load loss cross-check against FAT results	Required		
Insulation Tests – Winding insulation resistance (IR) and polarisation index (PI) at minimum 5 kV DC	Required		
Insulation Tests – Core and core-clamp insulation resistance at 500 V DC for one minute	Required		
Insulation Tests – Bushing and winding insulation integrity testing using Doble M4000	Required		
Insulation Tests – Tank and frame earthing continuity verification	Required		
Insulation Tests – Neutral earthing arrangement and continuity check	Required		
Transformer Oil Quality Tests – Dielectric breakdown voltage (BDV) of insulating oil per IEC 60156	Required		
Transformer Oil Quality Tests – Moisture content (water-in-oil) analysis per IEC 60814	Required		

Transformer Oil Quality Tests – Dissolved gas analysis (DGA) pre-energisation baseline sample per IEC 60599	Required		
Sweep Frequency Response Analysis (SFRA) – SFRA after final assembly and oil filling compared against factory FAT fingerprint	Required		
Current Transformer (CT) Tests – CT polarity verification on all cores	Required		
Current Transformer (CT) Tests – CT ratio and excitation (knee-point) test on all cores	Required		
Current Transformer (CT) Tests – CT winding insulation resistance test	Required		
Current Transformer (CT) Tests – CT secondary circuit continuity and burden check	Required		
Protection, Control and Alarm Functional Tests – Buchholz relay float and surge element function tests and alarm/trip contact verification	Required		
Protection, Control and Alarm Functional Tests – Sudden pressure relay (SPR) function and trip contact verification	Required		

Protection, Control and Alarm Functional Tests – Pressure relief device (PRD) function and alarm contact verification	Required		
Protection, Control and Alarm Functional Tests – Winding temperature indicator (WTI) calibration check and alarm/trip contact verification	Required		
Protection, Control and Alarm Functional Tests – Oil temperature indicator (OTI) calibration check and alarm/trip contact verification	Required		
Protection, Control and Alarm Functional Tests – Oil level gauge function and alarm contact verification	Required		
Protection, Control and Alarm Functional Tests – All other alarm and trip contacts complete functional test and loop check	Required		
Protection, Control and Alarm Functional Tests – Inter-trip and transfer trip scheme functional verification	Required		
On-Load Tap Changer (OLTC) Tests – OLTC complete operation through all tap positions local and remote control	Required		

On-Load Tap Changer (OLTC) Tests – OLTC drive motor insulation resistance and functional test	Required		
On-Load Tap Changer (OLTC) Tests – OLTC contact resistance measurement across all tap positions	Required		
On-Load Tap Changer (OLTC) Tests – OLTC tap position indicator verification local and remote	Required		
Cooling System Tests – Fan motor insulation resistance test on each motor	Required		
Cooling System Tests – Pump motor insulation resistance test on each motor	Required		
Cooling System Tests – Functional test of all cooling fans automatic and manual operation	Required		
Cooling System Tests – Cooling control panel automatic staging, alarm and trip contacts	Required		
Cooling System Tests – Cooling system interlock and sequencing verification	Required		

A11 – MARSHALLING INTERFACE BOX (MIB) AND WIRING

Parameter	Schedule A – Required	Schedule B – Offered	Notes
MIB Mounting Position	On main tank; stays fitted during transport & installation		
MIB Access	All parts accessible from ground level		
MIB Door Opening Angle	$\geq 120^\circ$ – door retainer fitted		
Spare Terminals	$\geq 10\%$ + minimum 12 spare terminals		
Gland Plate (Purchaser cables)	6 mm thick brass – separate undrilled plate		
Earthing Terminal	M12–M16 stud inside and outside each box		
Cable Type	UV stable, heat and oil resistant PVC SWA – corrosion-resistant glands		
Partitions between terminals	Vendor to specify		
Terminal Allocation	Fully compliant – vendor to specify		
Analogue Outputs (4–20 mA)	OTI, HV-WTI, MV-WTI, TW-WTI – vendor to specify		
Auxiliary Supply Voltage	400/230 V AC 3-phase 4-wire 50 Hz; DC: 110 V or 220 V as specified		

A12 – DOCUMENTATION DELIVERABLES

Document	Schedule A – Required	Schedule B – Offered	Notes
Nameplate & schematic drawings (5 copies)	Issued with design package		
Outline, base, bushing, wiring & terminal drawings (5 copies)	Issued with design package		
GA drawing – surge arresters mounted, all clearances dimensioned	Issued with design package		
OLTC schematic – coil ratings, step-by-step circuit, timing chart	Issued with design package		
Short-circuit withstand calculations	Issued with design package		
Manufacturing schedule (engineering, FAT, shipment dates)	After Design Approval		
FAT reports – all routine + special tests	After FAT, before shipment		
SFRA records – factory, each transport stage, final site	Doble M5000 format		
Instruction manuals (hard + soft copy)	As part of handover		
Training material (electronic)	As part of handover		
Notification of failure during test (written, within 24 h)	Mandatory		

A13 – MANUFACTURER RELIABILITY AND ADJUDICATION DATA

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Manufacturing Factory	Factory name & location from which this unit will be sourced – declare		
Population – Transformers > 10 MVA manufactured (last 10 years)	Declare total population		
Factory Failure – Definition	Major opening/untanking required to repair fault during factory testing		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Factory Failure Rate – Each year 1 through 10 (%)	≤ 3 % p.a. maximum		
Factory Failure Rate – 5-year Rolling Average (%)	≤ 3 % p.a.		
In-Service Failure – Definition	Forced outage + scheduled outage failure		
In-Service Failure Rate (one-year, %)	Declare per year for 10 years		
On-Time Delivery Rate (OTD, %)	≥ 95 % (units delivered on or before contractual date)		

A14 – TRAINING OF GTM PERSONNEL

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Training Duration	5 consecutive working days (formal)		
Number of Staff	10 staff		

A15 – LOCAL SUPPORT AND SAFETY

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Local Support			
Local Technical Support Base	Established local presence required Indicate		
Emergency Response Time	Contractor on site within 24 hours of notification		
Emergency Spares Holding	Maintenance & breakdown spares held locally		
Failure Investigation Capability	Local technical support caters for failure investigations		
Guarantee Period Coverage	Fully equipped to attend emergencies within guarantee period		
Safety Provisions			
Top of Tank Walking Surface	Non-slip paint; no obstructions to walking path during maintenance		

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Safety Harness Anchor	Safety harness securing point at landing above ladder		
Tank Rupture Prevention	Tank design and component arrangement minimises rupture risk		

A16 – BUSHINGS AND SURGE ARRESTERS

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Bushing Specification			
Bushing Technology (all windings)	RIS type with grey composite sheds		
Bushing Mounting – HV (3 phase + 1 neutral)	Top-mounted on transformer lid		
Bushing Mounting – MV (3 phase)	Top-mounted on transformer lid		
Bushing Axial Dimension Tolerance	± 100 mm accommodation in termination design		
HV Bushing BIL	550 kV peak		
HV Bushing Power Freq Withstand (60 s)	230 kV rms		
HV Bushing Creepage	≥ 4 092 mm (31 mm/kV × 132 kV)		
HV Neutral Bushing BIL (partially graded)	250 kV peak		
HV Neutral Bushing Power Freq Withstand (60 s)	95 kV rms		
MV Bushing BIL	350 kV peak		
MV Bushing Power Freq Withstand (60 s)	140 kV rms		
MV Bushing Creepage	≥ 2 046 mm (31 mm/kV × 66 kV)		
LV Bushing BIL	200 kV peak		
LV Bushing Power Freq Withstand (60 s)	66 kV rms		
LV Bushing Creepage	≥ 1 023 mm (31 mm/kV × 33 kV)		
HV Line Surge Arresters (132 kV)			

Parameter	Schedule A – Required	Schedule B – Offered	Notes
Quantity	3 (one per phase) – transformer-mounted		
MCOV	$\geq 84 \text{ kV rms } (U_m/\sqrt{3} = 145/\sqrt{3})$		
10 kA Residual Voltage	$\leq 360 \text{ kV peak}$		
Mounting	On transformer lid brackets; earth via bracket to tank		
MCOV	$\geq 48 \text{ kV rms}$		
10 kA Residual Voltage	$\leq 165 \text{ kV peak}$		
MV Line Surge Arresters (66 kV)			
Quantity	3 (one per phase) – transformer-mounted		
MCOV	$\geq 42 \text{ kV rms } (U_m/\sqrt{3} = 72/\sqrt{3})$		
10 kA Residual Voltage	$\leq 186 \text{ kV peak}$		
Mounting	On transformer lid brackets; earth via bracket to tank		
LV Tertiary Surge Arresters (33 kV)			
Quantity	3 (one per phase) – transformer-mounted		
MCOV	$\geq 21 \text{ kV rms } (U_m/\sqrt{3} = 36/\sqrt{3})$		
10 kA Residual Voltage	$\leq 97 \text{ kV peak}$		
Mounting	On transformer lid brackets earth via bracket to tank		
General – All Surge Arresters			
Compliance Standard	IEC 60099-4 (metal oxide, gapless)		
Altitude Rating	1 800 m a.s.l. – declare altitude correction applied		
Surge Arrester	Separately: HV line (Set of 3) + MV (Set of 3)		

B2 – DEVIATIONS FROM SPECIFICATION

NOTE: *The Tenderer shall list ALL deviations from the Schedule A requirements in this table. If there are no deviations, the Tenderer shall state 'No Deviations' in the first row. Undisclosed deviations discovered after award may constitute grounds for contract termination.*

Spec Clause No.	Specified Requirement	Proposed Deviation	Technical Justification

TENDERER'S DECLARATION

I / We, the undersigned, hereby confirm that the information provided in Schedule B of this document is accurate and complete, that the offered transformer and all associated equipment comply with the Schedule A requirements except where deviations are listed in Section B2, and that the offered design has been verified by a Registered Professional Engineer.

Authorised _____	Signatory:	Designation: _____
Company _____	Name:	Date: _____
Company Stamp:		

----- END OF TRANSFOMER SCHEDULE A & B -----

4.2 NECRT TECHNICAL DATA SCHEDULE A & B

NOTE: Schedule A (column 4) contains the Employer's mandatory NECRT technical specifications requirements. The Tenderer shall complete Schedule B (column 5) for every parameter listed. Blank cells in Schedule B will be interpreted as non-compliant. Where the offered value differs from the Schedule A requirement, a deviation shall be entered in Table B at found on the end of this schedule.

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
1 IDENTIFICATION					
1a	Manufacturer's name	-	Declare		
1b	Applicable Standards	-	IEC 60289 & ESKOM 240-57648848		
2 OPERATING CONDITIONS					
2a	Altitude	m	≤ 1 800		
2b	Maximum ambient temperature	°C	40		
2c	Minimum ambient temperature	°C	-10		
3 ELECTRICAL CONDITIONS					
3a	Nominal system voltage	kV	33		
3b	Maximum system voltage	kV	36		
3c	Nominal frequency	Hz	50		
3d	Number of phases	-	3		
4 RATED REQUIREMENTS					
4.1 NEC (Neutral Earthing Compensating Transformer)					
4.1a	Zero sequence reactance (Xc)	Ω	78.2		
4.1b	Nominal short-time (10 s) current for NECR	A	360		

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
4.1c	Nominal continuous current NECR	A	15		
4.2 NER (Neutral Earthing Resistor)					
4.2a	Zero sequence resistance (Rr) at 100 °C	Ω	53.3		
4.2b	Nominal voltage (Un/√3)	kV	19.053		
4.2c	Nominal short-time (10 s) current for NECR	A	360		
4.2d	Nominal continuous current NECR	A	15		
4.3 Auxiliary Transformer (AUX)					
4.3a	Nominal rating	kVA	100		
4.3b	Primary nominal voltage	kV	33		
4.3c	Secondary nominal voltage	V	400		
4.3d	frequency	Hz	50		
4.3e	Vector group	-	Dyn11		
4.3f	Percentage impedance	%	5.5		
4.3g	Coolant	-	PCB free Virgin Mineral Oil		
4.3h	Core Material		Declare		
4.3i	Load loss	W	Declare		
4.3j	No-load loss	W	Declare		
5 TEMPERATURE RISE AT 1 800 m ALTITUDE Conditions: I = 15 A continuous · II = AUX rated current · III = 300 A for 10 s					

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
5.1 Top Oil Temperature Rise (maximum, K)					
5.1a	Condition I (15 A continuous)	K	≤ 55		
5.1b	Condition II (AUX rated current)	K	≤ 55		
5.1c	Condition III (300 A for 10 s)	K	≤ 55		
5.1d	Conditions I and II simultaneously	K	≤ 55		
5.1e	Conditions I, II and III simultaneously	K	≤ 55		
5.2 NEC Winding Temperature Rise (maximum calculated, K)					
5.2a	Condition I (15 A continuous)	K	≤ 55		
5.2b	Condition II (AUX rated current)	K	≤ 55		
5.2c	Condition III (300 A for 10 s)	K	Class F ≤ 155		
5.2d	Conditions I and II simultaneously	K	≤ 55		
5.2e	Conditions I, II and III simultaneously	K	Class F ≤ 155		
6 MATERIAL					
6a	NEC winding	-	Aluminium		
6b	AUX HV winding	-	Aluminium		
6c	AUX LV winding	-	Aluminium		
6d	Grade of NER elements	-	Declare		
7 MATERIAL THICKNESS					
7a	Tank top	mm	Declare		

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
7b	Tank bottom	mm	Declare		
7c	Tank sides	mm	Declare		
7d	Conservator	mm	Declare		
7e	Radiator tubes (if applicable)	mm	Declare		
8 HOUSING AND CORROSION PROTECTION					
8a	Material Coastal -	-	Coastal grade		
8b	Corrosion protection Coastal	-	Coastal specification		
8c	Tank colour	-	Cloud Grey		
8d	Conservator colour	-	Declare		
9 MINIMUM INSULATION FOR WINDINGS					
9.1	Impulse withstand test voltage Primary	kV	200		
9.2	60 s separate source - Primary	kV	70		
9.3	60 s induced overvoltage - Primary to earth	kV	66		
9.4	Inter-turn insulation type	-	Paper / Enamel		
9.5a	Highest inter-layer stress non-tap part	kV/mm	< 5		
9.5b	Highest inter-layer stress tap part	kV/mm	< 5		
10 HV BUSHINGS 33 kV (IEC 60815)					
10.1 HV Line Bushings (3 off)					
10.1a	Profile / type	-	Solid bushing IEC 60815		

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
10.1b	Minimum creepage Coastal	mm/kV	31		
10.1c	Type	-	Outdoor		
10.1d	Stem size (dia × length)	mm	Declare		
10.1e	Impulse withstand voltage at sea level	kV	200		
10.1f	Power frequency withstand voltage	kV	70		
10.1g	Creepage	mm/kV	31		
10.2 Neutral Bushings					
10.2a	Type	-	Outdoor		
10.2b	Stem size (dia × length)	mm	Declare		
10.2c	Impulse withstand voltage	kV	Declare		
10.2d	Power frequency withstand voltage	kV	Declare		
10.2e	Creepage	mm/kV	31		
11 ELECTRICAL TEST REQUIREMENTS					
11a	Temperature rise tests	-	YES -TYPE		
11b	Lightning impulse test	-	YES - ROUTINE		
11c	Short duration induced overvoltage test	-	YES -ROUTINE		
11d	Separate source overvoltage withstand test	-	YES -ROUTINE		
11e	Short-circuit withstand tests	-	YES - ROUTINE		
11f	Insulation resistance	-	YES - ROUTINE		

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
11g	Winding resistance	-	YES - ROUTINE		
11h	Ratio test	-	YES - ROUTINE		
11i	Impedance tests	-	YES - ROUTINE		
11j	Pressure tightness tests	-	YES -ROUTINE		
11k	Load and no-load losses	-	YES -ROUTINE		
11l	Measurement of zero sequence impedance	-	YES - ROUTINE		
11m	Short-time current test	-	YES -TYPE		
11n	Vacuum test	-	YES -ROUTINE		
11o	Dye penetrant test on all welds	-	YES -ROUTINE		
12 CURRENT TRANSFORMERS					
12.1 CORE 1					
12.1a	Manufacturer	-	Declare		
12.1b	Ratio	-	1200 / 1		
12.1c	Accuracy class	-	Class X		
12.1d	Maximum excitation current (I _{ex})	mA	100		
12.1e	Knee-point voltage (V _k)	V	600		
12.1f	Secondary internal resistance (R _s)	Ω	2.5		
12.2 CORE 2					
12.2a	Manufacturer	-	Declare		
12.2b	Ratio	A/A	150–300 / 1		
12.2c	Accuracy class	-	10P		
12.2d	Accuracy limit factor (ALF)	-	10		
12.2e	Output	VA	15		
13 OVERALL DIMENSIONS					

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
13a	NEC height (base to top of conservator)	mm	Declare		
13b	NEC + stand height	mm	Declare		
13c	Length	mm	Declare		
13d	Width	mm	Declare		
15 MASS					
15a	Core and windings	kg	Declare		
15b	Oil mass	kg	Declare		
15c	Oil quantity	L	Declare		
15d	Total mass	kg	Declare		
16 DOCUMENTATIONS					
16a	Outline drawings	-	Required		
16b	Rating and diagram plate	-	Required		
16c	Internal general assembly drawing	-	Required		
16d	NECRT wiring diagram	-	Required		
17 Test Reports to be Provided					
17a	Power-frequency voltage withstand test	-	Required		
17b	Impulse test	-	Required		
17c	Separate source voltage withstand test	-	Required		
17d	Induced overvoltage test	-	Required		
17e	Measurement of zero sequence impedance	-	Required		
17f	Temperature rise test	-	Required		

Item	Description	Unit	Schedule A – Required	Schedule B – Offered	Notes
17g	Short-time current test	-	Required		

B2 – DEVIATIONS FROM SPECIFICATION

NOTE: The Supplier shall list ALL deviations from Schedule A requirements below. If there are no deviations, state 'No Deviations' in the first row. Undisclosed deviations discovered post-award may constitute grounds for contract action.

Item / Clause	Specified Requirement	Proposed Deviation	Technical Justification

SUPPLIER'S DECLARATION

I / We, the undersigned, hereby confirm that the information provided in Schedule B is accurate and complete, that the offered NECRT and all associated equipment comply with the Schedule A requirements except where deviations are listed above, and that the offered design has been verified by a Registered Professional Engineer.

Authorised _____	Signatory: _____	Designation: _____
Company _____	Name: _____	Date: _____
Company Stamp:		

----- END OF NECRT SCHEDULE A & B -----

4.3 PERFORMANCE CRITERIA

4.3.1 General

The Contractor shall deliver a complete, safe, fully integrated, tested and operational installation that satisfies the Employer's Requirements, this Scope of Work, the Technical Schedules, and all applicable standards. Compliance with the performance criteria set out below shall be a condition for achievement of Taking-Over / Practical Completion, unless otherwise stated.

The performance criteria shall apply to the complete Works, including but not limited to the power transformer, NECRT, protection panel, primary connections, civil works, earthing, control cabling, testing, hot commissioning, reliability run, documentation and statutory compliance.

Failure to meet any mandatory performance criterion shall constitute non-compliance, and the Contractor shall, at its own cost, promptly investigate, rectify, retest and demonstrate compliance to the satisfaction of the Employer's Agent.

4.3.2 Overall Functional Performance Requirement

The completed installation shall, as a minimum:

- a) safely receive, transform and deliver power at 132/66/33kV through the new 60MVA, three-winding transformer under the specified operating conditions.
- b) operate reliably in conjunction with the existing substation plant and protection systems;
- c) withstand the specified system, environmental, thermal, dielectric and fault-duty conditions;
- d) provide effective protection, control, alarm, indication and monitoring functions;
- e) integrate with the existing substation layout, plinth, bund, earthing and bay infrastructure;
- f) complete the 30-day trial operation / reliability run without major defect, forced outage, protection maloperation, unacceptable oil leak, or unresolved alarm condition; and
- g) be fully documented and handed over in a condition suitable for safe operation and maintenance by the Employer.

4.3.3 Mandatory Performance Criteria

A. Transformer Performance

1. The transformer shall achieve the declared and approved ratings of:
 - o ONAN: 36 MVA
 - o ONAF: 60 MVA
 - o 33 kV tertiary: 10 MVA
2. The transformer shall comply with the approved **Schedule A & B**, IEC 60076, IEC 60214, Eskom standards, and all guaranteed technical particulars.
3. The transformer shall operate continuously at rated voltage and frequency without abnormal vibration, overheating, oil leakage, dielectric distress, or unstable OLTC operation.
4. The transformer impedance values, losses, insulation levels, temperature rise limits, bushing characteristics, CT performance and OLTC range shall be within the approved tolerances in the technical schedules.
5. The transformer shall withstand all routine, type and site tests specified in the Contract without failure.
6. The transformer shall be capable of stable operation in parallel with the existing transformers T1 and T3, with no unacceptable circulating current or load imbalance attributable to transformer design or tap control malfunction.

B. OLTC and Voltage Regulation Performance

1. The OLTC shall operate smoothly through the full tap range without misoperation, hunting, excessive contact wear indication, or failure to complete a tap change.
2. The OLTC shall provide local and remote indication of tap position and shall correctly respond to raise/lower/manual/auto commands.
3. In AVR mode, the tap changer control relay shall maintain the target 66 kV busbar voltage within the approved setpoint and deadband.
4. Parallel operation functionality shall be demonstrated where applicable, including compatible load sharing with in-service transformers.
5. No OLTC oil leak, Buchholz trip, failure alarm, blocked condition, or motor drive malfunction shall remain unresolved at handover.

C. Protection and Control Performance

1. The protection system shall correctly detect and isolate internal transformer faults and abnormal operating conditions in accordance with the approved protection philosophy and settings schedule.
2. Main and backup relays shall be fully functional, correctly configured, and proven by FAT and SAT secondary injection tests.
3. All hardwired protection inputs, including Buchholz, PRD, OTI, WTI, oil level, OLTC surge and other alarm/trip contacts, shall correctly initiate alarm and/or trip functions as designed.
4. Protection grading and coordination shall be compatible with the existing Eskom and municipal network protection settings.
5. Trip outputs to the 132 kV and 66 kV breaker trip coils shall be fully proven and supervised.
6. Relay event records, disturbance records, alarms and indications shall function correctly and be retrievable.
7. No spurious trip, failure to trip, or incorrect discrimination attributable to the Contractor's design, wiring, settings, testing or commissioning shall occur during commissioning or the reliability run.

D. NECRT Performance

1. The NECRT shall be designed, manufactured and installed to match the approved protection and earthing scheme.
2. The NECRT shall meet the specified ratings, including:
 - 50 kVA, 33/0.4 kV, Dyn11
 - 15 A continuous
 - 300 A for 10 seconds
 - approved zero-sequence impedance and resistance values.
3. The NECRT shall operate correctly under normal and fault conditions.
4. The installed NECRT arrangement shall not compromise the intended earth fault protection sensitivity or coordination of the transformer.

E. Primary Plant and Connection Performance

1. All 132 kV, 66 kV and 33 kV connections shall be mechanically secure, electrically sound and suitable for the required current, insulation and fault-duty.
2. All clamps, connectors, conductors and fittings shall be correctly installed, tensioned, terminated and aligned.
3. All live clearances shall comply with the approved drawings, Eskom standards and IEC 61936.
4. No corona, overheating, loose connection, excessive sag, joint distress or visible insulation defect shall occur under service conditions.
5. Infra-red inspection carried out under load shall show no abnormal hot spot requiring remedial work.

F. Earthing Performance

1. All new equipment, including the transformer tank, surge arresters, marshalling kiosk, NECRT and panel earths, shall be effectively bonded to the existing substation earth mat.
2. Earthing continuity tests shall confirm sound metallic continuity of all bonds and earth connections.
3. The completed earthing works shall not reduce the integrity of the existing substation earthing system.
4. All earthing connections shall be durable, corrosion-resistant and accessible for inspection.

G. Civil and Bund Performance

1. The refurbished transformer plinth shall be level, structurally sound and suitable to support the replacement transformer under all operational and fault-duty conditions.
2. The bund wall and floor shall be watertight, oil-resistant and capable of containing the required oil volume in accordance with the approved design and applicable standards.
3. The oil drainage path to the containment dam shall be functional and unobstructed.
4. The NECRT plinth and associated civil works shall be complete, stable, cured, aligned and suitable for the installed equipment.
5. All civil works shall be certified by a suitably Registered Professional Civil Engineer as fit for purpose.

H. Delivery, Erection and Installation Performance

1. The transformer and all equipment shall arrive on site free from transport damage.
2. Offloading, lifting, positioning and erection shall be completed without damage to the equipment, plinth, existing plant or surrounding infrastructure.
3. The transformer shall be correctly aligned, levelled, anchored and erected in accordance with the manufacturer's instructions.
4. All accessories removed for transport shall be reinstated, tested and proven fully functional.
5. No oil leak, gasket failure, damaged bushing, cracked fitting, transport-related distortion or unresolved erection defect shall be present at energisation.

I. Testing and Commissioning Performance

1. FAT and SAT shall be successfully completed for all applicable equipment and systems.
2. No equipment shall be dispatched, energised or handed over unless all required tests have been completed and accepted.
3. All test results shall comply with the specified limits, approved technical schedules and manufacturer's guaranteed values.
4. Any failed or suspect result shall be investigated, rectified and repeated at the Contractor's cost.
5. Hot commissioning shall be carried out strictly in accordance with the approved commissioning procedure and authorised switching programme.

J. Hot Commissioning and Reliability Run Performance

1. The transformer and associated plant shall be successfully energised and brought into normal service without incident.
2. The Contractor shall demonstrate stable no-load, loaded and parallel operation performance.
3. During the initial post-energisation monitoring period and throughout the reliability run, the installation shall show:
 - no internal fault;
 - no protection maloperation;
 - no unresolved alarm or abnormal indication;
 - no unacceptable DGA trend;
 - no persistent overheating or thermographic hot spots;
 - no significant oil leak;
 - no unstable AVR or OLTC behaviour; and
 - no condition that, in the opinion of the Employer's Agent, prejudices safe and reliable service.
4. The Works shall complete a 30-day trial operation / reliability run under normal operating conditions.
5. Upon successful completion of the 30-day reliability run, and subject to satisfaction of all contractual requirements, the Employer's Agent shall issue the Practical Completion Certificate.

4.3.4 Measurable Acceptance Criteria

The following measurable criteria shall apply as minimum acceptance requirements:

Measurable Acceptance Criteria		
Item	Performance Measure	Acceptance Criteria
Transformer rating	Continuous operating capacity	60MVA ONAF and 36MVA ONAN achieved without exceeding guaranteed temperature rise
Voltage ratio / vector group	FAT and SAT verification	Must match approved Schedule A & B and IEC tolerances
Impedance	FAT / type / approved design verification	Within specified tolerance of approved values
Losses	FAT results	Not greater than guaranteed values
Insulation performance	FAT and SAT	All dielectric tests passed without breakdown or unacceptable partial discharge
Oil quality	Pre-energisation and post-energisation tests	Must comply with IEC 60296 / IEC 60599 acceptable limits and Engineer's acceptance
OLTC operation	Functional and commissioning tests	Full tap range, correct indication, no malfunction, correct AVR response
Protection performance	Secondary injection / trip proving	100% of required protection functions tested and proven
Earthing continuity	Continuity testing	All required bonds continuous and accepted by Engineer
Clearances	Physical measurement	All live clearances compliant with Eskom / IEC requirements
Bund watertightness	Bund test	No leakage or failure during test period
Thermography	Under-load inspection	No abnormal hot joints or hot spots requiring remedial works
Reliability run	In-service operation	30 consecutive days of satisfactory operation, subject to approved outage exclusions
Documentation	Handover submission	100% of required documents submitted and accepted

4.3.5 Reliability Run Failure Events

The following shall constitute failure of the reliability run unless otherwise agreed in writing by the Employer's Agent as being attributable solely to external network conditions or Employer-controlled causes:

- a) transformer trip caused by internal fault or Contractor-related defect;
- b) operation of differential, REF, Buchholz, PRD or any transformer protection due to equipment defect or incorrect settings;
- c) forced outage arising from oil leak, overheating, insulation defect, OLTC malfunction, cooling failure, control failure or defective workmanship;
- d) repeated unexplained alarm condition;
- e) inability to maintain stable service due to defective connections, protection panel, NECRT, or auxiliary systems;
- f) failure of parallel operation caused by incorrect ratio, phase displacement, impedance mismatch outside tolerance, or AVR/control malfunction.

Where the reliability run fails for Contractor-attributable reasons, the run shall recommence from zero after rectification and re-energisation, unless the Employer's Agent directs otherwise in writing.

4.3.6 Exclusions from Reliability Run Failure

The following shall not automatically constitute failure of the reliability run, provided the Contractor's plant and workmanship are not the cause:

- a) external faults on the Eskom or municipal network;
- b) planned outages instructed by the Employer or system operator;
- c) switching restrictions imposed by GTM or Eskom;
- d) load curtailment or operational changes outside the Contractor's control;
- e) force majeure events as defined in the Contract.

In such cases, the reliability run period may be suspended and resumed, subject to the Employer's Agent's written determination.

4.3.7 Documentation Performance Criteria

Practical Completion shall not be achieved unless the Contractor has submitted and obtained acceptance of all required documentation, including:

- Approved as-built drawings;
- FAT and SAT reports;
- relay settings files and test sheets;
- oil test and DGA reports;
- commissioning records;
- thermographic report;
- earthing test records;
- O&M manuals;
- training records;
- OHS file;
- compliance certificates and statutory documents.

All documents shall be accurate, complete, legible and consistent with the installed works.

4.3.8 Defects Liability Performance Requirement

During the defects liability period, the Contractor shall remain responsible for defects arising from design, manufacture, materials, workmanship, erection, testing or commissioning of the Works. The Contractor shall respond to any defect or failure event within 48 hours and make good such defect at its own cost.

4.3.9 Condition for Practical Completion

Practical Completion shall only be achieved when all of the following have occurred:

- a) all works have been completed except minor outstanding items that do not affect safe and reliable operation;
- b) all FAT, SAT and commissioning tests have been passed;
- c) the transformer and associated systems have been energised and are operating satisfactorily;
- d) the 30-day trial operation / reliability run has been successfully completed;
- e) all mandatory handover documents have been submitted and accepted; and
- f) there are no outstanding defects or safety issues that materially affect operation, reliability, maintainability or compliance.

4.4 General Work Specification

- The contractor shall allow for the following specific requirements of Greater Tzaneen Municipality:
 - a) Office accommodation for meetings held on site.
- In addition to the specific requirements of Greater Tzaneen Municipality, detailed above, the contractor shall allow for his own preliminaries and/or overhead costs as required for the execution of the contract. It shall be divided into the following two sections:
 - a) Contractual Requirement -Fixed Amount items such as:
 - Contractual requirements.
Establishment of facilities on site such as plant, sheds, water, electricity, lighting, etc. removal of facilities from site after completion of work.
 - Any other fixed-charge items.
 - b) Time related items such as:
 - Contractual requirements.
 - Operation & maintenance of facilities on site.
 - Supervision.
 - Company and head office overhead costs.
 - Other time related items.

5. OCCUPATIONAL HEALTH AND SAFETY (OHS) SPECIFICATIONS

FOREWORD

These Health and Safety Specifications have been compiled in terms of the Occupational Health and Safety Act (85 of 1993) and CR of 7 February 2014 as amended. This document is a management tool and should be used by the PC and Contractors to comply with the Act and its underpinning regulations. Should there be any contradiction between this document and the Act, the Act must take precedence, except where explicitly stated.

Similarly, where this document is silent on a specific health and safety requirement, the Act must be used as the minimum requirement. Should you be unclear about anything set out in this document, please contact the Greater Tzaneen Municipality.

These Specifications are site specific and include all works to be done by the PC, who will be responsible for all work on site. Every endeavour has been made to address the most critical aspects relating to Health and Safety issues to assist contractors in adequately providing for Health and Safety of employees on site. However, the PC is required to ensure they stay compliant with statutory requirements and construction programs and processes and include such aspects in their Health and Safety file.

ABBREVIATIONS

Abbreviation	Meaning
ALARP	As low as reasonably practicable
CEO	Chief Executive Officer
CI	Chief Inspector
CHSO	Construction Health and Safety Officer
CR	Construction Regulations, 2014
CV	Curriculum Vitae
DCP	Dry Chemical Powder
DEL	Department of Employment and Labour

GMR	General Machinery Regulations
GTM	Greater Tzaneen Municipality
HCA	Hazardous Chemical Agents
HSS	Health and Safety Specifications
OHS	Occupational Health and Safety
ORHVS	Operating Regulations for High Voltage Systems
PA	Principal Agent
PC	Principal Contractor
PMs	Project Managers
PPE	Personal Protective Equipment
PSPs	Professional Service Providers
SACPCMP	South African Council for Project and Construction Management Professionals
SANS	South African National Standards
SDA	Safety Data Sheets

5.1 INTRODUCTION

5.1.1 Background of the Health and Safety Specifications

Health and Safety Specifications (HSS) hinge on the need to protect workers. The construction sector is one of the most booming sectors and as such, workers need to be protected. In recent years, Health and Safety is more focused on risk management and as such there are some risks not directly catered for in specific CR, which are captured in HSS. Section 5(1)(b) of the CR 2014 places the onus on the Client (Greater Tzaneen Municipality) to prepare coherent HSS. This implies that the client sets standards of Health and Safety on site.

5.1.2 Responsibility and Accountability

It is imperative to understand the process of determining legal accountability, as the Occupational Health and Safety Act (Act 85 of 1993) is the only act still administered by the Department of Employment and Labour (DEL) which criminalises non-compliance. It assumes that the Chief Executive Officer (C.E.O.) has vicarious liability. Thus, even though he/she may delegate some of his/her responsibilities, the C.E.O. bears ultimate responsibility on a construction project to which they are appointed. This principle is entrenched in Section 37(1) of the OHS Act, generally referred to as the Mandatory Agreement / SECTION 37: Acts or Omissions by employees or Mandatories.

5.1.3 Purpose of the Health and Safety Specifications

The purpose of this Health and Safety Specification document is to provide the relevant PC (Principal Contractor) and Subcontractors with any Health and Safety related standard information in addition to the information found in the OHS Act and CR, 2014.

5.1.4 Implementation of the Health and Safety Specifications

To brief the PC and subcontractors on significant Health and Safety requirements and aspects of the project. This shall include the provision of the following requirements and information:

- Safety considerations affecting the site and the surrounding environment
- Health and Safety aspects of the associated structures and equipment
- Required submissions of Health and Safety documentation from the PCs and subcontractors
- The PC's (and subcontractors') Health and Safety Plan

The PC is informed that the OHS Act (Act 85 of 1993) in its entirety applies to the contract to which this document specification applies. The CR (2014) incorporated into the above Act by Government R84 published in Government Gazette 37305 shall specifically apply to all persons involved in this construction work.

5.1.5 Purpose of the OHS Act

To provide for the health and safety of persons at work and in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards arising from the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

5.1.5.1 Definitions as Stipulated in the OHS Act

"Agent" – means a competent person who acts as a representative for the Greater Tzaneen Municipality.

"Greater Tzaneen Municipality" – means any person for whom construction work is performed.

"Construction manager" – means a competent person responsible for the management of the physical construction processes and the coordination, administration, and management of resources on a construction site.

"Construction site" – means a workplace where construction work is being performed.

"Construction supervisor" – means a competent person responsible for supervising construction activities on a construction site.

"Construction work" – means any work in connection with: (a) The construction, erection, alteration, renovation, repair, demolition, dismantling of or addition to a building or any similar structure; (b) The construction, erection, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer, or water reticulation system; or the moving of earth, clearing of land, the making of excavations, piling, or any similar civil engineering structure or type of work.

"Contractor" – means an employer who performs construction work.

"Designer" – means: (a) A competent person who prepares, checks and approves a design, or arranges for such design work, including temporary works; (b) A building services engineer designing details for fixed plant; (c) A contractor carrying out design work as part of a design and build project; or an interior designer, shopfitter, or landscape architect.

"Health and Safety File" – means a file, or other record containing the information required by the CR.

"Health and Safety Plan" – means a site, activity or project specific documented plan in accordance with the Greater Tzaneen Municipality's health and safety specification.

"Health and Safety Specification" – means a site, activity or project specific document prepared by the Greater Tzaneen Municipality pertaining to all health and safety requirements related to construction work.

"Method Statement" – means a document detailing the key activities to be performed to reduce as reasonably as practicable the hazards identified in any risk assessment.

"PC" – means an employer appointed by the Greater Tzaneen Municipality to perform construction work.

"Risk" – means the probability that injury or damage will occur.

"Risk Assessment" – means a program to determine any risk associated with any hazard at a construction site, to identify the steps needed to be taken to remove, reduce or control such hazard.

"Safe" – means free from any hazard.

5.2 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

5.2.1 Roles

The Greater Tzaneen Municipality / OHS Agent will:

- Prepare a baseline risk assessment and issue a health and safety specification to the PC, Designer and include the specifications in the tender documentation.
- Appoint each PC for this project or phase/section of the project in writing for assuming the role of PC as intended by the CR, 2014.
- Discuss, negotiate, and approve the contents of the specified project health and safety plan submitted by the PC and Subcontractor.
- Take reasonable steps to ensure that the health and safety plan of the PC and Subcontractor is correctly implemented and maintained. Monthly audits shall be conducted to monitor compliance.
- In the event of design/scope changes, ensure that enough resources are provided to implement the work safely.
- Prevent the PC and/or the Contractor from commencing or continuing with construction work should they at any stage be found to:
 - have failed to comply with any of the administrative measures required by the CR (2014) in preparation for the construction project; or
 - have failed to implement or maintain their health and safety plan; or
 - have executed construction work which is not in accordance with their health and safety plan; or
 - have acted in any way which may pose a threat to the health and safety of any person(s) present on the site of the works or in its vicinity.

5.2.2 Implementation of the Health and Safety Specifications

This health and safety specifications document forms an integral part of the contract, and the PC is expected to use it when compiling their project-specific health and safety plan.

5.3 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM ELEMENTS

5.3.1 Scope of the Project

These Specifications set out the requirements for eliminating, or if not possible minimising as far as reasonably practicable, the risk of incidents and injuries occurring at Greater Tzaneen Municipality. This document covers work to be undertaken during the replacement of a 60 MVA 132/66/33 kV transformer at Tarentaalrand Substation and sets out the rules and procedures for engagement on the project. The scope also addresses legal compliance, GTM standards, hazard identification and risk assessment, risk control, and the promotion of a health and safety culture. The HSS also make provision for the protection of persons other than employees.

The Contractor shall be responsible for the complete execution of the following principal work items

Item	Work Package	Brief Description
1	Power Transformer Supply	Design, manufacture, supply, deliver, install, test and commission a 60MVA three winding Power Transformer rated 132/66/33kV with the specified vector group (YNa0d1), ONAN/ONAF cooling, complete with automatic On Load Tap Changer (OLTC) on the 132kV winding. The transformer shall comply with IEC 60076 and Eskom Standards 240-68973110 and shall include the following accessories: • Buchholz relay • Automatic OLTC complete with Automatic Voltage Regulator (AVR) panel • Tap changer position indicator • Magnetic oil level gauge • Pressure relief device • Winding temperature indicator with minimum of 4 contacts • Oil temperature indicator • Online dissolved gas analyser • Marshalling kiosk with IEC61850 communication interface • Silica gel breather • Conservator tank with diaphragm • Oil surge relay • 132kV and 66kV Surge arrestors complete with counters • 132kV , 132kV (Neutral Bushing), 66kV and 33kV Bushings • Current Transformers (CTs) in bushings • Radiator Tanks complete with cooling fans • Transformer base frame / skid compatible with existing plinth, jacking pads, hauling eyes, lifting lugs and earthing terminals. The transformer shall come with the following spares: • 10% of Virgin Insulating Oil • 1 * Gaskets of all sizes for the entire transformer where required. • 2 * Butterfly valve • 1 * 132kV HV Bushing

Item	Work Package	Brief Description
		• 1* 132kV HV Neutral Bushing • 1 * 66kV MV Bushing • 1 * 33kV LV Bushing • 1 * Breather Set • 1 * Cooling Fan • 1 * 50kg Silica Gel
2	Civil works	Refurbishment of the existing transformer oil bund wall and preparation of the existing plinth for installation of the replacement transformer
3	Transport and Delivery	Route survey and Road transport of the transformer and all associated equipment from the point of manufacture or Contractor's store to Tarentaalrand Substation
4	Offloading and Erection of transformer	Offloading, positioning on the existing certified plinth, mechanical erection, and making all primary and secondary connections.
5	Earthing	Connect the transformer and all new equipment to the existing substation earth mat and conduct earth continuity testing to confirm effective bonding.
6	NECRT Supply and Installation	Design, manufacture, deliver supply, install, test and commission a 100kVA 33/0.4kV NECRT Dyn11 with Short time current rating of 360A/10s, 15A Continuous current, Zero sequence impedance of 78.2 ohms, Resistance at 100 degree Celsius = 53,3 ohms including a 33kV cable and terminations of the NECRT to the 33kV bushing of the Main Power Transformer. The NECRT shall come complete with a mounting steel structure and core balancing CTs.
7	Transformer Protection Panel	Design, manufacture, supply, deliver, install, test and commission a Transformer protection panel consisting of main protection relay, backup protection relay, and OLTC voltage regulator and tap changer control relay, complete with all associated auxiliary relays, measuring instruments, control switches, indication lamps, wiring, termination facilities, busbars and panel wiring in accordance with the project specification and applicable IEC standards.
8	HV/MV Connections	Supply and installation of all clamps, connectors, conductors, and hardware to connect the transformer to the existing 132kV and 66kV bays
9	Factory Acceptance Tests (FAT)	Witnessed FATs in accordance with IEC standards for the transformer and all supplied equipment at the manufacturer's works prior to dispatch from manufacturing point.
10	Site Acceptance Tests (SAT)	SAT in accordance with IEC standards of all equipment supplied under this Contract after installation
11	Hot Commissioning and Reliability run test.	Energisation of the transformer and all associated equipment, load testing, reliability run test, and handover to the Employer
12	Substation Yard Rehabilitation	Removal of all weeds in the substation and application of herbicides.

Item	Work Package	Brief Description
12	Documentation	Provide drawings, specifications, as-builts, OHS file, commissioning reports
13	OHS Management	Provide OHS agent, health and safety plan, site audits, legal compliance

5.3.1.1 Application

This document is a legal compliance document compiled in terms of the OHS Act and CR, 2014 and is therefore binding. The document must be read in conjunction with other relevant legislation.

5.3.1.2 Definitions

The definitions as listed in the OHS Act 85 of 1993 and CR, 2014 shall apply. Some definitions deemed necessary for this project have been incorporated in Section 5.1.5 of these specifications.

5.3.2 Minimum Administrative Requirements

5.3.2.1 Notification of Construction Work

Greater Tzaneen Municipality or its OHS Agent shall require the PC to notify the Department of Employment and Labour 7 days before construction work commences on site. The application shall be done on an Annexure 2 form (Regulation 4 of the CR, 2014).

5.3.2.2 Assignment of Responsible Persons

The PC and all Contractors must make supervisory appointments as well as other relevant appointments in writing (as stipulated by the OHS Act and CR, 2014). See Annexure B of this chapter for detail on which health and safety management appointments are relevant on this project.

5.3.2.3 Competence of Appointed Competent Persons

The PC and Contractors' competent persons for the various risk management portfolios must fulfil the criteria as stipulated in terms of the definition 'competent' in accordance with the CR, 2014.

5.3.2.4 Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA)

The PC must have in their possession a 'Letter of Good Standing' issued by its Compensation Insurer as proof of registration. Contractors must also have proof of workman's compensation registration in the form of a 'Letter of Good Standing' and forward a copy to the PC before beginning work on site. Contractors must always be in good standing while carrying out work on site.

5.3.2.5 Health and Safety Organogram

The organogram must include all key personnel, all of whom are expected to collaborate in hazard identification and risk assessments prior to construction work commencement and during construction. In cases where appointments have not yet been made, the organogram shall reflect the intended positions. The organogram must be updated and dated when there are changes in the site management structure.

5.3.2.6 Preliminary Hazard Identification and Risk Assessments

The PC must cause preliminary hazard identification and risk assessment to be performed under the leadership of a competent person before commencement of construction work. Detailed task-specific risk assessments based on the proposed sequence of work must be compiled. Generic risk assessments will not be accepted.

The risk assessments must include:

- a. A list of hazards identified as well as potentially hazardous tasks.
- b. The risks which may result based on the list of hazards and tasks. Use of meta-language to explain risks is expected.
- c. A set of safe work procedures to be implemented, with the aim of eliminating, reducing, and/or controlling the risks as far as reasonably practicable to ALARP.
- d. A monitoring and review procedure of the risk assessments as they change, i.e. how and when the risk assessments will be reviewed.

The PC must ensure that all Contractors inform, instruct, and train their workers regarding any hazards, the associated risks, and the related safe work procedures before any work commences and thereafter at regular intervals as risks change. This training should be carried out in the form of toolbox talks.

NB: PC, contractors, and subcontractors must conduct toolbox talks and submit proof (attendance registers) to the client at least once per week. They should also conduct daily hazard identifications and risk assessments on a 'Daily Safety Task Instructions' form and forward a copy to the client.

5.3.2.7 General Record Keeping

The PC and subcontractors must keep and maintain all necessary Health and Safety records to demonstrate compliance with these HSS, the OHS Act, and the CR, 2014. Records of incidents/injuries, emergency procedures, training, planned maintenance inspections, and monthly contractor audits must be kept in the health and safety file, which must always be kept on site. The PC must ensure that all subcontractors keep, maintain, and make available their own health and safety files whenever an authorised person requests them.

5.3.2.8 Injury / Incident Reporting and Investigation

Injuries are to be categorised into: first aid; medical; disabling (lost time); and fatal. The PC must investigate all injuries. All Contractors must report injuries to the PC immediately and the PC must inform Greater Tzaneen Municipality immediately. All incidents reportable in terms of Section 24 of the OHS Act must be reported to the local Department of Employment and Labour in the prescribed manner.

5.3.2.9 Consolidation of Health and Safety Documentation

It is the duty of the PC to ensure that all documentation required to be kept or generated during the construction phase is consolidated into one set of documents and handed over to the Greater Tzaneen Municipality upon completion of the construction work. This consolidated safety file should include instructions from the design team required for the continued safe operation and maintenance of the new structures.

5.3.2.10 Offences and Penalties

Penalties may be imposed on the PC and subcontractors for ongoing non-compliance with the provisions of the HSS, the PC's health and safety plan, and site health and safety procedures. Non-compliances identified during Health and Safety Agent's audits will be categorised into one of three levels:

- Life-threatening situation – a prohibition order will be issued. The activity must be ceased immediately and corrective measures taken.
- Serious injury possibility – a contravention notice will be issued with a specified timeframe for compliance (e.g. 7 days), followed by a further audit.

- Minor or no injury possibility – an improvement notice will be issued. The corrective measures stipulated in the audit report must be taken.

Greater Tzaneen Municipality standards will not be compromised. The OHS Agent's recommendations will be taken seriously. The client's decision will be final.

5.3.3 PC, Contractors, and Sub-contractors

5.3.3.1 PC's and Contractors' Requirements

The PC must ensure that all subcontractors comply with these Specifications, the principal coherent health and safety plan, the OHS Act, CR 2014, and all other relevant legislation. A Contractor appointing other Contractors as sub-contractors shall ensure compliance mutatis mutandis as if it were the PC.

The PC may only allow a Contractor to begin work on site after receiving a health and safety plan which must include a project-specific hazard identification, risk assessments, and safety measures. The PC must verify competency and approve each subcontractor's site-specific health and safety plan. Monthly audits must be conducted on all contractors, with reports kept in the health and safety file.

The PC must stop any Contractor from carrying out construction work that is not in accordance with the applicable health and safety plan or if there is an immediate threat to the health and safety of persons. The PC shall ensure that every contractor is registered and in good standing with a recognised compensation fund prior to work commencing on site.

5.3.3.2 PC / Contractor Competency Assessment

The PC must be reasonably satisfied that contractors they intend to appoint have the necessary competencies and resources to safely conduct the work. This should be established at tender stage before appointments are made.

The PC and Contractors should submit the following documentation for verification by the Greater Tzaneen Municipality:

- Health and safety plan as compiled for this project (including risk assessments, safe work procedures, fall protection plan)
- Management structure as envisaged at tender (organogram)
- Letter of Good Standing with the Compensation Commissioner or FEM
- All-risk insurance or public liability insurance
- Professional indemnity insurance (if mandated to conduct design work)
- Proof of health and safety training and other related training (CV and certificates)
- Legislative appointment letters

5.3.3.3 Pricing for Occupational Health and Safety Compliance

All parties bidding to do work on this project must ensure that they have made provision for the cost of complying with this Specifications document as well as with the OHS Act and incorporated Regulations as a minimum requirement in their tender documentation. No additional claims will be entertained at a later stage for any compliance requirement prescribed in the OHS Act, incorporated regulations, or in this Specifications document.

5.3.3.4 Contractors' Health and Safety Plans [CR 7]

The CR (2014) aims to improve overall management and co-ordination of Health, Safety, and Welfare throughout the Construction Phase. The PC is required to develop a Health and Safety Plan before work

commences on site and review it throughout the Construction Phase. The degree of detail should be proportionate to the nature, size, and level of project risk profile. This is not a low-risk project.

The Construction Health and Safety Plan should set out the arrangements for ensuring the Health and Safety of everyone carrying out the construction work as well as all other persons who may be affected by it. The Health and Safety Plan must clearly spell out the Physical Agents as per the Physical Agents Regulations of 2024.

5.3.3.5 Communication and Management of the Work

The PC must indicate in its health and safety management plan provision for the following:

- a. Management structure and responsibilities.
- b. Health and Safety goals for the project and arrangements for monitoring and review.
- c. Arrangements for:
 - i. Regular liaison between parties on site (meetings).
 - ii. Consultation with the workforce (toolbox talks, Health and Safety committee meetings).
 - iii. Exchange of design information/shop drawings between GTM, designers, and Contractors.
 - iv. Selection and control of Contractors (selection criteria, inspections, audits).
 - v. Site health and safety induction and onsite training.
 - vi. Welfare facilities, first aid, emergency planning, and fire prevention strategy.
 - vii. Reporting and investigation of injuries and incidents including near misses.
 - viii. Production, approval, and review of risk assessments, safe work procedures, and method statements.
 - ix. Health and Safety value reviews.
- d. Site-specific rules and procedures.

5.3.4 Hazards and Potentially Hazardous Situations

5.3.4.1 Unforeseeable Hazards

The PC must immediately notify contractors as well as the GREATER TZANEEN MUNICIPALITY, in writing, of any hazardous or potentially hazardous situations that may arise during construction activities so that the necessary precautions may be taken before such work begins.

5.3.5 Site Operational Requirements

5.3.5.1 Health and Safety Representative(s)

The PC must ensure that Health and Safety Representative(s) are appointed in consultation with employees. The representatives must be competent to carry out their functions. Appointments must be in writing. Health and Safety Representatives should carry out monthly inspections, keep records, and report all findings to the CHSO.

5.3.5.2 Health and Safety Training

5.3.5.2.1 Induction

The PC must ensure that all site personnel including all sub-contractors undergo the agreed health and safety induction training before any worker starts work on the project. A record of attendance must be kept in the health and safety file. Workers must carry proof of induction on their person while on site.

5.3.5.2.2 Awareness

The PC must ensure that periodic toolbox Health and Safety talks take place at least once per week. All site personnel including all sub-contractors must attend. The induction manual and attendance registers must be forwarded to the client prior to commencement of construction work.

5.3.5.2.3 Competence

All competent persons must have the knowledge, experience, training, and qualifications specific to the work they have been appointed to supervise, control, and/or carry out. This must be assessed on a regular basis through training, evaluation, and periodic audits.

5.3.5.3 Health and Safety Audits, Monitoring and Reporting

The PC is obliged to conduct monthly audits on all subcontractors appointed by them and keep audit reports in its health and safety file. Greater Tzaneen Municipality / Agent will conduct monthly audits on the PCs' safety management plan.

5.3.5.4 Emergency Procedures

The procedure must detail the response procedures including the following key elements:

- List of competent personnel.
- Details of emergency services (first responders e.g. paramedics, police officers).
- Actions or steps to be taken in the event of specific types of emergencies.
- Evacuation procedures, including routes and exits, available on a drawing.
- Emergency procedures must include but shall not be limited to: fire; spills; injury to employees; damage to material/equipment/plant; use of hazardous substances; bomb threats; major incidents/injuries; evacuation.
- The PC must advise the Greater Tzaneen Municipality in writing of any emergency situations, together with a record of action taken.
- A contact list of all service providers (Fire Department, Ambulance, Police, Medical and Hospital) must be maintained and made available to site personnel.
- The emergency plan must be reviewed from time to time as conditions change.

5.3.5.5 First Aid Boxes and First Aid Equipment

The PC and all Contractors must appoint First Aider(s) in writing. The PC must appoint at least one First Aider holding valid certificates (with a Chief Inspector's number) kept on site. The PC must provide at least one first aid box, adequately stocked, kept at the site office.

5.3.5.6 Personal Protective Equipment (PPE) and Clothing

The Contractor must ensure that all site workers are issued with and wear the appropriate PPE as indicated in the risk assessments. SANS-approved PPE must be kept on site in adequate quantities.

- Safety harnesses are mandatory wherever work takes place at elevation where safe working platforms or ladders are not possible.
- Overalls clearly indicating the Contractor's logo must be worn; all subcontractors must conform.
- Eye protection must be worn by those working with grinders, skill saws, and high-pressure water cleaners, and by workers near these operations.
- Safe footwear is required by all workers.
- A high-visibility vest is mandatory.

5.3.5.7 Occupational Health and Safety Signage

The PC must provide adequate on-site OHS signage including but not limited to:

- 'Construction work – no unauthorised entry', 'beware of overhead work', 'hard hat area', 'first aid' – posted at all work areas/zones.
- Signage posted at strategic locations to warn the public of diversions, alternative throughways, and other irregularities caused by construction work.
- Signs as required by law for high voltage and other potential risk areas/operations such as transformer replacement.
- Safety signs and awareness posters must be well maintained including weekly inspections, cleaning, replacement, and repair.

5.3.5.8 Site Visitor Health & Safety

Site visitors must be briefed on the hazards they may be exposed to and the measures in place to control these hazards. CR 2014 Section 7(6) requires that a record of these 'inductions' be kept on site. A logbook with site rules leaflet must be kept at the reception/site office for all visitors to sign. The site will be live, so it is the PC's responsibility to ensure site visitors are supervised while on site. Visitor hard hats and reflectors must be kept in the site office. The access gate(s) must be controlled and visitors must sign in at the site office.

5.3.5.9 Transport of Workers

The PC and other Contractors may not transport persons together with goods or tools. The transformer will be transported in specific abnormal load trucks; no unauthorised personnel will be allowed in this truck. Contractors must adhere to the National Road Traffic Act.

5.3.5.10 Construction Health & Safety Officer (CHSO)

A full-time Construction Health and Safety Officer, in terms of CR 2014 Section 8(5), will be required on this project. The CHSO must be registered with SACPCMP. The CHSO will be required to carry out at least the following duties:

- Health and safety audits and inspections on site, including administrative and physical audits of all contractors' health and safety plans, files, and activities, with findings recorded in audit reports kept in the health and safety file.

5.3.6 Physical Requirements

5.3.6.1 Transportation of Transformer

The Contractor is responsible for the complete transportation of the transformer and all associated equipment from the manufacturer or Contractor's storage facility to Tarentaalrand Substation. The substation is accessed from the R71 public road via an existing gravel access road, with an internal concrete roadway for transformer positioning.

The Contractor shall:

- Arrange and be responsible for all abnormal load transport permits, police escorts, traffic management, and route clearance required by applicable legislation.
- Confirm the transport route and obtain all necessary permits before the transformer is dispatched from the factory.
- Ensure the transport vehicle and trailer are rated for the full transformer mass (including oil, if transported oil-filled) plus all temporary transport fittings.
- If transported without oil (gas-blanketed), supply the correct grade and quantity of transformer oil and be responsible for all oil filling, filtration, and degassing at site.
- Notify the Engineer not less than seven (7) days before the planned delivery date.
- Conduct a visual inspection of the transformer immediately upon arrival at site before offloading, documenting any visible transit damage in a written delivery inspection report.
- Be solely responsible for any damage to the transformer or other equipment during transport and offloading.

5.3.6.2 Civil Works

Works shall include:

- Inspection and repair of the existing concrete plinth including crack repair and surface levelling.
- Removal and replacement of damaged bund wall bricks and rebuilding of affected sections.
- Sealing of bund wall joints and application of oil-resistant waterproof coating to bund walls and floor.
- Verification that the bund capacity is adequate for the oil volume of the replacement transformer.
- Installation or refurbishment of the oil drainage pipe connecting the bund to the existing oil containment dam.
- Cleaning and inspection of the existing oil dam prior to connection.
- Water tightness testing of the refurbished bund prior to commissioning.

5.3.6.3 Offloading, Positioning, and Erection

5.3.6.3.1 Lifting and Positioning

- The Contractor shall supply all lifting equipment (crane, rigging, slings, shackles, and spreader beams) required for offloading the transformer and placing it on the existing certified plinth.
- All lifting equipment shall have valid load test certificates (not older than 12 months) and shall be inspected by a competent rigger before each lift.
- The crane shall be rated with an adequate factor of safety; the Contractor shall submit a written lift plan to the Engineer for approval not less than seven (7) days before the planned lift.
- Lifting shall only be performed using the dedicated lifting lugs and jacking pads provided on the transformer tank; lifting from any other point is prohibited.
- The transformer shall be lowered onto the plinth and aligned to the anchor bolt pattern; anchor bolts shall be torqued to the manufacturer's specified values.
- A spirit level shall be used to verify the transformer is level in both axes; out-of-level shall not exceed 1:500 in any direction.

5.3.6.4 Mechanical Erection

- All transformer accessories removed for transport (conservator, cooling radiators, bushings, surge arrester structures, and external pipework) shall be reinstated per the manufacturer's erection manual.
- All flanged connections shall be fitted with new gaskets; no reuse of gaskets from transport.
- All pipework connections (conservator, OLTC, Buchholz, PRD) shall be leak-tested before oil filling.
- Cooling fans and fan control panel shall be installed and connected.
- Marshalling kiosk shall be mounted and all pre-wired cabling connections made.
- NECRT and NER shall be installed on their foundation adjacent to the transformer and all LV connections made.
- All earthing connections from the transformer and NECRT to the substation earth bar shall be made and tested before energisation.

5.3.6.5 Oil Filling and Drying (if transported without oil)

- The Contractor shall supply transformer oil conforming to IEC 60296 Class I in a sufficient quantity to fill the transformer, conservator, OLTC compartment, and all external pipework, with a minimum 200-litre surplus retained on site.
- Oil shall be filtered and degassed using a dedicated oil filtration and degassing plant before filling; filtration shall continue until oil quality meets IEC 60296 requirements (dielectric strength minimum 60 kV at 2.5 mm gap; moisture content below 10 ppm).
- Oil shall be filled under vacuum to eliminate air pockets in the windings and tank.
- Oil quality test certificates from a SANAS-accredited laboratory shall be submitted to the Engineer before energisation.

5.3.6.6 Deliveries, Waste Removal, Stacking/Storage of Materials

The PC and other relevant contractors must ensure there is an appointed stacking supervisor, and all materials are stacked and stored safely, on level compact ground, out of access ways and no more than three times the minimum base width in height. Waste materials must be kept within designated construction zones.

5.3.6.7 Fire Extinguishers and Fire Fighting Equipment

The PC and relevant Contractors shall provide adequate, regularly serviced firefighting equipment located at strategic points on site, specific to the classes of fire likely to occur. A minimum of two 9 kg dry chemical powder fire extinguishers must be available in and around the site office establishment and stores. Fire extinguishers must also be placed at all work zones. Wherever hot work is taking place, additional fire extinguishers must be on hand.

NB: 'Hot work' includes all work that generates a spark or flame and may therefore result in a fire.

5.3.7 Plant, Machinery and Equipment

5.3.7.1 Construction Vehicles and Mobile Plant

'Construction Plant' includes all types of plant including but not limited to cranes, excavators, construction vehicles, compaction plant, batch plants, and lifting equipment. The PC must ensure that such plant complies with the requirements of the OHS Act, CR 2014, and manufacturer specifications. Vehicles and pedestrian traffic must be safely separated. Any vehicle or mobile plant using any public road must be roadworthy and carry a valid certificate. The operator must carry the necessary driver's licence.

5.3.7.2 General Machinery

The PC and relevant contractors must ensure compliance with the Driven Machinery Regulations, which includes carrying out risk assessments on machines, inspecting machinery regularly, appointing a competent person to inspect and ensure maintenance, issuing PPE and relevant clothing, and training those who use machinery.

5.3.7.3 Electrical Installations, Major Hazard Installations, and Portable Electrical Tools

The GREATER TZANEEN MUNICIPALITY will ensure as far as possible that the PC is made aware of the positions of all electrical power lines. The PC must comply with the Electrical Installation Regulations, the Electrical Machinery Regulations, CR 24, and the Major Hazard Installation Regulations (MHIR), 2022. The PC must appoint a full-time responsible person to conduct risk assessments, establish emergency plans, and notify local authorities. Portable electrical tools and equipment must be visually inspected daily with records kept.

5.3.8 Occupational Health and Safety

5.3.8.1 Industrial Hygiene

5.3.8.1.1 Noise

Occupational noise emitted by construction machinery and power tools must be controlled as far as possible by implementing engineering solutions such as noise dampening, servicing, inspection, screening, and reducing the number of persons exposed. Noise must be kept on or below 85 dB. Personal protective equipment such as earmuffs and earplugs must also be used in conjunction with engineering controls.

5.3.8.1.2 Ergonomics

The PC and subcontractors must take ergonomics into consideration when conducting risk assessments, thereby improving the worker-task relationship, which will improve productivity and reduce chronic conditions such as back strains, joint problems, and mental fatigue.

5.3.8.2 Hazardous Chemical Agents (HCA)

The PC and other relevant contractors must provide the necessary training and information regarding the use, transportation, and handling of HCA, in this case transformer oil. The use, transport, and storage of HCA must be carried out as prescribed in the Regulations for HCA, 2021. All hazardous chemicals on site must have Safety Data Sheets (SDS) on site. First Aiders must be made aware of the SDSs. Copies of the SDSs must be kept in the first aid box and in the store. All containers must be clearly labelled.

Flammable substances must be stored separately, away from other materials, in a well-ventilated area. Two 9 kg DCP fire extinguishers must be placed near fuel containers, but not within 5 m of the containers. These extinguishers are separate from the two required for the site offices and stores.

5.3.8.3 Welfare Facilities

- The PC must supply sufficient toilets (1 toilet per 30 workers per gender), clean lockable changing facilities, hand washing facilities, soap, toilet paper, and hand drying material.
- Waste bins must be strategically placed around site and emptied regularly.
- Workers must be provided with adequate, sheltered eating areas complete with benches and tables.
- Stores may not double up as change rooms or mess areas.
- Clean drinking water must be provided for all workers; the drinking water container must be transparent and have a dispenser.

5.3.8.4 Alcohol and Other Drugs

No alcohol and/or other drugs will be allowed on site. No person may be under the influence of alcohol or any other drugs while on the construction site. Any person on prescription medication must inform his/her superior, who shall report this to the PC. Any person suspected of being under the influence must be sent home immediately for a preliminary inquiry the following day. The Contractor must follow a full disciplinary procedure and forward a copy to the PC.

5.3.8.5 Ablution Facilities

- All ablution facilities shall have a sanitation station.
- Sufficient paper towels shall be available to dry hands after sanitising.
- All ablution facilities must have a biochemical hazardous bin with a medical waste bag that can be sealed.
- Ablution facilities must be cleaned daily to ensure hygiene.
- Chemical toilet ratio: 1 per 30 employees; flush toilet ratio: 1 per 15 employees.
- Cleaners must focus on the most touched areas (handles, taps, basins, toilet seats, etc.).

5.3.8.6 Eating Areas

- Eating areas must accommodate all employees.
- All eating areas must have a biochemical hazardous bin with a medical waste bag that can be sealed.
- All eating areas shall have a washing station or sanitation station.
- Lunch breaks should be standardised.
- A notice board shall be placed at the eating area.
- Hand washing and clean drinking water must be supplied to all employees at the eating area.

5.3.8.7 Waste Management

Waste management on site is critical and must be monitored. Where waste separation is possible, the PC should ensure it is practised. Debris, off-cuts, cement bags, and any other waste must be placed at designated waste areas and disposed of accordingly. Hazardous bins shall be foot-operated to ensure employees do not touch the lid.

5.3.8.8 Paper Towels

Paper towels shall be supplied by the contractor at all sanitation stations and washing stations. These towel papers will be discarded in the medical waste bins. The contractor shall ensure that sufficient paper towels are in storage for fast and effective replacements.

5.3.8.9 PPE

All disposable PPE shall be discarded in the medical waste bins. Disposable PPE includes dust masks, surgical masks, etc.

5.4 SITE ACTIVITIES AS PER SCOPE OF WORK

5.4.1 Alterations

- Loading, offloading, and lifting operations procedure to be communicated.
- Inspect the load before leaving the loading bay.
- Only competent and authorised operators to operate the machine.
- Certified lifting equipment and tackle.
- Regularly maintain the machine.
- Provide appropriate PPE – gloves for workers.
- Appoint a competent person to ensure hoarding withstands the minimum notional horizontal load.

5.4.2 Servicing of Fire Extinguishers

- All fire-fighting equipment to be serviced as per fire-equipment regulations.
- All fire-fighting equipment placed strategically all over the site and signs conspicuously displayed.
- Fire Marshal should communicate site induction, risk assessment, and other relevant procedures.
- Identify a safe parking area maintaining safe distance from embankments, ditches, soft edges, and vulnerable flora/fauna; put in place policies for emergency escape such as reverse parking.

5.4.3 Lay-down Area

The PC shall have various construction materials on site and must therefore have:

- A dedicated lay-down area provided by the Project / Resident Engineer or Client prior to plant entry.
- Clean and orderly housekeeping that remains with the contractor.
- Suitable and effective demarcation.

5.4.4 Manual Handling

Lifting and moving items manually is one of the most common causes of injury at work. The PC is required to prevent manual handling injury by:

- Avoiding unnecessary handling.
- Identifying operations involving lifting heavy or awkward loads, or repetitive lifting. Lifting must be less than 20 kg; if it exceeds this weight, two people must share the load. 50 kg is the maximum load that can be lifted by two people; any weight beyond this must be lifted mechanically, NOT manually.
- Using lightweight materials or mechanical aids where possible.
- Positioning loads by machine and planning to reduce the height from which they must be lifted and the distance over which they must be carried.
- Training workers in safe lifting techniques and sensible handling of loads.

5.4.5 Electrical Work

- Correct PPE in accordance with the PPE procedure, including rubber gloves.
- Provide lock-out and tag-out system.
- Permits to do electrical work to be issued by a Competent Person – Electrician.
- Qualified personnel to be appointed to do electrical work.
- Assessments of work area to be done prior to going on site – care to be taken for underground cables as well as overhead cables.
- All work to be supervised by Construction Supervisor.
- All work to be certified by PC's Engineer.

5.4.6 Cleaning of Tools and Equipment

Before commencing maintenance, ensure:

- There are no sharps.
- Decanting residue will be controlled.
- Maintain hand tools in proper working condition.
- Use the correct tool for the task; avoid 'knuckle-banging' and wear leather gloves when possible.
- Lift heavy objects using the legs and not the back.
- Use lifting equipment when moving heavy materials.

5.5 OMISSIONS FROM THE SITE-SPECIFIC HEALTH AND SAFETY SPECIFICATIONS

Every endeavour has been made to address the most critical aspects relating to Health and Safety issues, to assist the contractor in adequately providing for the Health and Safety of employees on site. However, the PC is required to ensure they stay compliant with statutory requirements and construction programs, processes, and include such aspects in their Health and Safety File.

ANNEXURE A – PRIMARY HEALTH AND SAFETY COMPLIANCE

Tender Number: TBC

The PC and Contractors must submit compliance with Annexure A before commencing work on site. Compliance must be maintained and proven to the OHS Agent throughout the duration of the project.

Item	Requirement	Legal Reference	Compliance Period
A1	Health & Safety Plan (H&S Plan)	Construction Regulations	Within one week of receipt of these specifications
A2	Notification of Construction Work	Annexure 2 form (Construction Regs 4.)	Before commencement of work
A3	Assignment of responsible persons to supervise construction work	OHS Act Section 16(2) – all written appointments under the Construction Regulations 2014	Before commencement on site
A4	Competence of responsible persons – CVs and related work history of appointees	OHS Act Section 16(2) – all written appointments under the Construction Regulations 2014	Together with H&S Plan

ANNEXURE B – LEGAL APPOINTMENTS

The PC must make all the management appointments set out below. Compliance with Annexure B is to be maintained and proven to the safety agent at audits. Further appointments could become necessary as the project progresses.

Item	Appointment	Legal Reference	Requirement
B1	CEO Assignee	Section 16(2)	A competent person to assist the CEO in achieving compliance with the OHS Act – PC's or Contractor's responsible person.
B2	Construction Work Manager	CR 8(1)	A full-time competent person to supervise and be responsible for health and safety related issues on site. Appointed by the Section 16(2) appointee.
B3	Assistant Construction Work Manager	CR 8(2)	A full-time competent person(s) to assist the CR 8(1) appointee with daily supervision. One must be designated to fulfil the role of the CR 6(1) when such person is not on site – make this clear in the appointment letter.
B4	Health & Safety Representative(s)	Section 17	A competent person(s) to represent the workforce in H&S matters. Reps may attend safety meetings, conduct monthly site audits, attend incident/injury investigations, and make recommendations on H&S.
B5	Incident Investigator	GAR 9	A competent person to head up the investigation team and co-ordinate incident/injury investigation on site.
B6	Risk Assessment Coordinator	CR 9	A competent person to co-ordinate the drafting, reviewing, and distribution of risk assessments on behalf of the PC. NQF Level 5.
B7	Fall Protection Plan Coordinator	CR 10	A competent person to co-ordinate the drafting, reviewing, and distribution of the Fall Protection Plan. NQF Level 4.

B8	Emergency Plan Coordinator	Contractor's ERP	A competent person to co-ordinate the drafting, reviewing, and distribution of the site emergency procedures / evacuation plan. Must be fulltime on site.
B9	First Aider(s)	GSR 3	A certified person to address first aid situations and take charge of injuries. Level 1 certificate.
B10	Scaffolding Inspector	SANS 10085-2004	A competent person to inspect scaffolding before use and every time after bad weather.
B11	Scaffold Supervisor	SANS 10085-2004	A competent person to supervise all scaffolding on site, ensuring that scaffolds are safe, inspected, extended/alterd, repaired when required, and that all trades are co-ordinated and authorised to work on such scaffolds.
B12	Scaffolding Erector	SANS 10085-2004	A competent person(s) to erect scaffolding – leader of the scaffold team.
B13	Ladder Inspector	GSR 13A	A competent person to inspect ladders daily and ensure they are safe for use, keeping monthly records.
B14	Stacking Supervisor	CR 28	A competent person to supervise all stacking and storage operations.
B15	Major Hazard Installations Inspector	MHI 3(1)	A competent person to inspect all major hazard installations premises.
B16	Portable Electrical Tool Inspector	CR 24	A competent person to co-ordinate/inspect portable electrical tools, leads, and plugs.
B17	Fire-fighting Equipment Inspector	CR 29	A competent person to co-ordinate and inspect firefighting equipment, including ad-hoc checks and monthly inspections with records kept.

B18	CHSO	CR 8(5)	A competent person to fulfil the functions as set out in these HSS.
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ANNEXURE C – PROOF OF COMPLIANCE

The PC and Contractors must comply with but not be limited to the requirements tabled below and prove their compliance at audits conducted by the Health and Safety Agent.

Item	What	When	Output / Evidence Required
C1	Construction Phase H&S Plan	Monthly review	PC to indicate the status of Contractors' health and safety plans.
C2	Health & Safety File(s)	Open at start; maintain throughout	Contractors to report on their file at monthly H&S audits by the PC.
C3	OHS Act and relevant Regulations	Monthly review	To be kept in the health and safety file on site.
C4	Health & Safety Induction Training	Every worker, before starting work	Attendance registers to be kept.
C5	Awareness Training (Toolbox Talks)	At least once a week	Attendance registers to be kept.
C6	Health & Safety Meetings	Monthly	Meeting minutes to be kept.
C7	Health & Safety Reports	Monthly	Report covering: incidents/injuries and investigations; non-conformances; internal H&S audit reports.

C8	Audits on Contractors	Monthly	Report covering: H&S File/Plan; WCA status; appointment letters; Section 37(2) agreements; risk assessments and safe work procedures; physical site inspection; other contractor-specific requirements.
C9	Emergency Procedure	Monthly evaluation	Compile written procedure and telephone numbers.
C10	Risk Assessments & Fall Protection Plan	Updated and signed off	Documented risk assessments to be available.
C11	Method Statements	Before workers are exposed to the risks	Documented set of method statements, reviewed and signed off.
C12	General Inspections	Daily	Report OHS Act compliance: excavations; portable electrical tools; formwork and support work; explosive powered tools.
C13	General Inspections	Daily	Scaffolding; temporary electrical installations.
C14	General Inspections	Monthly	Firefighting equipment; ladders.
C15	General Inspections	Monthly	Fall prevention and arrest equipment.
C16	General Inspections	6-Monthly	Lifting machines.
C17	List of Contractors	Updated weekly	Compile a list of contractors: name, supervisor, company telephone numbers, and trade.
C18	Workman's Compensation	Ongoing	Compile a list of Contractors' workman's compensation proof of good standing.

C19	Site Rules & Section 37(2) Agreements	Ongoing	Compile a list of all signed mandatories. Proof of agreement documents to be kept in H&S file.
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OCCUPATIONAL HEALTH & SAFETY – COSTS TO BE INCLUDED IN THE PC'S / CONTRACTORS' PRICE

In terms of the Construction Regulations (2014), it is the Greater Tzaneen Municipality's duty to ensure that the cost for health and safety has been provided for by the PC before appointment. The following items represent the minimum health and safety costs to be included in the tender price. It is the duty of the PC and Contractors to ensure that all aspects of the OHS Act (85/1993) and Construction Regulations (2014) are catered for.

Item	Description
1	Supply of all Personal Protective Clothing/Equipment and ensure use thereof for full compliance
1.1	Steel toe capped safety boots
1.2	Overalls
1.3	Reflective vests (high visibility)
1.4	Hard hats
1.5	Dust masks
1.6	Hearing protection
1.7	Hand gloves
1.8	Any other – PC to specify

2	Supply and provision of Equipment for Working at Heights and ensure use thereof for full compliance
2.1	Fall protection equipment (safety harness)
2.2	Double lanyard harness
2.3	Fall protection plan
2.4	Scaffolding access ladders/toe boards/handrails
2.5	Portable ladders
2.6	Any other – PC to specify
3	Barricading: supply and install, including removal upon completion, to ensure full compliance with legislation
3.1	Rigid type barricading
3.2	Temporary fence barricading along perimeter of excavated area
3.3	Any other – PC to specify
4	Related Training
4.1	First Aid Training
4.2	Health and Safety Representative training
4.3	Emergency Rescue training (height)

4.4	Hazard Identification Training
4.5	Training of Personnel working at heights
4.6	Construction Plant Training
4.7	Legal Liability (OHS Act) Training
4.8	COID Act Training
4.9	Scaffold Erector and Inspector Training
4.10	Any other – Contractor to specify
5	Occupational Health and Safety Administration
5.1	Develop a site-specific Health and Safety Plan and Hazard and Risk Assessment by a Competent Person
5.2	Develop a Fall Protection and Rescue Plan by a Competent Fall Protection Plan Developer
5.3	Competent Occupational Health and Safety Officer/Consultant
6	Medical Surveillance
6.1	Medical Certificates of fitness for all employees by an Occupational Health Practitioner
6.2	Medical Certificates of fitness for all EPWP employees by an Occupational Medical Practitioner during the duration of the project
7	Facilities and Equipment

7.1	Sanitary facility for each sex and for every 30 workers
7.2	Sheltered eating areas
7.3	First aid boxes
7.4	Fire extinguishers
7.5	Waste bins
8	Safety Signage
8.1	Sufficient and adequate safety signage on construction site and at all flammable stores
9	COVID-19 / Coronavirus and Generic Health and Hygiene Requirements (optional)
9.1	Face masks
9.2	Sanitizers
9.3	Disinfectant
9.4	Toilet papers
9.5	Toilet soap
9.6	Surgical gloves

OCCUPATIONAL HEALTH AND SAFETY FILE – DOCUMENT INDEX

The Occupational Health and Safety file must consist of the following documentation:

Ref	Description
1	Appointment Letter from GREATER TZANEEN MUNICIPALITY
2	Notification of Construction Work
3	Letter of Good Standing – COID
4	Copy of Public Liability Insurance Policy and UIF Registration
5	Health and Safety Specifications
6	Scope of Work
7	Tool and Machinery List
8	Method Statement of all work that will be conducted
9	Risk Assessment Guide / Procedure
10	Task-Based Risk Assessments
11	Safe Work Procedures for all Risks
12	Medical Certificates / Copy of IDs and Personal Information
13	All Health and Safety Related Policies

14	Section 37.2 Agreements
15	Induction Training Information
16	Site-Specific Emergency Numbers and Emergency Plan
17	Site-Specific Fall Protection and Rescue Plan
18	Site-Specific Health and Safety Plan
19	Incident / Accident Management Control
20	Environmental Management
21	Hazardous Chemical Agents Register and corresponding SDSs
22	Example of Monthly Health and Safety Report
23	Health and Safety Organogram and OHS Appointments – With Competencies
24	Sample of all registers that will be used on site
25	Copy of the Occupational Health and Safety Act and Construction Regulations 2014

NB: SHE file contents will be either added or removed depending on the final scope of work.

5.6 BASELINE RISK ASSESSMENT

The Baseline Risk Assessment (BRA) has been developed for the proposed works associated with the replacement of the 60MVA 132/66/33kV Transformer No. 2 at Tarentaalrand Substation. The purpose of this assessment is to identify, evaluate, and document potential hazards and risks associated with the execution of the works within an operational high-voltage substation environment.

This BRA forms a critical component of the project's Occupational Health and Safety (OHS) management framework and is intended to ensure compliance with the requirements of the Occupational Health and Safety Act No. 85 of 1993, relevant regulations, and applicable industry standards. The assessment provides a structured approach to risk identification and establishes appropriate control measures to eliminate or mitigate risks to an acceptable level.

The scope of this assessment includes, but is not limited to:

- Electrical risks associated with live high-voltage equipment
- Civil and structural risks related to foundation works and equipment installation
- Mechanical handling and lifting operations involving heavy plant and equipment
- Environmental and site-specific risks within the substation footprint
- Interface risks between existing infrastructure and new installations

The BRA is intended to inform the development of task-specific risk assessments, method statements, and safe work procedures to be implemented by the Contractor. It further serves as a reference document for all stakeholders, including the Employer, Engineer, Contractor, and OHS personnel, to ensure that all foreseeable risks are proactively managed throughout the project lifecycle.

All Contractors tendering for this project shall review this Baseline Risk Assessment and incorporate its findings into their Health and Safety Plans, demonstrating how identified risks will be effectively controlled during execution of the works.



SAFETY AND HEALTH MANAGEMENT SYSTEM

HAZARD IDENTIFICATION AND RISK ASSESSMENT

Legal requirements:		OHS Act 85 of 1993, Section 8(2)(d), Construction Regulation 2014, Section 9									
Project location:		Tarentaalrand Substation (Greater Tzaneen Municipality)									
Risk Assessment Number:		RA: 001						Date		March 2026	
Description of the activity		a) Baseline risk assessment b) Delivery of transformer to site, c) Replacement of transformer, d) Hot commissioning									
ACTIVITY/PROCESS/OPERATIONS/ PRODUCTS/SERVICES	Safety & Health Hazards Including Environmental Aspects	Safety & Health Risk Including Environmental Impact	Hazard Class			Risk Value (Before Mitigation)			Mitigation and Control Measures	Responsible Person	Monitoring Mechanisms
			S	H	E	LK	CO N	Rating			
LEGAL REQUIREMENTS											
Compliance with applicable legislation for safety, health, and environment	OHS Act/ Client's (Greater Tzaneen Municipality) processes and/ or procedures not followed as per legislative/contractual requirements.	Contractor could not comply with legal requirements resulting in fines and possible job stoppages from Department of Employment and Labour (DEL)	X	X	X	3	3	H13	• Planning, design, and implementation to comply with legislative requirements particularly for safety, health, and environment together with quality.	Manager CEO	Audit
	Lack of knowledge or no qualified safety, health, and environment personnel on compliance	Contractor not registered as per legislative requirements, Lacking qualified and	X	X	X	3	3	H13	• Appointment of a qualified persons to assist with the development of legislative guide processes and procedures	Manager CEO	Organogram/ Verification procedure of persons hired,

		registered Health and Safety personnel									once work commences
	No available legislation on site	Could result in fines from Department of Employment and Labour (DEL) and possible job interruption	X	X	X	3	3	H13	Responsible Manager to ensure that there is latest revision of the Act and relevant Regulations available on/during the site establishment	Manager CEO	Audit
	Use of outdated legislation and Act	Employees not aware of the changes relevant to their activities resulting in injuries	X	X	X	3	3	H13	- Responsible Manager to ensure that there is latest revision of the Act and relevant Regulations - E.g. Physical Agents Regulations, 2025	Manager CEO	Audit
Developing and implementing safety, health, and environmental plan	Working without company or project specified	Non-compliance with legislation and project required compliance which could lead to stop of work by relevant authorities	X	X	X	3	3	H13	The safety, health and environmental management plan must be established, implemented, and maintained to define GREATER TZANEEN MUNICIPALITY plan towards legal compliance to all applicable safety, health, and environmental legislation	Manager CEO	Audit
	SHE plan not submitted to the client for negotiation and approval	Non-compliance to construction regulation and client specification that could result in fines and possible job stoppages	X	X	X	3	3	H13	Safety, health, and environmental management plan to be submitted to client prior start with work on site and SHE plan to be approved by client	Manager CEO	Audit
	SHE management plan not specific to the project	Non-compliance to construction regulation and client specification that could result in fines and possible job stoppages	X	X	X	3	3	H13	- SHE management plan to be developed as per scope of work and reviewed regularly to ensure it remains a relevant and working document - SHE plan to be developed in accordance with Health and Safety specifications of the project	Developer of SHE Plan Contractor's Health and Safety Manager	Audit
Conduct risk assessments	No procedure in place for risk assessment	Non-compliance to construction regulation and substandard risk assessment conducted resulting in injuries to employees	X	X	X	3	3	H13	Baseline risk assessment and risk assessment (HIRA) must be done and communicated to all employees	Manager CEO Risk Assessor	Audit
	Risk assessments not conducted or conducted improperly	Employees exposed to unknown hazards resulting in serious injuries to fatality	X	X	X	3	3	H13	- Before any work commences, risk assessment must be conducted and the report must be deemed comprehensive by an external auditor. - Record kept in both the safety files	Manager CEO Risk Assessor Construction Manager (Whole Risk Management Team)	Audit

	Risk assessment conducted by incompetent risk assessor	Non-compliance to construction regulation and substandard risk assessment conducted resulting in injuries to employees	X	X	X	3	3	H13	- Risk assessment must be conducted by a competent person who is trained to do so. - All control measures recommended in the risk assessment must be implemented	Manager CEO	Audit
Attending client's SHE induction and conducting SHE induction training	Employees, contractors, visitors, and suppliers not aware, of applicable procedures, standards, and legislative requirements the project	Non-compliance to legislation that could result in multiple injuries to fatality	X			3	4	E18	- Every new employee or visitor must attend client and company SHE induction before entering company premises or starting work - All employees absent from work or on leave for a period of 14 days or more must attend SHE induction - Visitors must always be accompanied when walking around site/Tarentaalrand substation premises	Manager CEO Health and Safety Officer	Audit
	Employees, contractors, visitors, and suppliers not aware of company policies, system procedures, and safe working procedures to be applied during the project activities	Non-compliance to legislation, client requirements that could result in multiple injuries to fatality	X			2	4	H14	- Every new employee or visitor must attend client and company SHE induction before entering company premises or starting work - All employees absent from work or on leave for a period of 14 days must attend SHE induction - Visitors must always be accompanied when walking around company premises	Access Controller Health and Safety Officer	Security Checkpoint Audit
	Employees, contractors, visitors, and suppliers not aware of risks attached to work they are to perform	Exposure to unknown hazards & risks that could result in multiple injuries to fatality	X			2	4	H14	- Every new employee or visitor must attend client and company SHE induction before entering company premises or starting work - All employees absent from work or on leave for a period of 14 days must attend SHE induction - Visitors must always be accompanied when walking around company premises	Manager CEO Health and Safety Officer	Accredited/ Unaccredited, Training
Arranging medical surveillance or examination	No job-task specification for employees attending medical fitness tests	Non-compliance to statutory requirements and possible exclusion during evaluation due to insufficient information provided on the job-man specification	X	X		2	3	M9	- Responsible manager to ensure correct job-task specification is completed as per the employee job description and risk exposure - All employees shall have individual job specification prior tests	Manager CEO	Audit
	Employees, contractors, visitors, and suppliers not	Non-compliance to statutory requirements which can	X	X		3	4	E18	Medical examination or assessments must be conducted prior	Manager CEO	Audit

	medically fit for their tasks	result in serious injuries or possible fatality							to starting work and annually by an Occupational Health Practitioner Every person must be declared medically fit for the type of work they are performing and copies of employee's medical certificates must be kept for a period of 40 years minimum	Occupational Health Practitioner	
	Employees, specialist contractors placed to perform work not medically fit to perform	Infectious/contagious diseases inherent at the workplace, accidents/injuries when an individual succumbs to existing ailments that might affect agility	X	X		2	2	L5	- Medical examination or assessments must be conducted prior to start of work and annually by an Occupational Health Practitioner - Every person must be declared medically fit for the type of work they are performing and copies of employee's medical certificates must be kept for the period of 40 years minimum	Manager CEO Occupational Health Practitioner Worker	Medical Surveillance Report Audit
	No proof of medical fitness	Non-compliance to statutory requirements which can result in serious injuries or possible fatality	X	X		2	4	H14	- Medical examination or assessments must be conducted prior to starting work and annually by an Occupational Health Practitioner - Every person must be declared medically fit for the type of work they are performing and copies of employee's medical certificates must be kept for the period of 40 years minimum	Manger CEO Occupational Medical Practitioner	Copies of Medical Fitness Audit
	Employees working with expired medical fitness certificate	Non-compliance to statutory requirements which can result in serious injuries or possible fatality	X	X		3	3	H13	- Medical examination or assessments must be conducted prior to start of work and annually by an Occupational Health Practitioner - Every person must be declared medically fit for the type of work they are performing and copies of employee's medical certificates must be kept for the period of 40 years minimum	Manager CEO	Records Audit
Establish legal appointments or appointees	Appointments not done as per the risk assessment conducted or legal requirements. especially Occupational health and safety Act no 85 of 1993 with its regulation	Non-compliance of legal requirements for minimum appointments legislatively required and as required by Greater Tzaneen Municipality SHE specifications	X			3	3	H13	- All legal appointments relevant for work operations of GREATER TZANEEN MUNICIPALITY must be developed and signed by relevant appointees and appointer - All copies of legal appointments shall be kept in the safety file	Manager	Audit
	Legal appointees not competent	Non-compliance of legal requirements	X			3	3	H13	Only competent personnel shall be appointed for specific appointment(s)	Manager CEO	Educational and, where

									and competency certificate shall be attached to the appointment letter		applicable: Professional Registration Certificates Audit
Notification of construction work to Department of Employment and Labour	Department of Employment and Labour (DEL) not notified about construction work underway	Violation of construction regulatory requirements for all construction project work	X	X	X	2	3	M9	- Department of Employment and Labour (DEL) must be notified 7 days before start of any construction work within GREATER TZANEEN MUNICIPALITY and client's projects. - No construction activities must be conducted if Department of Labour has not been notified.		Audit
RISK MANAGEMENT (HIRA)											
Obtain all hand tools, power tools and equipment including PPE as per risk assessment	Hand tools not to standard or defective tools / equipment being selected for the job	Contractor not following safe work procedures for handling, using and maintaining hand tools leading to injuries.	X			3	3	H13	All tools and equipment to be used must be inspected prior to use by relevant operator and result recorded on relevant registers. Supervisor to ensure that systems are obtained and managed	Supervisor	Inspection Planned Task Observation (PTO)
	Improper selection and usage of PPE		X	X		3	3	H13	Supervisor to ensure that the correct PPE for the task has been issued and that only PPE as per the PPE matrix will be used	Health and Safety Officer Supervisor	Inspection Planned Task Observation (PTO)
	Power tools used beyond regulated voltage thresholds		X			3	3	H13	Only tools and equipment that was specified as per the method statement / risk assessment will be issued to the workforce	Electrical Supervisor	Inspection Planned Task Observation (PTO)
Task-based risk assessment, and all relevant documentation as per HIRA	Working without pre-work HIRA principle which can lead to exposure to uncontrolled hazards	Could result or can lead to exposure to uncontrolled hazards and risks	X			3	3	H13	- Before any work can commence a pre-work, HIRA must be conducted for each task that needs to be performed. - Any additional hazards should be identified on the pre-work HIRA.	Manger CEO Risk Management Team	Inspection Planned Task Observation (PTO)
	Changes in conditions not assessed and not added into issue-based HIRA	Leading to lost time injuries or brief disruption of operations.	X	X		3	4	E18	- Any additional hazards must be identified on pre-work HIRA – Management of change procedure to be followed. - Whenever the scope of work or the conditions change a new issue-based HIRA must be facilitated and must be signed off by all relevant employees. This new risk assessment must be	Supervisor Risk Assessor Health and Safety Officer	Inspection Planned Task Observation (PTO)

									communicated to all employees and they must sign as acknowledgement before the task can continue		
	All hazards not identified on permit - exposure to unknown hazards and risks.	Could result or may lead to a lost time injury or brief disruption of operation	X	X		3	4	H18	Supervisor to brief all employees on all hazards on permit and HIRA each employee to sign HIRA and pre-work HIRA/STAR as acknowledgement of understanding the hazards and risks involved with the task at hand. Inform employees during 15-minute safety talks and safety information board of various exposure hazards.		Inspection Planned Task Observation (PTO)
Supervisor's communication with the team (employees): risk assessment and signing all pre-task HIRA	The risk assessment is not carried out or some workers fail to sign the risk assessment.	Risk assessment is not carried out or some employees fail to sign the risk assessment. May result in medical treatment cases / exposure to major health risk	X	X		2	2	M8	Supervisor to brief all workers on all hazards identified in risk assessment and ensure that all relevant employees sign risk assessment before work commence.	Supervisor	Inspection Planned Task Observation (PTO)
	Signing incorrect document for the task	Employees may not be informed of the correct task resulting in injury to fatal incident	X	X		2	4	H14	Supervisor to ensure correct documentation is obtained and communicated with all employees. Artisan and assistant to verify with the Supervisor if HIRA is not the same with the task allocated.	Supervisor	Inspection Planned Task Observation (PTO)
	Employees not understanding the language while supervisor is communicating.	Employees not understanding the language while supervisor is communicating. Lost time injury / brief disruption of operations	X	X		2	2	M8	- If a language barrier exists an approved translator must be used to communicate risk assessment to workforce for all to understand and be aware of all the hazards / risks and the control measures. - Supervisors should regularly ask workers if they understand the language.	Supervisor	Inspection Planned Task Observation (PTO)
Inspect works area and access to working area	Uneven surfaces	Could lead to twisting of ankles, foot injuries or knee injuries	X			2	2	M8	Awareness to be raised during toolbox talk	Supervisor	Inspection Planned Task Observation (PTO)
	Unsafe access	Could lead to lost time injuries or brief disruption of operations.	X			2	3	M9	Supervisor / site manager must provide safe access to works area.	Supervisor	Inspection Planned Task Observation (PTO)

	Snakes, poisonous insects, bees, wasps, spiders etc.	Could cause lost time injuries or disruption of operations	X	X	X	2	2	M8	Ensure environmental awareness is provided to increase awareness on snakes, insects	ESO	Inspection Planned Task Observation (PTO)
	Unsafe/limited access to working area	Could result in injuries	X			2	2	M8	- Supervisor to ensure that safe access is provided to working area. - Proper housekeeping to be conducted. - Access ramp for mobile equipment to be wide enough and not too steep	Supervisor	Inspection Planned Task Observation (PTO)
CIVIL WORKS											
Refurbishment of existing transformer oil bund wall	Poor risk assessment, Omissions or miscalculations of bund capacity due to incompetence or lack of adherence to regulations	Could lead to Environmental damage, penalization from competent authorities such as LEDET			X	2	4	H14	- Accurate calculation of bund capacity, depending with oil volume of the transformer - Calculation of additional volume of rain water, if bund is in an open area - Regular inspections and maintenance of bund wall	Supervisor ECO Maintenance Team	Inspection Planned Task Observation (PTO)
Preparation of existing plinth for installation of replacement transformer	Employees are exposed to harmful moving machinery such as cranes	Injuries	X			2	3	M9	- Pre-task assessments - Barriers - Inspection - Awareness	Manager Crane Operator	Inspection Planned Task Observation (PTO)
	Employees are exposed to dust	Respiratory issues	X	X	X	3	3	H13	- Hazard awareness - PPE	ESO	Inspection Planned Task Observation (PTO) Audit
	Insect bites	Insect bites	X			3	2	M8	- Hazard awareness - Vegetation control - Emergency preparedness	ESO	Inspection Planned Task Observation (PTO)
PHYSICAL AGENTS											
Loading and Off-loading; Material handling	Falling material	Resulting in moderate to serious injuries	X			3	2	M8	Employees to make use of correct personal protective equipment (safety boots) when handling materials	Supervisor	Inspection Planned Task Observation (PTO)
	Failure to use safety equipment or personal protective equipment	Resulting in moderate to serious injuries	X			2	3	M9	Approved personal protective equipment (PPE) shall be supplied at no cost to workers	Supervisor	Inspection Planned Task Observation (PTO)

	Nip and Pinch points resulting in fracture	Fracture injuries	X			3	2	M8	- Hand gloves shall be used at all time when moving or handling mechanical components. - Identify possible nip and pinch point in the daily HIRA for the activity to be done. Avoid placing hand and fingers between materials while moving them or between materials and any other structure or building	Supervisor	Inspection Planned Task Observation (PTO)
	Uneven surfaces and loose stones along the walk way	Could cause slip/trip and falls resulting in minor to serious injury	X			3	2	M8	Supervisor and assisting workers to ensure the work area is free from any tripping hazard and care should be taken when approaching stacking areas	Supervisor	Inspection Planned Task Observation (PTO)
Replacement of existing structures (Transformer)	Electricity	Employees in contact with electrical cables resulting in electrocution	x			3	3	H13	- Supervisor to conduct pre-use inspection on the portable electrical equipment and other appliance to ensure the equipment is in good working condition. - Live testing to be undertaken with insulated test equipment and to ensure the electrical equipment is completely switched off when conducting replacement	Supervisor	Inspection Planned Task Observation (PTO)
	Substandard PPE used	Resulting in employees exposed to hazardous material	X			3	3	H13	Responsible supervisor to ensure all employees under their control have correct PPE and ensure all employees make use of PPE provided at all time.	Manager CEO Supervisor Health and Safety Officer	Audit
	Slippery surface	Could result in employee falling resulting in serious injury	X			3	3	H13	Employees to ensure correct PPE (Safety boots) is used when entering wet area or working with liquids where there is potential of slippery.	Supervisor	Inspection Planned Task Observation (PTO)
Manually handling/lifting, carrying & manoeuvring of small, medium and large materials	Employees carrying out excessive heavy material	Could result in problems such as muscle strains and back problems	X			3	2	M8	Employees to adhere to manual handling practices, employees to avoid carrying or lifting heavy material alone. Two or more employees to carry heavy material	Supervisor	Inspection Planned Task Observation (PTO)
	Heavy materials dropped landing on employee's foot or toes	Workshop employees could result in fracture, broken foot and property damage.	X			3	2	M8	Employees to make use of correct PPE (safety boots with steel toe cap) and ensure material are not stacked on the walkways	Supervisor Health and Safety Officer	Inspection Planned Task Observation (PTO)
	Tripping over carelessly positioned materials	Tripping hazards resulting in bruises and cuts	X			3	2	M8	Operator, employee to ensure tripping hazards are removed from the	Supervisor Health and Safety Officer	Inspection Planned Task

									walkways and always maintain good housekeeping		Observation (PTO)
	Unsafe Manual Handling	Nip and Pinch points resulting in fracture	x			3	2	M8	Hand gloves shall be used at all time when moving or handling material. Identify possible nip and pinch point in the daily HIRA for the activity to be done. Avoid placing hand and fingers between materials while moving them or between materials and any other structure or building	Supervisor Health and Safety Officer	Inspection Planned Task Observation (PTO)
	Poor housekeeping / combustible material. No housekeeping done	Fire, Explosion causing property damage and serious injuries	X			2	4	H14	Supervision is responsible to ensure housekeeping is done daily and no combustible material in work areas. Daily work area inspections to be done and recorded on HIRA	Supervisor	Inspection Planned Task Observation (PTO)
ROUTE SURVEY											
Transport and Delivery	Abnormal loads during transportation	Could result Road rage from unreasonable motorists			X	2	2	L5	- All routes are surveyed from Manufacturer to destination - Vehicle will be escorted by SAPS	Manager CEO	Pre-delivery surveys
	Incorrect route used	Could resulted in production delays and project interruption	X			3	3	H13	Only allocated route shall be used to avoid unnecessary delays	Manager CEO Transporter	Route inspection
	No location identified for disposal	Could result in disposal in sensitive areas			X	3	3	H13	Only location identified by the client shall be used to ensure correct location for disposal is used		
ENVIRONMENTAL HAZARDS AT THE WORKPLACE											
Observe work environment for the possibility of environmental hazards that may present in the bushes, long grass and under material	Reptiles or insect bites (snakes, bees, WASP & spiders)	Bodily harm and possible allergic reaction			X	3	2	M8	- Daily inspection to be completed and employees to be made aware of the emergency procedure to be followed in case of any bites, snake identified - Environmental awareness training to be conducted and all employees to attend	Supervisor	Inspection Planned Task Observation (PTO)
EARTHING											
Improper grounding	Ineffective fault current dissipation	Electric fault, which may lead to equipment damage and electrical shocks to personnel	X			2	4	H14	Ensure grounding electrodes are properly installed and provide a direct connection between the transformer and the earth.	Electrical Engineer Certified Major Hazard	Inspection Planned Task Observation (PTO)

									• Use insulated tools to avoid the risk of shock • Implement the Lockout/Tagout procedures to safely de-energize the transformer before any work is performed • Familiarize yourself with emergency procedures	Installations Supervisor	
CONNECTIONS											
Installation of clamps, connectors, conductors, and hardware to connect into existing transformer	Electrical shock from live electrical systems	Could result in serious injuries or fatalities	X			3	4	E18	• All workers must treat/assume that electrical wires are live before working on any circuit or equipment • Verify with a voltage tester that the power is off before commencement with work • Follow instructions from Supervisor/systems	Supervisor Worker	Inspection Planned Task Observation (PTO)
	Falling objects	Poor handling of materials might result in falling objects which might cause property damage	X			3	3	H13	• Responsible manager to ensure all company proper lifting techniques, and proper equipment are used to prevent such incidents	Manager CEO Supervisor	Inspection Planned Task Observation (PTO)
	Fires	Electrically equipment can produce heat and if not properly grounded, can lead to fires which can cause burns, even fatalities	X			3	4	E18	• All electrical components must be properly grounded. • Adequate fire marshals • Adequate fire-fighting equipment, and extinguishers that can quench electric fires	Manager CEO Supervisor Fire Marshal	Inspection Planned Task Observation (PTO)
	Chemicals	Could result in skin damage (Dermatitis), medical cases if ingested/inhaled		X		3	3	H13	• Training and awareness for chemical handling • Awareness of emergency procedures • SDS aligning to enlisted chemicals/ HCA must be in the file	Supervisor Health and Safety Officer	Inspection Planned Task Observation (PTO)
	Accidental energizing	Improperly installed or maintained systems can lead to accidental energization which may result in severe injuries or fatality	X			3	4	E18	• No person shall work with electrical equipment or system without a thorough appreciation of the risk assessment • Awareness • Always wear PPE	Manager CEO Supervisor Worker	Inspection Planned Task Observation (PTO)
HOT COMMISSIONING											
Energizing of Transformer	Arc flash	Electric current straying from its intended path,	X			2	4	H14	• Maintain safe distance. • Always wear appropriate PPE	Electrical Engineer	Inspection Planned Task

		which can result in severe burns, pressure waves that might injure or kill								Manager CEO Supervisor	Observation (PTO)
	Fire and Explosion	In the event of transformer malfunction, fire accidents could occur resulting in explosions that in turn, can result in serious injury to possible fatality	X		X	2	5	H19	- Regular maintenance is a must - Show maintenance schedules - Fire suppression equipment must be on site always	Supervisor	Inspection Planned Task Observation (PTO)
CLOSE OUT											
Close out of work area (daily)	Sub-standard housekeeping	Employees exposed to minor injuries and tripping hazards due to poor housekeeping	X		X	2	2	M8	Supervisor to ensure proper housekeeping is done prior leaving the site. Appointed supervisor and safety officer to ensure that DSTI is signed off by himself and the safety officer when the shift is completed	Supervisor	Inspection Planned Task Observation (PTO)
	Tools and equipment left on site	Resulting in tools and equipment stolen	X			2	2	M8	Supervisor to ensure no tools and equipment are left on site	Supervisor	Inspection Planned Task Observation (PTO)
Assessment prepared by: Risk Assessor –						Approval by Technical Director/Electrical Engineer:					
Designation:						Designation:					
Signature:						Signature:					
Date:						Date:					
RISK ASSESSMENT TEAM (GREATER TZANEEN MUNICIPALITY)						RISK ASSESSMENT TEAM (GREATER TZANEEN MUNICIPALITY)					

PART G: FUNCTIONALITY EVALUATION

EVALUATION CRITERIA

Responsive tenders will then be evaluated on functionality. The minimum score for functionality is 70%, and a bidder who scores below this minimum shall not be considered for further evaluation in terms of the preference point system.

Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum Score
A	<u>Company Experience</u> Similar experience in the supply and construction of 20MVA and above Substations Appointment letters, Completion certificates , Stamped and signed reference letters must be submitted to score points.	Two (2) projects of similar nature in the supply and construction of 20MVA and above Substations completed.	10	30
		Three (3) projects of similar nature in the supply and construction of 20MVA and above Substations completed	15	
		Four (4) projects of similar nature in the supply and construction of 20MVA and above Substations completed	25	
		Five (5) projects of similar nature in the supply and construction of 20MVA and above Substations completed	30	
		Score Obtained = (Out of 30)		
Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum Score
B ₁	<u>Specific Personnel Knowledge</u> Certified copies of Academic qualification and ID need to be attached for functionality points scoring otherwise no points will be allocated Include the organogram of the project team and no points will allocated if organogram is not attached.	<u>Construction Manager</u> <u>Total Points:15</u>		
		N. Dip: Electrical Engineering with more than 5 years’ experience, AND Curriculum Vitae of Project Manager to be attached for points scoring. Non-submission or submission of only one of the above will result in no points allocated.	5	

		N. Dip: Electrical Engineering with more than 5 years' experience and with valid registration as candidate for Construction Management Professional (SACPCMP), and Curriculum Vitae of Project Manager to be attached for points scoring. Non-submission or submission of only one of the above will result in no points allocated.	10	15
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		B-Tech / BSc in Electrical Engineering with more than 10 years' experience and with valid registration as a Professional Construction Manager with SACPCMP, and Curriculum Vitae of Project Manager to be attached for points scoring. Non-submission or submission of only one of the above will result in no points allocated.	15	
		Score out of 15	=	
Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum score
B ₂	<u>Specific Personnel Knowledge</u> Certified copies of Academic qualification and ID need to be attached for functionality points scoring otherwise no points will be allocated Include the organogram of the project team and no points will be allocated if organogram is not attached.	<u>Project Engineer.</u> <u>Total Points: 15</u> Bachelor's degree in electrical engineering with more than 15 years' experience in the design of power transformer and registered as a Professional Engineer with ESCA and Curriculum Vitae of Project Engineer to be attached for points scoring. Non-submission or submission of only one of the above will result in no points allocated.	15	15
		Score out of 15	=	

Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum score
B₃	<u>Specific Personnel Knowledge</u> Certified copies of Academic qualification and ID need to be attached for functionality points scoring otherwise no points will be allocated Include the organogram of the project team and no points will be allocated if organogram is not attached.	<u>High Voltage/Medium Voltage Construction Supervisor.</u> <u>Total Points: 15</u>		10
		ORHVS Authorized Person (level 1-10) certificates and 5 years' experience working on 20MVA 132/66kV Substation networks.. AND Curriculum Vitae of person to be attached for points scoring. Non submission or submission of one of the above will result in no points allocated.	5	
		ORVHS Authorized Person with (level 1-10) certificates and 10 years' experience working on 20MVA 132/66kV Substation networks. Curriculum Vitae of person to be attached for points scoring. Non-submission or submission of only one of the above will result in no points allocated.	10	
		Score out of 15	= 	

Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum Score
B₄	<u>Specific Personnel Knowledge</u> Certified copies of Academic qualification and ID need to be attached for functionality points scoring otherwise no points will be allocated Include the organogram of the project team and no points will be allocated if organogram is not attached.	<u>Safety Officer: Total Points: 10</u>		15
		No formal qualification.	0	
		Registered with SACPCMP as Construction Health and Safety Agent (CHSA) qualifications with less than 5 years of experience.	10	
		Registered with SACPCMP as Construction Health and Safety Manager (CHSA) qualifications with more than 5 years' experience.	15	
		Score out of 15	= 	

Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight	Maximum Score
C	<u>LIST OF PLANT</u> Tenderer to submit proof of ownership with certificate, not older than three months and in case of hiring, a letter of intent must be submitted with proof of ownership with certification	<u>Required plant</u> <u>Total points:</u> <u>15</u>		
	Bidder will score half points where the total minimum plant required has a letter of intent and also proof of ownership by a rental company. Full points will be obtained for directly owned plant by the Bidder. All testing equipment shall be supported by valid calibration certificates issued by an accredited body, and such certificates shall not be older than twelve (12) months at the time of tender submission.	1 x 50-Ton Mobile Crane Truck Crane Not Provided score =0 Crane Provided score =5 1 x Insulation resistance tester (Tester Not Provided score =0 Tester provided score = 5 1 x Winding resistance Tester Tester Not Provided score =0 Tester Provided score = 3 Transformer Turns Ratio (TTR) test Tester Not Provided score =0 Tester Provided score =2	15	15
		Score out of 15	= 	

N.B Bids scoring less than 70% will not be considered be considered for pricing and specific goals

Key functionality areas	Evaluation Criteria	Scoring Criteria	Weight (max)	SCORED
A	Company Experience	Years, relevance, proofs	30	
B ₁	Specific Personnel Knowledge	Construction Manager	15	
B ₂	Specific Personnel Knowledge	Project Engineer	15	
B ₃	Specific Personnel Knowledge	HV/MV Supervisor	10	
B ₄	Specific Personnel Knowledge	Safety Officer	15	
C	Required Plant	Transport, equipment, machinery	15	
TOTAL WEIGHT IN POINTS			100	
TOTAL FUNCTIONALITY POINTS SCORED				

EVALUATION OF BIDS

N.B: The evaluation of bid will be conducted in two stages. First stage it be the assessment of functionality, there after **only bidders that obtain 70 points will be evaluated in terms of 80/20** Preference point scoring system, where 80 points will be allocated for price only and 20 specific goals points scored.

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)	Means of verification (MOV) for specific goals	
Black People	20		CK, CSD report and Certified Identification documentation	Tick
TOTAL	20			

PART H

MBD 2

TAX CLEARANCE CERTIFICATE REQUIREMENTS

It is a condition of bid that the taxes of the successful bidder must be in order, or that satisfactory arrangements have been made with South African Revenue Service (SARS) to meet

THE BIDDER'S TAX OBLIGATIONS

1 In order to meet the requirements, bidders are required to complete in full the attached form TCC 00. "Application for a Tax Clearance Certificate" and submit it to any SARS branch office nationally. The Tax Clearance Certificate Requirements are also applicable to foreign bidders / individuals who wish to submit bids.

2 SARS will then furnish the bidder with a Tax Clearance Certificate that will be valid for a period of 1 (one) year from the date of approval.

3 The original Tax Clearance Certificate must be submitted together with the bid. Failure to submit the original and valid Tax Clearance Certificate will result in the invalidation of the bid. Certified copies of the Tax Clearance Certificate will not be acceptable.

4 In bids where Consortia / Joint Ventures / Sub-contractors are involved; each party must submit a separate Tax Clearance Certificate.

5 Copies of the TCC 001 "Application for a Tax Clearance Certificate" form is available from any SARS branch office nationally or on the website www.sars.gov.za.

6 Applications for the Tax Clearance Certificates may also be made via e-filing. In order to use this provision, taxpayers will need to register with SARS as e-filers through the website www.sars.gov.za.

PART I

MBD 4

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the bidder or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
- 3 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

3.1 Full Name of bidder or his or her representative:

3.2 Identity Number:

3.3 Position occupied in the Company (director, trustee, hareholder²):

3.4 Company Registration Number:

3.5 Tax Reference Number:

3.6 VAT Registration Number:

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state?

YES / NO

3.8.1 If yes, furnish particulars.....

.....

¹MSCM Regulations: "in the service of the state" means to be –

(a) a member of –

- (i) any municipal council;
- (ii) any provincial legislature; or
- (iii) the national Assembly or the national Council of provinces;

(b) a member of the board of directors of any municipal entity;

(c) an official of any municipality or municipal entity;

(d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);

(e) a member of the accounting authority of any national or provincial public entity; or

(f) An employee of Parliament or a provincial legislature.

² Shareholder" means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.

3.9 Have you been in the service of the state for the past twelve months? ...**YES / NO**

3.9.1 If yes, furnish particulars.....

.....

3.10 Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.10.1 If yes, furnish particulars.

.....

.....

3.11 Are you, aware of any relationship (family, friend, other) between any other bidder and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars

.....

.....

3.12 Are any of the company's directors, trustees, managers, Principle shareholders or stakeholders in service of the state?**YES / NO**

3.12.1 If yes, furnish particulars.

.....

.....

3.13 Are any spouse, child or parent of the company's director's trustees, managers, Principle shareholders or stakeholders in service of the state?

YES / NO

3.13.1 If yes, furnish particulars.

.....

.....

3.14 Do you or any of the directors, trustees, managers, Principle shareholders or stakeholders of this company Have any interest in any other related companies or Business whether or not they are bidding for this contract.

YES / NO

3.14.1 If yes, furnish particulars:

.....

.....

4. Full details of directors / trustees / members / shareholders.

Full Name	Identity Number	State Employee Number

.....
Signature

.....
Date

.....
Capacity

.....
Name of Bidder

PART J

MBD 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.

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

- (a) **“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;
- (b) **“price”** means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) **“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
- (e) **“the Act”** means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

3. FORMULAE 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
$P_s = 80 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$	or	$P_s = 90 \left(1 - \frac{P_t - P_{min}}{P_{min}} \right)$

Where

- P_s = Points scored for price of tender under consideration
- P_t = Price of tender under consideration
- P_{min} = Price of lowest acceptable tender

3.2. FORMULAE 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:

$$\begin{array}{ccc} 80/20 & \text{or} & 90/10 \\ \hline P_s = 80 \left(1 + \frac{P_t - P_{\max}}{P_{\max}} \right) & \text{or} & P_s = 90 \left(1 + \frac{P_t - P_{\max}}{P_{\max}} \right) \end{array}$$

Where

- P_s = Points scored for price of tender under consideration
 P_t = Price of tender under consideration
 $P_{\max}$ = 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)	Means of verification (MOV) for specific goals	
Black People	20		CK, CSD report and Certified Identification documentation	Tick
TOTAL	20			

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:	
	
	
	

PART K

MBD 5 DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (VAT INCLUDED)

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire.

Tenderers are to
circle applicable

- | | | | |
|-----|--|-----|----|
| 1.0 | Are you by law required to prepare annual financial statements for auditing? | YES | NO |
| 1.1 | If YES, you will be required to submit audited annual financial statements (on request during the tender evaluation period) for the past three years or since the date of establishment if established during the past three years. | | |
| 2.0 | Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days? | YES | NO |
| 2.1 | If NO, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days. | | |
| 2.2 | If YES, provide particulars on a letterhead.
(Attach this letter to the back inside cover of this document). | | |
| 3.0 | Has any contract been awarded to you by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract? | YES | NO |
| 3.1 | If YES, provide particulars on a letterhead.
(Attach this letter to the back inside cover of this document). | | |

4.0 Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality / municipal entity is expected to be transferred out of the Republic? YES NO

4.1 If YES, provide particulars on a letterhead.
(Attach this letter to the back inside cover of this document).

I, the undersigned,

certify that the information furnished on this declaration form is correct. I accept that the state may act against me should this declaration prove to be false.

Signature..... Date.....

Position..... Name Of Bidder.....

(of person authorised to sign on behalf of the Tenderer)

PART L

MBD 7.2

CONTRACT FORM - RENDERING OF SERVICES

PART 2 (TO BE FILLED IN BY THE PURCHASER)

1. I..... in my capacity as..... accept your bid under reference numberdated.....for the rendering of services indicated hereunder and/or further specified in the annexure(s).
2. An official order indicating service delivery instructions is forthcoming.
3. I undertake to make payment for the services rendered in accordance with the terms and conditions of the contract, within 30 (thirty) days after receipt of an invoice.

Description of Service	Price (all applicable taxes included)	Completion date	Minimum threshold for local production and content (if applicable)

4. I confirm that I am duly authorized to sign this contract.

Signed at on

Name (print)

Signature

OFFICIAL STAMP

--

WITNESSES

.....

.....

DATE:.....

PART M

MBD 8

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 This Municipal Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a. abused the municipality's / municipal entity's supply chain management system or committed any improper conduct in relation to such system.
 - b. been convicted for fraud or corruption during the past five years.
 - c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - d. Been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004).
- 4 **In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.**

Item	Question	Yes	No
4.1	Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the <i>audi alteram partem</i> rule was applied). The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.1.1	If so, furnish particulars:		

Item	Question	Yes	No
4.2	Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
4.3.1	If so, furnish particulars:		
4.4	Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
4.7.1	If so, furnish particulars:		

CERTIFICATION

I, the undersigned (full name) certify
that the information furnished on this declaration form true and correct. Accept that, in
addition to cancellation of a contract, action may be taken against me should this declaration
prove to be false.

.....
Signature

.....
Date

.....
Designation

.....
Name of Bidder

PART N

MBD 9

CERTIFICATE OF INDEPENDENT BID DETERMINATION

- 1 This Municipal Bidding Document (MBD) must form part of all bids¹ invited.
- 2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
- 3 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
- 4 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
- 5 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid number:

.....

Bid Description:

.....

In response to the invitation for the bid made by **Greater Tzaneen Municipality**

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

I certify, on behalf of:

_____ that:

(Name of Bidder)

1. I have read and I understand the contents of this Certificate.
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect.
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder.
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder.
5. For the purposes of this Certificate and the accompanying bid, I understand that the word “competitor” shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) Has been requested to submit a bid in response to this bid invitation.
 - (b) Could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities, or experience; and
 - (c) Provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. 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 consortium³ will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) Prices.
 - (b) Geographical area where product or service will be rendered (market allocation)
 - (c) Methods, factors or formulas used to calculate prices.
 - (d) The intention or decision to submit or not to submit, a bid.
 - (e) The submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) Bidding with the intention not to win the bid.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.
9. 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 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.

10. 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.

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

PART O: PRICING DATA

PRICING INSTRUCTIONS

1. GENERAL

The pricing instructions describe the criteria and assumptions which will be assumed in the Contract that the Bidder has taken into account when developing his prices.

The terms of payment and the provisions for price adjustment, if applicable, are established in the Contract Data. These items are not described in the Pricing Data.

The Bidder's obligations in pricing the Bidder offer and the Employer's undertakings in the checking and correction of arithmetical errors are dealt with in the Standard Conditions of Bidder contained in Annexure F of SANS 294, as amended in and read in conjunction with the Bidder Data.

The Contractor shall be deemed to have priced for all works (expressly and impliedly) necessary to ensure that the Works are fit for their intended and satisfy the Employer's Requirements stated in Part F:Employer's Requirements of the document.

An item left un-priced shall be deemed to be provided for elsewhere and no claim for additional payment arising from the Contractor's omission to price any item shall be entertained.

2 CONTRACT SUM BREAKDOWN

The Contractor shall provide a breakdown of his rates and prices with his tender showing how the Contract Sum is established.

3. WORKS MEASUREMENT AND PAYMENT

Except for Item 2.1 [Power Transformer] , Works shall be measured and paid according to the Activity Schedule.

Item 2.1 [Power Transformer] shall be measured and paid according to the Progress Payment Milestones below and on satisfaction of the conditions precedent under "Documentation Required for Payment" and provisions of the required guarantees under "Security Required" .

Progress Payment Milestones – 60MVA 132/66/33kV Power Transformer				
Milestone No.	Milestone Description	Payment (%)	Documentation Required for Payment	Security Required
1	Approval of Design, Drawings and Technical Documentation – Submission and approval of GA drawings, detailed design drawings, schematics, datasheets, protection interfaces, and quality documentation.	10	Approved design drawings and technical documentation signed off by the Engineer/Employer.	Not Required
2	Manufacturing Deposit / Commencement of Manufacturing - Procurement of major raw materials and commencement of transformer manufacture.	20	Evidence of procurement of major materials (core steel, copper windings, OLTC, bushings), approved manufacturing programme, and confirmation of commencement of manufacture.	Advance Payment Guarantee Required from the Contractor
3	Successful Completion of Factory Acceptance Tests (FAT) – Completion of routine tests and inspection at manufacturer's works.	30	Approved FAT reports, routine test certificates, and inspection release certificates signed by the Engineer/Employer.	Offsite Material Guarantee Required from the Contractor
4	Delivery of Transformer to Site – Transformer and all associated accessories delivered to site.	10	Delivery notes, packing lists, transport inspection report, and confirmation of receipt at site.	Not Required
5	Installation, Testing and Commissioning – Completion of erection, oil filling, testing and energisation.	20	Site test reports, commissioning certificates, and approval by the Engineer.	Not Required
6	Project Completion	5	Certificate of Completion	Not Required
7	Defects Liability Period / Retention Release – Completion of the defects liability period.	5	Expiry of defects liability period , written confirmation by the Engineer that all defects have been rectified and in terms of clause 6.10.5 of the GCC.	Not Required

CURRENCY

All rates and sums of money quoted shall be in Rand and whole cents. Fractions of a cent shall be discounted.

2. DOCUMENTS MUTUALLY EXPLANATORY

The documents forming the Contract are to be taken as mutually explanatory of one another. The Activity Schedule forms an integral part of the Contract Documents and shall be read in conjunction with the Bidder Data, Contract Data, Employer's Requirements, Site Information General and Special Conditions of Contract, the Specifications and the Drawings.

3. DESCRIPTIONS

Descriptions in the Activity Schedule are abbreviated and comply generally with those in the Standardized Specifications. Clause 8 of each Standardized Specification, read together with the relevant clauses of the Employer's Requirements, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standardized Specification, or the Scope of Work, conflict with the terms of the Activity Schedule, the requirements of the Standardized Specification or Employer's Requirements, as applicable, shall prevail.

5. REFERENCES

The clauses in a specification in which further information regarding the schedule item can be obtained appear under "Reference clause" in the Activity Schedule. The reference clauses indicated are not necessarily the only sources of information in respect of scheduled items. Further information and specifications may be found elsewhere in the contract documents. Standardized Specifications are identified by the letter or letters which follow SABS in the SABS 1200 series of specifications, e.g. G for SABS 1200 G.

6. VALUE ADDED TAX

Value Added Tax shall be excluded from the rates and sums contracted for the various items of work included in the Activity Schedule. VAT will be added as a single entry to the summary.

7. RATES AND PRICES **General**

- a) The Contractor must price each item in the Activity Schedule in **BLACK INK**. Reproduced computer printouts of the Activity Schedule will not be acceptable.

- b) The rates and prices to be inserted in the Activity Schedule shall cover all the services and incidentals for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Bidder is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.
- c) Where the Contractor is required to furnish detailed drawings and designs or other information in terms of the Contract Data, all costs thereof shall be deemed to have been provided for and included in the unit rates and sum amounts contracted for the items scheduled in the Activity Schedule. Separate additional payments will not be made.
- d) A price or rate is to be entered against each item in the Schedule of Activities, whether the quantities are stated or not. An item against which no price is entered will be considered to be covered by the other prices or rates in the Bill. The Contractor will not be paid for items against which no rate or lump sum has been entered in the Bill of Quantities.
- e) Should the Contractor group a number of items and contract one lump sum for such group of items, this single lump sum shall apply to that group of items and not to each individual item.
- f) Should the Contractor indicate against any item that compensation for such item is included in another item the rate for the item included in another item shall be deemed nil.
- g) A submission may be regarded as non-responsive if any rates or lump sums in the Activity Schedule are, in the opinion of the Employer, unreasonable or out of proportion.

8. VARIATION IN TEXT

No alteration, erasure or addition is to be made in the text of the Activity Schedule. Should any alteration, erasure or addition be made, it will not be recognized; the original wording of the Activity Schedule shall be adhered to.

ACTIVITY SCHEDULE

The Contractor shall price the Activity Schedule in full, and no item shall be left unpriced. Any item not priced shall be deemed to be included in other rates and prices.

The rates and prices shall include full compensation for the complete execution of the Works in accordance with the Contract, including all labour, materials, plant, equipment, overheads, risks, and profit.

Notwithstanding any provision to the contrary contained elsewhere in the Contract, all rates and prices shall remain firm and fixed for the duration of the Contract, except to the extent that Contract Price Adjustment (CPA) is expressly provided for and applied in accordance with the relevant provisions of the Contract.

The Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the rates and prices submitted. Accordingly, no claim for additional payment arising from omissions, errors, misinterpretations, incorrect assumptions, or any misunderstanding of the scope of work shall be entertained by the Employer.

SUMMARY ACTIVITY SCHEDULE -REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.		
ITEM	DESCRIPTION	AMOUNT
1	PRELIMINARY AND GENERALS	
2	PRIMARY PLANT EQUIPMENT	
3	CIVIL WORKS	
4	SECONDARY PLANT EQUIPMENT	
5	TESTING AND COMMISSIONING	
6	SPARE PARTS	
7	SUPPLMENTARY OR ANCILLARY WORKS	
	SUB TOTAL A	
	ADD 10% FOR CONTINGENCIES TO BE UTILISED ONLY WITH THE APPROVAL AND AT THE DISCRETION OF THE EMPLOYER	
	SUB TOTAL B	
	ADD 15% VAT	
	TOTAL BID AMOUNT CARRIED TO FORM OF OFFER	
NB TENDERERS MUST INCLUDE IN THEIR PRICE ALL ACCESSORIES, MATERIALS AND OTHER ITEMS DEEMED NECESSARY TO EXECUTE AND SUCCESSFULLY COMPLETE THE PROJECT. NO ADDITIONAL COSTS WILL BE ACCOMMODATED DUE TO OMISSIONS ON THE PART OF THE TENDERER.		

PRELIMINARY AND GENERALS - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1	PRELIMINARY AND GENERAL				
	Amount allowed for all expenses, regarding the following:				
1.1	CONTRACTUAL REQUIREMENTS - FIXED AMOUNT				
1.1.1	Nett price for the fulfilment of the Tender Requirements, Conditions of Contract, Performance Guarantee. Gurantee to remain valid until date of issue of the Final Approval Certificate. (Note : Perfomance guarantee shall be 10% of the Contract Sum)	Sum	1		
1.1.2	Insurance of the Works for the Contract Sum in the joint names of the Employer and Contractor, Third Party Liability Insurance of R5 000 000 , Professional Indemnity Insurance of 10% of the Contract Sum and anysusch other insurances required by the law of South Africa. The Insurance to remain valid until date of issue of the Certificate of Completion.	Sum	1		
1.1.3	Site establishment, which includes, site office, site store, laydown area, temporary housing, security fence, sanitary toilets, obtaining water, electrical connection, etc.	Sum	1		
1.1.4	Determining and locating of existing services	Sum	1		
1.1.5	Survey of Transportation route	Sum	1		
1.1.6	Weeds clearing and herbicide application to the substation	Sum	1		
1.1.7	Medicals and Induction costs both Entry & Exit	Sum	1		
1.1.8	Protective Equipment Clothing for all workers	Sum	1		
1.2	COMPLY WITH THE FOLLOWING SAFETY, HEALTH, ENVIRONMENTAL AND QUALITY (SHEQ) REQUIREMENTS-FIXED AMOUNT				
1.2.2	Adherence to Construction Regulations of the OHSA	Sum	1		
1.2.3	Compile a Health and Safety Plan (H & S Plan)	Sum	1		
1.2.4	Compile a Risk Assessment for activities (RA)	Sum	1		
1.2.5	Comply with Environmental Management Plan (EMP)	Sum	1		
1.2.6	Compile a SHEQ File to also include all the above in distinct sections	Sum	1		
1.2.7	Compile a detailed Quality Control Program for construction activities.	Sum	1		
1.3	TIME RELATED COSTS				
	The running cost of the project related to the contract period.				
1.3.1	Overhead costs including supervision, site facilities, utilities, transport and general site management for the entire duration of the contract.	Sum	1		
1.3.2	Security for site camp and work areas including 24-hour armed security for the protection of personnel, plant, equipment and materials for the entire duration of the contract.	Sum	1		
1.4	PROVISIONAL SUMS & TRAINING				
1.4.1	Provide training for the Employer's personnel on the operation, maintenance and protection systems of the installed substation equipment, including demonstration, training materials and user manuals.	Sum	1		
1.4.2	Provisional Sum: Allow for travel, accommodation and associated expenses for the Employer and/or the Employer's Representative to attend and witness Factory Acceptance Tests (FAT) at the manufacturer's works.	Prov Sum	1	R 150 000,00	R 150 000,00
1.4.3	Provisional Sum: Allow for provision of facilities for the Engineer and/or the Engineer's Representative during the execution of the works	Prov Sum	1	R 50 000,00	R 50 000,00
	SUBTOTAL OF ITEM 1 CARRIED OVER TO SUMMARY				

PRIMARY PLANT EQUIPMENT- REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.						
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL	
2	PRIMARY PLANT EQUIPMENT					
	POWER TRANSFORMER					
	<u>Design, Manufacture, Supply, Deliver, Install, Test and Cold Commissioning</u>					
	Design, Manufacture and Supply of a 60MVA, 132/66/33 kV, 3 winding YNa0d1 (Vector group) , ONAN/ONAF Power Transformer complete with Automatic On Load Tap Changer (OLTC). The transformer shall comply with IEC 60076 and Eskom Standards 240-68973110 and shall include the following accessories: • Buchholz relay • Automatic OLTC complete with Automatic Voltage Regulator (AVR) panel • Tap changer position indicator • Magnetic oil level gauge • Pressure relief device • Winding temperature indicator with minimum of 4 contacts • Oil temperature indicator • Online dissolved gas analyser • Marshalling kiosk with IEC61850 communication interface • Silica gel breather • Conservator tank with diaphragm • Oil surge relay • 132kV and 66kV Surge arrestors complete with counters • 132kV , 132kV (Neutral Bushing), 66kV and 33kV Bushings • Current Transformers (CTs) in bushings • Radiator Tanks complete with cooling fans • Transformer base frame / skid compatible with existing plinth, jacking pads, hauling eyes, lifting lugs and earthing terminals. The new transformer must match the characteristics of the old transformer that needs to be replaced in terms of weight, dimensions , oil capacity , bushings and surge arrestors positioning and arrangement to ensure that the transformer fits within the spaces constrains of the existing infrastructure. It is the contractors responsibility to verify the limitations onsite . Any deviations will be at the Contractor's cost risk. Factory Acceptance Testing (FATs) of the Power Transformer in accordance with IEC 60076, comprising: Routine tests The following mandatory routine, type and special tests shall be performed on the transformer at the manufacturer's works as a minimum, in accordance with the relevant IEC standards: Mandatory Routine Electrical Measurements in accordance with IEC 60076-1 • Winding resistance on all taps & phases • Voltage ratio & polarity verification on all tap positions, all three phases • Short-circuit impedance & load loss on principal tap and min. 2 other taps • No-load loss & excitation current at rated voltage • Zero-sequence impedance on HV/MV, HV/LV & MV/LV winding pairs Mandatory Routine Dielectric & Insulation Tests in accordance with IEC 60076-3 and IEC 60137 • Insulation resistance (Megger) on all windings to earth & between windings at 5 kV DC • Tan delta (dissipation factor) all windings and bushings (Not mandatory as per IEC but recommended for this contract) • Bushing power factor & capacitance measurement • Separate source (applied voltage) AC withstand test on each winding • Induced AC overvoltage withstand test (twice rated voltage, 60 s) • Partial discharge (PD) measurement during induced AC withstand mandatory at Um ≥ 72.5 kV Mandatory OLTC Routine Tests (IEC 60214-1) • OLTC mechanical operation test for full tap range cycling (min. 5 full cycles) • OLTC switching sequence verification • OLTC contact resistance measurement • OLTC dielectric tests Mandatory Type Tests (Reports to be Submitted or Witnessed) • Temperature rise (heat run) at rated ONAF load with direct hot-spot measurement using fibre-optic sensors per IEC 60076-7, IEC 60076-2 and IEC 60076-7 • Lightning impulse :full wave & chopped wave on HV and MV line terminals per IEC 60076-3 • Switching impulse test on HV terminals (mandatory for Um = 123 kV class) per IEC 60076-3 • Short-circuit withstand test (or analytical assessment with supporting calculations) per IEC 60076-5 • Acoustic noise level measurement per IEC 60076-10 (Not mandatory per IEC but required for this contract) • Tank vacuum type test to 1.5 kPa per IEC 60076-1 • Tank hydraulic pressure type test per IEC 60076-1 Mandatory Special Tests in accordance with IEC 60076-18 and IEC 61869 • Sweep Frequency Response Analysis (SFRA) baseline fingerprint at FAT using Doble M5000 to be stored as reference record IEC 60076-18 • SFRA repeated at each transport stage & on-site after installation using Doble M5000; formal comparison report against FAT baseline to be submitted • Mandatory Routine Oil Tests • Oil dielectric strength (breakdown voltage) per IEC 60156 • Oil moisture content measurement per IEC 60814 and IEC 60422 • Dissolved gas analysis (DGA) : Oil sample taken after heat run or immediately before dispatch per IEC 60567 and IEC 60599 Mandatory Protection, Control & Alarm Device Functional Tests in accordance with IEC 60076 -1 • Buchholz relay functional operation test (alarm & trip) • Pressure relief device (PRD) functional test • Oil temperature indicator (OTI) calibration & alarm/trip setpoints • Winding temperature indicator (WTI) calibration & alarm/trip setpoints • Oil level gauge functional and visual inspection • Cooling fan controls : auto/manual operation, alarm & trip functions All FATs shall witnessed by the Employer and or his representatives at an ISO 9001 certified manufacturer's workshop/plant and a minimum of four weeks' notice from the Contractor will be required. Delivery and offloading of the Power Transformer to site, including: • All route surveys and Abnormal load permits and statutory notifications • Provision of an appropriate specialist transport vehicle and crane vehicle sized to manoeuvre within the constraints of the existing substation access road • Sweep frequency response analysis (SFRA) using Doble M5000 at point of loading and immediately following offloading, and offloading of the transformer directly onto the existing prepared plinth • All associated lifting equipment, rigging, and supervision by certified and qualified riggers. Erection and installation of the Power Transformer onto the existing prepared plinth, including: • Alignment and levelling of the transformer base frame, • Installation and torquing of holding down bolts to manufacturer's specified torque values and Connection of all HV, MV and LV bushing connections, • Installation of all cooling equipment, pipework, valves and fittings, connection of all auxiliary equipment including conservator tank, buchholz relay, pressure relief device, oil temperature indicators, winding temperature indicators and marshalling kiosk and Oil filling ,processing to specified dielectric strength and Reinstatement of all oil sampling and filtration valves, and • Installation and connection of earthing conductors to the transformer tank, core and neutral earthing, • Completion of all pre-commissioning checks in accordance with the manufacturer's erection and installation manual, all by competent and experienced transformer erection personnel. Cold Commissioning & Site Acceptance Testing Tests shall be in accordance to specifications requirements found under Section 3.11.1 Transformer SAT of the bid document					
2.1		Sum	1			

2.2	NECRT				
2.2.1	Design, Manufacture and Supply of a 100kVA 33/0.4kV NECRT Dyn11 Short time current of 360A/10s, 15A Continuous Current, zero sequence impedance of 78.2 ohms, Resistance at 100 degree Celsius = 53,3 ohms including cable and terminations of the NECRT to the 33kV bushing of the Main Power Transformer. The NECRT shall come complete with a mounting steel structure and core balancing CTs.	Sum	1		
2.2.2	Factory Acceptance Testing (FATs) of the NECRT in accordance with IEC 60076, comprising: Routine Tests (Mandatory) IEC 60076-1 & IEC 60076-6 • Winding resistance measurement • Voltage ratio and vector group verification • Short-circuit impedance and load loss • No-load loss and no-load current • Applied voltage withstand test • Induced voltage test • Zero-sequence impedance measurement • Oil dielectric strength test (mandatory only if oil-filled) • Tank leak test (mandatory only if oil-filled) Type Tests (Mandatory) IEC 60076-1 & IEC 60076-6 • Temperature rise test • Lightning impulse test (LI) • Short-time current withstand All FATs shall witnessed by the Employer and or his representatives at an ISO 9001 certified manufacturer's workshop/plant and a minimum of four weeks' notice from the Contractor will be required.	Sum	1		
2.2.3	Delivery and offloading of the NECRT to site, including all transport arrangements, provision of appropriate vehicle and lifting equipment, and offloading of the NECRT to its final position, including all rigging and supervision by certified and qualified riggers.	Sum	1		
	Install				
2.2.4	Erection and installation of the NECRT onto its prepared plinth and steel support structure, including alignment and levelling of the base frame, installation and torquing of holding down bolts to manufacturer's specified torque values, connection of all HV and LV terminals, installation and connection of all auxiliary equipment and monitoring devices, connection of earthing conductors to the NECRT tank and neutral point, completion of all pre-commissioning checks, and reinstatement of all valves and fittings in accordance with the manufacturer's erection and installation manual, all by competent and experienced installation personnel.	Sum	1		
2.3	Clamps and Conductors				
2.3.1	Supply, delivery and installation of ACSR Bull conductor droppers from the 66 kV and 132 kV busbars to the transformer 132kV & 66kV bushings, including all associated tensioning and termination fittings, and all necessary live line or outage coordination for connection to the existing energised busbars, installed and tensioned in accordance with the conductor manufacturer's specifications and applicable Greater Tzaneen Municipality standards.	m	100		
2.3.2	Supply, delivery and installation of Aluminium tubular conductor from the 132 kV transformer bushings to the post insulators, including all associated end caps, flange fittings, expansion joints where required, and installation in accordance with the conductor manufacturer's specifications and applicable Greater Tzaneen Municipality requirements.	m	50		
2.3.3	Supply, delivery and installation of all clamps and connectors for the attachment of ACSR droppers and aluminium tubular conductor to the 66 kV busbar, 132 kV post insulators, transformer HV bushings and surge arresters, including all associated bolts, washers, anti-corrosion compound and hardware, installed and torqued in accordance with manufacturer's specifications and applicable Municipal requirements.	Sum	1		
2.3.4	Supply, delivery and installation control cables and terminations from the transformer marshalling kiosk to the transformer protection panel, comprising 2.5 mm² Class 2 stranded plain annealed copper conductor, XLPE insulated, multicore, overall copper tape screened, galvanised steel wire armoured, PVC outer sheathed, 600/1000 V rated control cable complying with IEC 60502-1 and SANS 1507, including all associated cable glands, lugs, ferrules, cable markers, termination ferrules, and cable support and cleating at required intervals, installed, glanded, terminated, ferruled and tested in accordance with the project specification and applicable standards. Cable run length between transformer and control room is approximately 100 meters.	Sum	1		
2.3.5	Supply, delivery and installation of a 25m three-core 95 mm² stranded copper conductor, XLPE insulated, copper wire screened, HDPE outer sheathed, 19/33 kV rated cable and terminations for the connection of the NECRT to the 33kV neutral bushing of the Main Power Transformer, complying with IEC 60502-2 and SANS 1339, including all associated cable glands, lugs, heat shrink or cold shrink termination kits, cable support and cleating at required intervals, earth continuity bonding of cable screen, and testing of the completed cable installation including insulation resistance and high voltage pressure testing, installed and terminated in accordance with the cable manufacturer's specifications, project specification and applicable IEC standards.	Sum	1		
2.3.6	Supply, delivery and installation of earth bonding conductors for the connection of the Power transformer tank, neutral point, cable screens and NECRT to the existing substation earth mat, using bare copper conductors of minimum 70 mm² cross-section, including all associated compression lugs, bolted clamp connections, exothermic welded connections to the earth mat where required, and earth continuity testing of all bonding connections upon completion, installed in accordance with IEC 61936-1, SANS 10198.	Sum	1		
	SUBTOTAL OF ITEM 2 CARRIED OVER TO SUMMARY				

CIVIL WORKS - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
3.	CIVIL WORKS				
3.1	Foundation investigation ,inspection and repair of the existing concrete transformer plinth, including detailed visual and physical condition assessment, crack mapping, cleaning and preparation of all defective surfaces, crack injection or routing and sealing using appropriate epoxy or polyurethane resin systems, breaking out and reinstating any spalled or delaminated concrete, surface grinding and levelling to achieve the required surface flatness and level tolerance for transformer installation, application of surface hardener or protective coating where required, and final inspection and sign-off by a competent ECSA Registered Civil Engineer, all in accordance with the project specification and applicable concrete repair standards	Sum	1		
3.2	Inspection, removal and replacement of all damaged, cracked or deteriorated brickwork to the transformer oil containment bund wall, including breaking out and removal of defective bricks and mortar, rebuilding of all affected sections using clay or concrete masonry units to match the existing construction, repointing of all joints with oil-resistant mortar, application of oil-resistant waterproof render or coating to all internal bund wall faces and floor where required, reinstatement of the oil drain sump and pipework where disturbed, and final inspection to confirm the integrity and oil-tightness of the completed bund, all in accordance with the project specification and applicable standards	Sum	1		
3.3	Inspection, installation or refurbishment of the oil drainage pipework connecting the transformer bund to the existing oil containment dam, including removal and replacement of any damaged, corroded or blocked pipework sections, supply and installation of all new pipes, fittings, valves and isolation points, cleaning and flushing of retained pipework, reinstatement of all pipe supports and brackets, sealing of all penetrations through the bund wall, testing of the completed drainage system for flow and oil-tightness, and final inspection to confirm satisfactory drainage from the bund to the oil containment dam, all in accordance with the project specification and applicable environmental and drainage standards.	Sum	1		
3.4	Design ,Supply, construct and install NECRT reinforced concrete plinth for substation equipment including excavation to required depth, formwork, steel reinforcement, concrete casting, embedded anchor bolts, earthing inserts, levelling, curing, backfilling and compaction.	Sum	1		
	SUBTOTAL OF ITEM 3 CARRIED OVER TO SUMMARY				

SECONDARY PLANT EQUIPMENT - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
4	TRANSFORMER PROTECTION PANEL				
	<u>Supply</u> Design, manufacture and supply of Protection Panel for the three-winding power transformer, comprising a full protection scheme including one Main Protection Relay, one Back-Up Protection Relay and one OLTC Voltage Regulator and Tap Changer Control Relay, complete with all associated auxiliary relays, measuring instruments, control switches, indication lamps, wiring, termination facilities, busbars and panel wiring in accordance with the project specification and applicable IEC standards. The Contractor shall carry out a detailed measurements and inspection of the existing control room and panel dimensions prior to design and manufacture to ensure the new panel dimensions are fully compatible with the existing control room constraints, panel arrangement and cable entry provisions. Any deviations from the required dimensions or incompatibilities identified after award that result in additional works or modifications shall be entirely at the Contractor's risk and cost, with no additional claims entertained by the Employer. Main Protection Relay (IED 1 : SEL 487) : Transformer Differential and Buchholz This will be a numerical IED providing main transformer protection. The minimum protection functions shall include but not limited to: • Percentage biased differential protection (87T) with variable slope characteristic • Second and fifth harmonic restraint to prevent false tripping on magnetising inrush • Through-fault stability confirmed by the relay manufacturer's application guide for the transformer impedance • Restricted earth fault (REF) protection on the 132kV HV star winding (64REF) • Hardwired binary inputs for all Buchholz relay contacts (main tank alarm and trip, OLTC surge trip), PRD trip, OTI trip, and WTI trip from the marshalling kiosk • All above input signals shall initiate a trip of both the 132kV and 66kV circuit breakers and shall latch in the relay event log • Integrated disturbance recorder: minimum 8 analogue channels and 16 binary channels, 100ms pre-fault recording, records stored in the relay for retrieval via the relay front panel or communication port • Event log: minimum 1 000 date- and time-stamped events • LED indication on the relay front face for: differential trip, REF trip, Buchholz alarm, Buchholz trip, PRD trip, OTI alarm, OTI trip, WTI alarm, WTI trip • IEC 61850 GOOSE and MMS communication interface (RJ45 or fibre), or IEC 60870-5-103 serial interface as a minimum, for future SCADA integration 4.1 Backup Protection Relay (IED 2 : SEL 451) : Overcurrent, Earth Fault and Thermal The separate numerical IED shall provide independent backup protection. Minimum protection functions shall include but not limited to: • Three-phase IDMTL overcurrent protection (51) on the 132kV side with selectable IEC standard or definite time characteristic • Earth fault protection (51N/51G) on the 132kV side with IDMTL and definite time stages • Three-phase overcurrent protection (51) on the 66kV side (definite time) • Earth fault protection (51N) on the 66kV side • Thermal overload protection (49) with biased thermal model, adjustable time constants, and pre-load memory; alarm and trip contacts; output to initiate forced cooling fans in the marshalling kiosk • Negative sequence / unbalance detection (46) with alarm and trip • Undervoltage (27) and overvoltage (59) protection stages on the 66kV side • All overcurrent and earth fault settings shall be coordinated with the upstream Eskom protection and downstream municipal feeder protection per the approved protection settings schedule • Integrated disturbance recorder: minimum 4 analogue channels and 16 binary channels • Separate trip output contacts for 132kV circuit breaker and 66 kV circuit breaker trip coils OLTC Voltage Regulator and Tap Changer Control Relay (SEL 2141) • A dedicated tap changer control relay (AVR/VReg) shall be provided on the protection panel to control the OLTC in automatic voltage regulation mode. The relay shall include but not limited to: • Automatic voltage regulation (AVR) mode: maintains the 66kV secondary busbar voltage within the set-point deadband by initiating tap raise or lower commands to the OLTC motor drive • Line drop compensation (LDC) to compensate for distribution feeder impedance where required • Tap raise / lower / auto / manual control switches on the panel front face • Tap position display on the panel front face (numeric LED or LCD) • High and low voltage alarm outputs (visual and potential-free contacts for SCADA) • OLTC blocked / run indication on panel front face • Parallel transformer operation mode capability (circulating current or master-follower) compatible with T1 and T3 tap changer control relays, to allow load sharing between all three transformers • Operation counter with alarm output for OLTC maintenance scheduling	Sum	1		

4.2	Factory Acceptance Testing of the Protection Panel at the manufacturer's workshop/Plant, comprising of the following: Prior to dispatch of the protection panel, the Contractor shall carry out a Factory Acceptance Test (FAT) in accordance with IEC 62271-200 and IEC 60255-27. The FAT shall comprise mandatory routine tests on the assembled panel, mandatory routine test certificate submission for all individual relays, and witness tests as specified herein. Test results shall be recorded on approved test sheets and signed by both parties. No panel shall be released for shipment until all FAT requirements have been satisfied and written acceptance issued by the Employer. Relay Manufacturer Routine Test Certificates Prior to the FAT, the Contractor shall submit IEC 60255-27 routine test certificates issued by the relay manufacturer for every protection and control relay on the equipment list, including as a minimum: Transformer differential protection relay Backup protection and control relay Automatic voltage regulator and tap change relay Certificates shall confirm that each relay has passed the following routine tests at component level per IEC 60255-27: Visual inspection and workmanship verification Functional and operational test including pick-up, drop-off and output contact verification Power frequency voltage test 2 kVac for 1 minute Insulation resistance test minimum 100 MΩ at 500 Vdc Burden and power consumption verification No relay shall be accepted into the panel build without a valid manufacturer routine test certificate. Certificates shall be included in the FAT documentation pack. Panel Mandatory Routine Tests The following mandatory routine tests shall be performed on the fully assembled panel in accordance with IEC 62271-200 and IEC 60255-27: Visual Inspection (IEC 62271-200) Workmanship, labelling and build quality inspected against approved drawings Nameplate data verified against specification Enclosure ingress protection confirmed - minimum IP51 per IEC 60529 Workmanship, labelling and build quality inspected against approved drawings Nameplate data verified against specification Enclosure ingress protection confirmed - minimum IP51 per IEC 60529 Power Frequency Voltage (Dielectric) Test (IEC 62271-200 and IEC 60255-27) All control and auxiliary circuits - 2 kVac for 1 minute CT secondary circuits - 500 Vdc with shorting links inserted No flashover, breakdown or puncture permitted All control and auxiliary circuits 2 kVac for 1 minute CT secondary circuits - 500 Vdc with shorting links inserted No flashover, breakdown or puncture permitted Insulation Resistance Test (IEC 60255-27 Cl. 6.4 / IEC 61869-2) All circuits to earth 1 kVdc for 1 minute, minimum 100 MΩ CT secondary circuits 500 Vdc, minimum 10 MΩ Wiring Verification (IEC 62271-200 Cl. 6.5 / IEC 60255-27 Cl. 6.2) CT secondary circuits 500 Vdc, minimum 10 MΩ 100% point-to-point wiring continuity against approved schematic drawings Correct termination of all conductors verified DC auxiliary supply polarity confirmed at all relay terminals Functional Verification of Auxiliary Circuits (IEC 62271-200 and IEC 60255-27) Operation of all trip, alarm and indication output contacts verified Correct operation of all panel-mounted switches, push-buttons and indicators Auxiliary supply voltage confirmed within rated tolerance at all devices Witness Tests The following tests are required by the Employer over and above the mandatory routine tests and shall be performed at FAT in the presence of the Employer's representative: Secondary Injection : Protection Relay Functional Tests (IEC 60255 series) All configured protection elements shall be verified using a calibrated secondary injection test set Main relay functional testing of all protection elements Back up relay functional testing of all protection elements OLTC voltage regulator and tap changer control relay functional testing of all protection elements AVR & Tap Changer Control Verification (IEC 60214-1, IEC 60255-181) AVR regulation function in auto mode Voltage band, deadband and OLTC step response Auto/manual changeover bumpless transfer confirmed Tap-change lockout on protection operation interlock and indicator lamp verified Supervisory isolating switch (SIS) and mechanism isolating switch (MIS) interlock logic Tri-neutral close (TNC) selector switch logic verified End-to-End Scheme Test (IEC 60255-27) Simulated fault injection correct trip output, correct indication, no spurious operations All protection functions verified to drive and latch master trip indication Panel-not-healthy (PNH) watchdog verified on DC supply failure and relay dropout Auxiliary supply dip test no spurious trip during 20 ms supply interruption Documentation The following documentation shall be compiled by the Contractor and submitted to the Employer as part of the FAT pack: Relay manufacturer routine test certificates Completed and signed FAT test sheets for all tests As-built wiring diagrams marked up with any deviations from issued-for-construction drawings Relay configuration files and setting schedules as programmed and tested Communications configuration files and signal schedules as tested All FATs shall be witnessed by the Employer and/or his representatives at an ISO 9001 certified manufacturer's workshop/plant and a minimum of four weeks' notice from the Contractor will be required.	Sum	1	
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4.3	Delivery and offloading of the Protection Panel to site, including all transport arrangements with due care taken to protect the panel and all internal equipment from damage during transit and handling, provision of appropriate vehicle and lifting equipment, offloading and positioning of the panel within the existing control room, by certified and qualified personnel.	Sum	1		
	Install				
4.4	Erection, installation , programming and interface of the Protection Panel within the existing control room, including positioning and bolting down of the panel to the floor or existing panel framework, levelling and alignment with adjacent panels, connection and termination of the panel 110V DC supply from the existing Battery Trip Unit (BTU), testing of the DC supply voltage and polarity prior to energisation, and confirmation of correct operation of all panel equipment following energisation, all in accordance with the manufacturer's installation instructions, project specification and applicable standards.	Sum	1		
	SUBTOTAL OF ITEM 4 CARRIED OVER TO SUMMARY				

TESTING AND COMMISSIONING - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
5	TESTING AND COMMISSIONING				
5.1	Site Acceptance Tests				
	Earthing				
5.1.1	Earth continuity testing to verify that all equipment is bonded to the earth mat and forms a continuous low-resistance electrical path to the ground . Testing shall include verification of continuity between the transformer tank and earth mat, transformer neutral and earth mat, marshalling kiosk and earth mat, surge arresters and earth mat, and all other bonded metallic structures. Testing shall be carried out using calibrated instruments suitable for low-resistance continuity measurement, with the measured resistance between any bonded equipment and the earth mat not exceeding 0.5 Ω . The Contractor shall submit a comprehensive earth continuity test report to the Employer upon completion, all shall be done in accordance with IEC 61936-1 , SANS 10199 and the project commissioning specification.	Sum	1		
	NECRT				
5.1.2	Site Acceptance Testing of the NECRT and associated MV cable, upon completion of installation and prior to energisation, comprising: • Insulation resistance testing of the NECRT windings and MV cable at minimum 5 kV DC, with results compared against factory baseline values; • High voltage withstand testing of the MV cable and terminations using VLF AC (0.1 Hz) at $1.5 \times U_0$ for 60 minutes in accordance with IEC 60502-2; • Zero sequence impedance measurement and verification against the specified value of 78.2 ohms; • Winding resistance measurements on all windings, compared against factory acceptance test results; • Voltage ratio check on all tap positions, within $\pm 0.5\%$ of the declared ratio; • Vector group confirmation; and • Functional testing of all alarm and trip contacts and monitoring devices, all conducted using calibrated test equipment by competent and experienced commissioning personnel in accordance with IEC 60076-1, IEC 60076-3, and IEC 60502-2, with all test results documented and submitted to the Employer in a Site Acceptance Test report.	Sum	1		
	ElectroMechanical Works				
5.1.3	Site Acceptance Testing of all busbars, conductor droppers and aluminium tubular conductors upon completion of installation and prior to energisation, comprising visual inspection of all conductor installations, clamp connections, terminations and hardware for correct installation and torquing, insulation resistance testing of all busbar and conductor sections, contact resistance testing of all clamp and bolted connections using a calibrated micro-ohmmeter, verification of all conductor sag and tension against acceptable values, confirmation of correct phase identification and labelling, and clearance verification of all conductors and busbars against earthed structures and adjacent live equipment in accordance with the applicable GreaterTzaneen minimum clearance requirements, all conducted using calibrated test equipment by competent and experienced commissioning personnel, with all test results documented and submitted to the Employer in a comprehensive Site Acceptance Test report	Sum	1		
	Control Cabling				
5.1.4	Site Acceptance Testing of all control cabling and terminations upon completion of installation and prior to energisation, comprising: • Visual inspection of all cable installations, • Cable routes, support and cleating, gland and termination arrangements, • Insulation resistance testing of all control cable cores and screens at 500 V DC, • Loop and continuity testing of all cable cores. • Verification of all ferrule and cable marker labelling • Screen and armour earth continuity testing, and • Functional end-to-end testing of all control, protection, alarm and trip circuits from the transformer marshalling kiosk to the transformer protection panel, all conducted using calibrated test equipment by competent and experienced commissioning personnel in accordance with IEC 60502-1 and the project commissioning specification, with all test results documented and submitted to the Employer in a comprehensive Site Acceptance Test report.	Sum	1		

5.1.5	Protection Panel Site Acceptance Testing of the protection panel shall be carried out upon completion of installation and prior to energisation of the transformer. All tests shall be performed by competent and experienced protection commissioning personnel using calibrated test equipment with current calibration certificates traceable to national standards. The SAT shall be conducted in accordance with IEC 60255-27, IEC 62271-200, IEC 61869-2/3, IEC 60255-187-1, IEC 60255-187-3, IEC 60255-151 and IEC 60214-1, and the project commissioning specification. The Contractor shall submit a SAT procedure for approval no less than 21 days prior to commencement of testing. No energisation of the transformer shall take place until all pre-energisation SAT tests have been completed satisfactorily and written acceptance issued by the Employer. All test results shall be documented and submitted to the Employer in a comprehensive SAT report within 14 days of test completion. All test records shall be retained for a minimum period of 10 years. Visual Inspection & Installation Check (IEC 62271-200) • Panel installation, earthing and cable entry inspected against approved as-built drawings • All external cabling terminations and wiring verified for correctness and workmanship • Confirmation that all FAT test links, shorting plugs and temporary wiring have been removed • Nameplate and labelling verified against final as-built documentation • Enclosure integrity and ingress protection confirmed DC Supply Verification (IEC 60255-27) • 110 V DC supply voltage and polarity from the existing Battery Trip Unit (BTU) confirmed at panel terminals and at all relay auxiliary supply inputs, within rated tolerance • Correct fuse and MCB ratings confirmed throughout DC distribution • DC earth fault detection system verified operational Insulation Resistance Testing (IEC 60255-27 / IEC 61869-2/3) • All CT secondary cables to earth 500 Vdc, minimum 10 MΩ (shorting links inserted) • All VT secondary cables to earth 500 Vdc, minimum 10 MΩ • All DC control cables to earth 1 kVdc for 1 minute, minimum 100 MΩ • All AC auxiliary cables to earth 500 Vdc, minimum 10 MΩ CT & VT Circuit Verification (IEC 61869-2 / IEC 61869-3) These tests are mandatory prerequisites to all secondary and primary injection testing and shall be completed and accepted before injection testing commences. • CT ratio, polarity and magnetisation curve verified at each installed CT • CT secondary loop resistance measured and burden confirmed within rated capacity • All CT secondary circuits confirmed earthed at one point only; no CT secondary circuit to be left open-circuited • VT ratio, polarity and phase rotation confirmed correct at relay terminals • VT secondary voltage magnitude confirmed correct under no-load conditions • VT fuse and MCB ratings confirmed correct against burden Secondary Injection Tests (IEC 60255 series) All configured protection elements shall be verified by secondary injection through the installed CT and VT circuits using a calibrated secondary injection test set, and confirmed correct against the approved relay settings: Trip Circuit & Circuit Breaker Verification (IEC 60255-27 / IEC 62271-100) • Complete trip circuit continuity verified from each relay output contact through to the associated HV and MV circuit breaker trip coils • Each protection function verified to energise the correct trip coil • Circuit breaker trip and close times measured and confirmed within manufacturer specification • Breaker status and position indication • Breaker auxiliary contact states verified correct in panel indication and interlock circuits • Emergency trip push-button verified to trip associated breakers directly OLTC, AVR & Tap Changer Control Testing (IEC 60214-1 / IEC 60255-181) • Emergency trip push-button verified to trip associated breakers directly • OLTC mechanical operation verified through full tap range in both raise and lower directions • AVR auto-regulation function verified voltage band, deadband and step response confirmed against settings • Manual tap change operation verified from panel and from remote • Auto/manual changeover verified bumpless transfer confirmed All OLTC interlock and lockout logic verified including: • Auto/manual changeover verified bumpless transfer confirmed • Tap-change lockout on protection operation • Supervisory isolating switch (SIS) interlock • Mechanism isolating switch (MIS) interlock • Tri-neutral close (TNC) selector logic Parallel operation settings verified where applicable	Sum	1		
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	Bund wall oil-tightness test (flood test) to verify no leaks following repair				
5.1.6	Site Acceptance Testing of the transformer oil containment bund following completion of all repair and reinstatement works, comprising a flood test by filling the bund with water to the maximum design oil retention level and retaining for a minimum period of 24 hours, visual inspection of all bund wall faces, floor, joints, penetrations and drainage pipework connections for any signs of leakage or seepage during and upon completion of the flood test, measurement and recording of water level at commencement and conclusion of the test to confirm no measurable loss, reinstatement of the drainage valve to the closed position prior to testing and confirmation of valve operation following test completion, draining and drying of the bund upon satisfactory completion of the test, and submission of a flood test report to the Employer confirming the bund is oil-tight and fit for purpose, all in accordance with the project specification and applicable environmental standards.	Sum	1		
	Oil drainage pipe flow test to confirm free drainage to the oil containment dam				
5.1.7	Site Acceptance Testing of the oil drainage pipework connecting the transformer bund to the oil containment dam, comprising visual inspection of all pipework, fittings, valves, supports and penetrations, functional testing of all isolation and drain valves to confirm correct operation, flow testing by introducing a measured volume of water into the bund and opening the drain valve to confirm free and unobstructed drainage to the oil containment dam, confirmation that no blockages, restrictions or reverse gradients are present along the full length of the drainage pipework, inspection of the oil containment dam to confirm receipt of flow and correct discharge point, reinstatement of the drain valve to the normally closed position upon completion of testing, and submission of a drainage flow test report to the Employer confirming satisfactory drainage from the bund to the oil containment dam, all in accordance with the project specification and applicable environmental and drainage standards.	Sum	1		
	Transformer plinth level and dimensional check post-installation				
5.1.8	Site Acceptance Testing of the transformer plinth following completion of all repair and reinstatement works and prior to transformer installation, comprising dimensional survey of the plinth to verify length, width and height against the new transformer base frame dimensions and manufacturer's installation requirements, level survey of the plinth surface using a calibrated optical or digital level to confirm surface flatness and level tolerance is within the manufacturer's specified limits, verification of holding down bolt positions, projections and thread conditions against the transformer base frame drilling pattern, confirmation of adequate plinth surface hardness and integrity following all repair works, and submission of a plinth dimensional and level survey report to the Employer confirming the plinth is acceptable for transformer installation, all conducted using calibrated survey equipment by a competent person in accordance with the manufacturer's installation manual and project specification.	Sum	1		
	Surge Arrestors				
5.1.9	Site Acceptance Testing of all surge arrestors upon completion of installation and prior to energisation, comprising: • Visual inspection of all surge arrester installations, mountings, connections and earth bonds, • Insulation resistance testing of each surge arrester using a calibrated high voltage insulation resistance tester to confirm integrity of the arrester housing and internal elements, • Leakage current measurement of each surge arrester to confirm values are within the manufacturer's specified limits, • Verification of correct phase identification and labelling, • Confirmation of correct installation orientation and earthing of the arrester counter and leakage current monitor where fitted, and • Submission of a surge arrester SAT report to the Employer including all measured insulation resistance and leakage current values and pass/fail assessment against the manufacturer's acceptance criteria, all conducted using calibrated test equipment by competent and experienced commissioning personnel in accordance with IEC 60099-4 and the project commissioning specification.	Sum	1		

	Testing of Existing T2 Transformer Bay Equipment				
5.2	The Contractor shall carry out testing of the existing equipment installed on the T2 feeder bay. This shall include testing of the existing 132 kV and 66 kV primary plant equipment, comprising circuit breakers, current transformers, voltage transformers and isolators, together with all associated junction boxes, marshalling kiosk, and all control and auxiliary cabling between the transformer bay and the control room. The testing shall include all functional and operational checks necessary to verify and confirm the integrity of the equipment for continued reuse. The Contractor shall satisfy itself that the existing equipment is fit for purpose and suitable for continued service. The Contractor shall take full responsibility for the complete transformer bay installation, including both the existing equipment and the new equipment, being the transformer, NECRT and all associated equipment. The tests shall demonstrate compliance of the equipment with the applicable IEC standards and shall include, as a minimum, the following: Circuit breakers: verification of the main circuit insulation by power-frequency withstand voltage test, measurement of the main circuit resistance (contact resistance), mechanical and electrical operation tests, functional tests of auxiliary and control circuits, verification of gas tightness for gas-filled breakers, and visual and functional inspection. Current transformers: verification of insulation by power-frequency withstand voltage test, measurement of winding resistance, verification of ratio and polarity, measurement of excitation characteristics where applicable, accuracy verification for metering cores, verification of secondary winding insulation, and checks of terminal markings and general assembly. Voltage transformers: verification of insulation by power-frequency withstand voltage test, measurement of winding resistance, verification of voltage ratio and polarity, accuracy verification for metering and protection windings, insulation tests on secondary windings, and checks of terminal markings and general assembly. Isolators (disconnectors): verification of the main circuit insulation by power-frequency withstand voltage test, measurement of main circuit resistance, mechanical operation tests to confirm correct opening and closing, functional verification of auxiliary and control circuits where applicable, and visual and dimensional inspection. Control cabling, junction boxes and marshalling kiosk: visual and dimensional inspection of assembly and wiring, verification of terminal identification and ferruling, insulation resistance testing of control wiring, continuity testing of all control and signal circuits, functional verification of terminal connections and interlocks where applicable, and verification of earthing continuity for the enclosure and gland plates. In addition to the above, the Contractor shall carry out all recommended routine maintenance tests in accordance with the original equipment manufacturer's recommendations.	Sum	1		

5.3	Hot Commissioning				
5.3.1	Completion and sign-off of the pre-energisation checklist prior to first energisation of the power transformer, comprising verification and written confirmation that all installation, termination, testing and commissioning activities have been satisfactorily completed, all SAT reports have been reviewed and accepted by the Employer, all protection relay settings have been applied, verified and approved by Greater Tzaneen Municipality, all OLTC settings and limits have been configured and verified, all control and protection circuits have been tested and confirmed operational, all earthing and bonding connections are installed and tested, all oil systems are filled, processed and confirmed oil-tight, all access covers, inspection hatches and terminal box lids are fitted and secured, all temporary earths and safety grounds have been removed, all clearances from live equipment have been confirmed, and the transformer bay is clear of all personnel and equipment, with the completed and signed pre-energisation checklist submitted to the Employer prior to authorisation of first energisation, all in accordance with the project commissioning specification and applicable Greater Tzaneen Municipality switching and safety procedures.	Sum	1		
5.3.2	Sampling and dissolved gas analysis (DGA) of the transformer insulating oil prior to energisation, comprising extraction of an oil sample from the transformer drain valve or dedicated sampling point in accordance with IEC 60475 sampling procedures, submission of the oil sample to an accredited laboratory for full dissolved gas analysis in accordance with IEC 60567, measurement of all key fault gases including hydrogen, methane, ethane, ethylene, acetylene, carbon monoxide and carbon dioxide, measurement of oil dielectric breakdown voltage, water content, acidity and interfacial tension, interpretation of DGA results against IEC 60599 diagnostic criteria to confirm the absence of any active fault conditions or abnormal gas levels prior to energisation, and submission of the laboratory DGA report and interpretation to the Employer as part of the pre-energisation documentation pack, establishing a baseline fingerprint for future condition monitoring and trending of the transformer oil in service, all in accordance with IEC 60567, IEC 60599 and the project commissioning specification.	Sum	1		
5.3.3	Provision of first energisation procedure and supervision for the power transformer, including preparation and submission of a detailed first energisation procedure to the Employer for review and approval prior to energisation, coordination with the Greater Tzaneen Municipality for all necessary switching operations, outages and safety clearances, attendance of the Contractor's competent and experienced commissioning engineer and transformer manufacturer's representative during all first energisation activities, supervision of all switching operations and confirmation of correct transformer response upon energisation including verification of correct voltage levels on all windings, phase rotation, vector group and OLTC operation, monitoring of all protection relay indications, alarm and trip circuits during and immediately following energisation, confirmation of absence of abnormal noise, vibration or oil leakage following energisation, and submission of a first energisation report to the Client documenting all switching operations performed, observations recorded and confirmation of satisfactory energisation, all in accordance with the project commissioning specification and applicable Greater Tzaneen Municipality switching and safety procedures.	Sum	1		
5.3.4	Post-energisation checks and thermographic survey of the power transformer and associated equipment under load, comprising monitoring of all transformer parameters including oil temperature, winding temperature, load current and voltage levels on all windings during the initial loading period, verification of correct OLTC operation and voltage regulation under load, inspection of all bushing connections, clamp connections, cable terminations and tubular conductor connections for signs of overheating or abnormal temperature using a calibrated thermal imaging camera, thermographic survey of all HV, MV and LV connections, surge arresters, earth bonds and cooling equipment under load with all thermal images recorded and reported, inspection of all oil systems for leakage under load and thermal conditions, verification of correct operation of all cooling fans and pumps under automatic and manual control, monitoring and recording of all alarm and trip relay indications, and submission of a comprehensive post-energisation and thermographic survey report to the Employer including all thermal images, measured temperatures and identification of any hotspots or anomalies requiring remedial action, all conducted by competent and experienced commissioning personnel using calibrated thermal imaging equipment in accordance with the project commissioning specification and applicable IEC standards. The transformer load shall be stepped up to not less than 80% of rated ONAF capacity (48 MVA) during the load test period and all temperatures and electrical parameters recorded The Contractor shall record all data from the hot commissioning in a commissioning log, which forms part of the handover documentation	Sum	1		

5,4	Close Out and Documentation				
5.4.1	Preparation, submission and sign-off of all as-built drawings upon completion of all installation and commissioning works, comprising updating of all project drawings to reflect the actual installed condition including transformer general arrangement and foundation drawings, single line diagrams, protection and control schematic drawings, wiring and termination diagrams, cable schedules and routing drawings, earthing and bonding drawings, civil and bund drawings, and all other project drawings affected by site variations or deviations from the issued for construction drawings, submission of draft as-built drawings to the Employer for review and comment within the period stipulated in the project specification, incorporation of all Employer comments and resubmission for final approval, and provision of the final approved as-built drawing set in both hard copy and electronic format (PDF and native CAD format) to the Employer upon sign-off, all in accordance with the project document control procedure and applicable standards.	Sum	1		
5.4.2	Preparation, compilation and submission of a comprehensive Operation and Maintenance (O&M) Manual upon completion of all installation and commissioning works, comprising manufacturer's operation and maintenance manuals for all major equipment including the Power Transformer, NECRT, Protection Panel, OLTC, Surge Arrestors, Cooling equipment and all other supplied equipment, transformer nameplate data and design documentation, approved factory and site acceptance test reports, as-built drawings, protection relay setting schedules and relay manufacturer's instruction manuals, OLTC maintenance schedule and lubrication instructions, oil maintenance and sampling procedures, recommended spare parts lists and supplier contact details, emergency and fault response procedures, and all relevant IEC and project standards referenced in the design, submitted to the Employer in both hard copy and electronic format (PDF) within the period stipulated in the project specification, with draft O&M Manual submitted for Employer review and comment prior to finalisation, and final approved O&M Manual issued following incorporation of all Employer comments and sign-off, all in accordance with the project document control procedure and applicable standards.	Sum	1		
5.4.3	The Contractor shall submit all documentation listed below to the Employer's Agent as a condition of practical completion. All documents shall be submitted in electronic format (PDF and native editable format where applicable) and as three (3) bound hard copy sets: As-Built Drawings Test Reports and Certificates Manuals and Spare Parts Transformer operation and maintenance manual (original manufacturer's document) OLTC operation and maintenance manual IED 1 protection relay operation and settings manual IED 2 protection relay operation and settings manual Tap changer control relay operation and settings manual NECRT operation manual Spare parts list and recommended initial stock for the transformer, OLTC, and protection relays List of all consumables (filters, oil, gaskets, silica gel) required for the first 5-year maintenance cycle Certificates and Compliance Documents OHS compliance declaration signed by the Contractor's OHS representative Waste disposal certificates for all oil, contaminated material, and construction waste removed from site Copy of all abnormal load transport permits	Sum	1		
	SUBTOTAL OF ITEM 5 CARRIED OVER TO SUMMARY				

TRANSFORMER SPARE PARTS - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
6	TRANSFORMER SPARE PARTS				
	<u>Supply</u>				
6,1	10% of Virgin Insulating Oil	Sum	1		
6,2	Gaskets of all sizes	Sum	1		
6,3	Butterfly valves	e.a	2		
6,4	132kV HV Bushing	e.a	1		
6,5	132kV HV Neutral Bushing	e.a	1		
6,6	66kV MV Bushing	e.a	1		
6,7	33kV MV Bushing	e.a	1		
6,8	Breather Set	e.a	1		
6,9	Cooling Fan	e.a	1		
6.10	50kg Silica Gel	e.a	1		
	SUBTOTAL OF ITEM 6 CARRIED OVER TO SUMMARY				

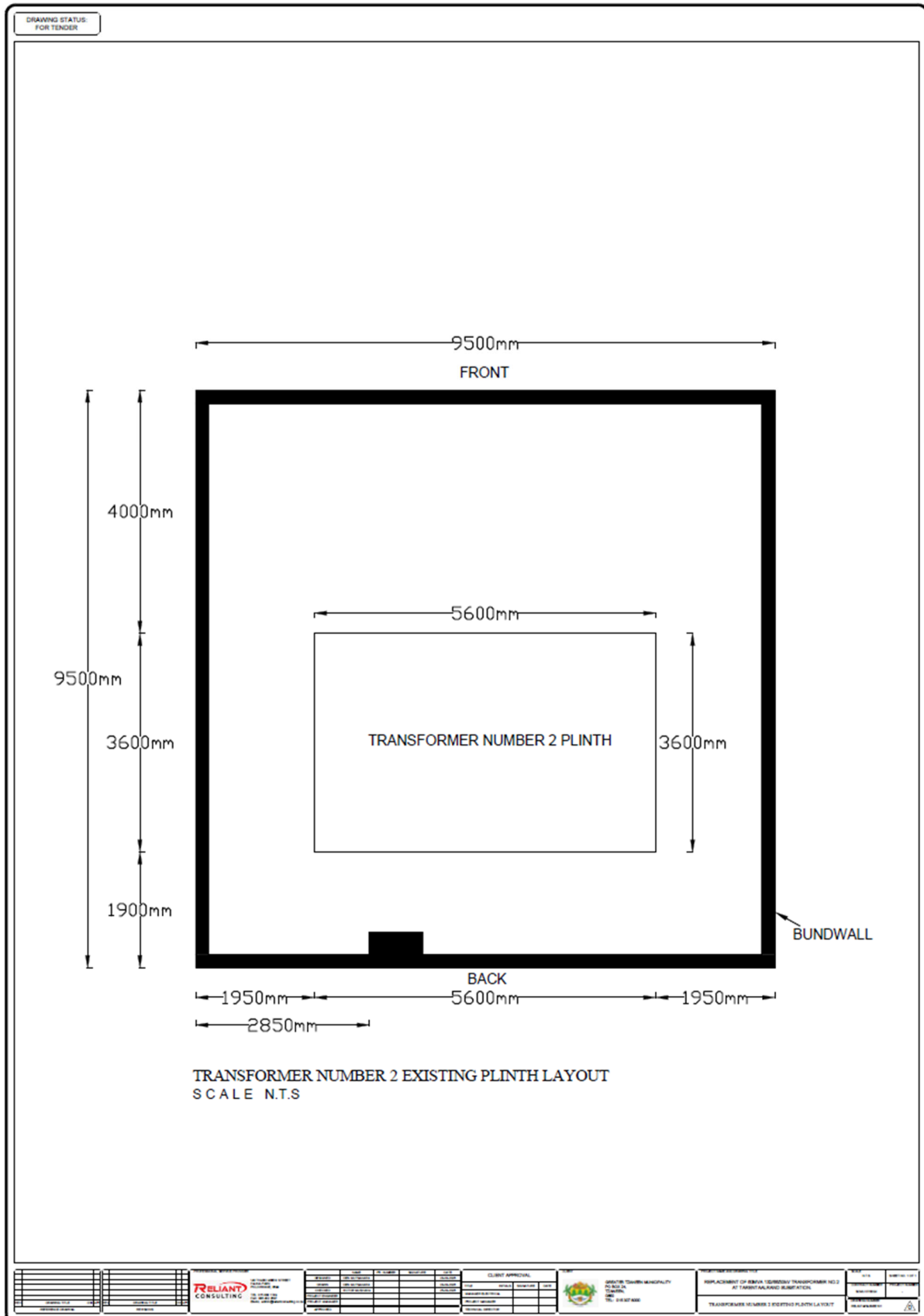
SUPPLEMENTARY OR ANCILLARY WORKS - REPLACEMENT OF 60MVA 132/66/33kV TRANSFORMER NO.2 AT TARENTAALRAND SUBSTATION.					
ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
7	Any supplementary or ancillary works identified by the Tenderer during the compulsory site visit and deemed necessary for the proper completion of the works shall be listed below and priced accordingly by the Tenderer				
7.1					
7.2					
7.3					
7.4					
7.5					
7.6					
7.7					
7.8					
7.9					
7.10					
	SUBTOTAL OF ITEM 7 CARRIED OVER TO SUMMARY				

PART P: DRAWINGS

The drawings listed below are attached for information purposes and provide a general overview of the project scope and layout. Tenderers shall review all drawings and satisfy themselves as to the extent of the works. Any discrepancies or ambiguities must be clarified with the Employer and or his Agent prior to tender submission.

DWG NO	DESCRIPTION	PAPER SIZE
REL/GTM/SUB/EE101	TRANSFORMER NUMBER 2 EXISTING PLINTH LAYOUT	A4
REL/GTM/SUB/EE102	TARENTAALRAND SUBSTATION SINGLE LINE DRAWING	A4
REL/GTM/SUB/EE102	TARENTAALRAND SUBSTATION PROTECTION PANEL GENERAL ARRANGEMENT DRAWING	A4

- The existing transformer Plinth dimensions measures 5600mm x 3600mm as shown below.



[illegible]

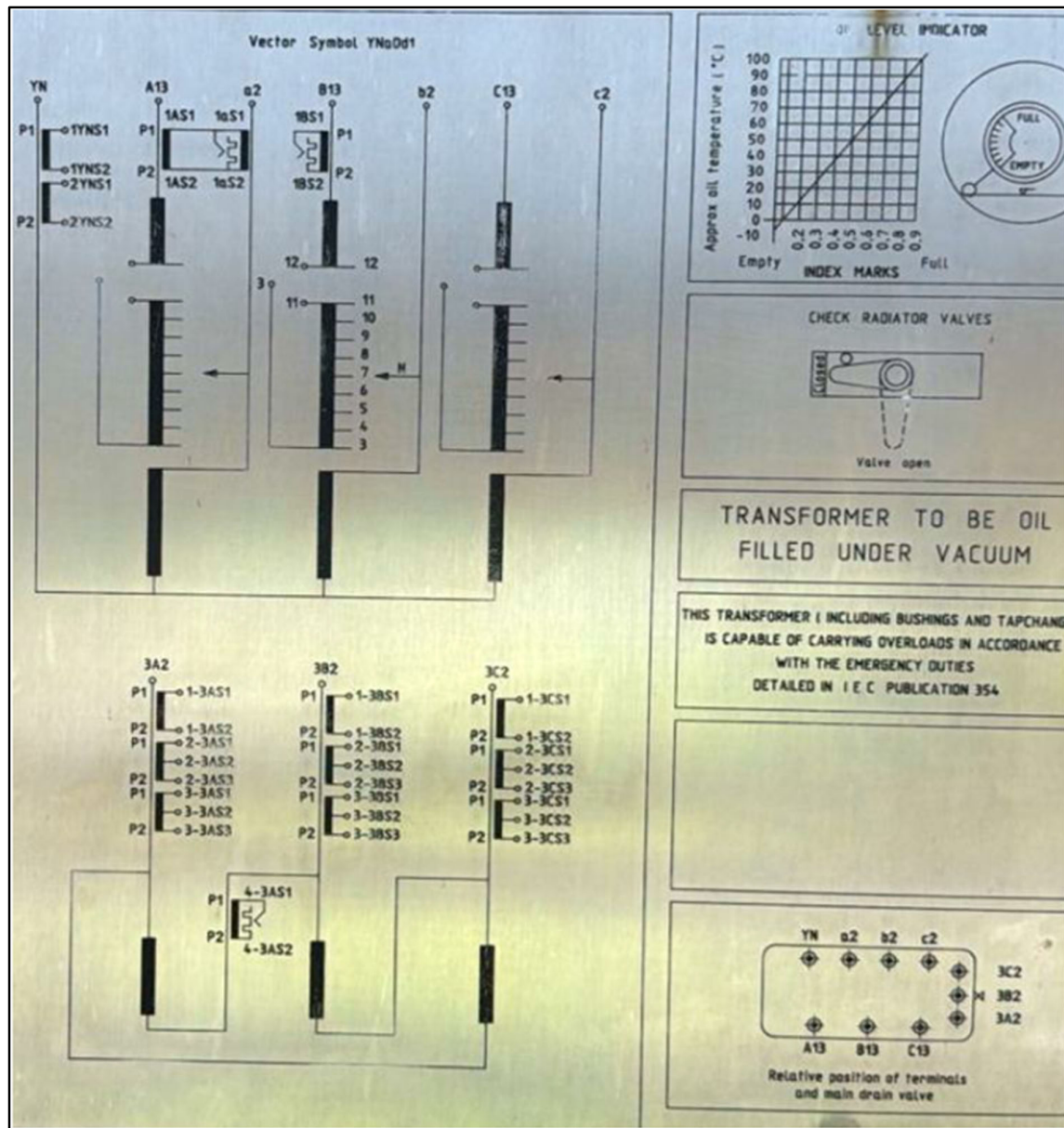
DRAWING STATUS:
FOR TENDER

REF	ITEM	DESCRIPTION	MANUFACTURER	PART No.
U48	PMI	INDICATION LAMP - PANEL NOT HEALTHY	MME COMPONENTS	KREZZZ (AMBER)
U38	MP2	BACKUP PROTECTION & CONTROL RELAY	S&L	S&L - 45T
	L1	INDICATION - MASTER TOP OPERATOR	HMMERAT	KRE-222Z (RED)
	ETOP	EMERGENCY STOP PUSH BUTTON WITH COVER	ABB	MP1-NB-MPBH-60(MPBH-60)X2
	FV	MC CIRCUIT BREAKER FAULT TOP CENTER	FOX	309P
U31	MPM1	MAIN PROTECTION AND CONTROL RELAY	S&L	S&L - 44TE
U24	L2	INDICATION - MANUAL SELECTED	HMMERAT	KRE-22F (GREEN)
	L3	INDICATION - TAP CHANGE LOCKOUT	HMMERAT	KRE-22ZF (RED)
	FB	RESET / LAMP TEST PUSH BUTTON	ABB	MP1-NB-MPBH-60(MPBH-60)X2
	SFS	TAP CHANGE SUPERVISORY ISOLATED SWITCH	KRAUS & NAMPER	CAB-A370-600
	MS	TAP CHANGE MECHANISM/ISOLATED SWITCH	KRAUS & NAMPER	CAB-A370-600
	TNC	PH NEUTRAL CLOSE SELECTOR SWITCH	KRAUS & NAMPER	CAB
U27	S&L 24N	AUTOMATIC VOLTAGE REGULATOR (AVR) - TAP CHANGER	S&L	S&L 24N
	MTD	MASTER TRIP RELAY	TNE	MASTER TRIP RELAY
	TNC	MC CB CONTROL - SWITCH - SPRING RETURN LOCKABLE	ACTOM	3 POS. 2 POLE
U09	TBI	HW OFF CT TEST BLOCK (SEL 4WE)	ELECTRO CONTACT	EL TREK 4-POLE
	TB2	HW ON E CT TEST BLOCK (SEL 75A)	ELECTRO CONTACT	EL TREK 4-POLE
	TB1	HW HW PROTECT FROM TEST BLOCK FOR LOCK	ELECTRO CONTACT	FI TBY 4-PIR F
U06	TBL	HW VT MAIN PROTECTION VT TEST BLOCK (SEL 4WE)	ELECTRO CONTACT	EL TREK 4-POLE
	TBS	HW VT BACKUP PROTECTION VT TEST BLOCK (SEL 75A)	ELECTRO CONTACT	EL TREK 4-POLE
	TBA	HW VT MAIN PROTECTION VT TEST BLOCK (HAVER)	ELECTRO CONTACT	EL TREK 4-POLE
U03	TBT	AVR CT TEST BLOCK	ELECTRO CONTACT	EL TREK 4-POLE
	TBB	AVR TEST BLOCK	ELECTRO CONTACT	EL TREK 4-POLE

PANEL NOTES

- ALL SHEET STEEL TO BE 2mm MINIMUM THICKNESS
- FINISH EXTERIOR
- RAL7025pm
PLUMB
CHASSIS PLATE - APPLIANCE WHITE
- PAINT THICKNESS TO BE 70 MICRON MINIMUM
- ALL LABELS TO BE FITTED BY MEANS OF PLASTIC DOWELS OR ALUMINUM SLIDING RAILS
- FRONT PANEL ENTRY, TOP AND BOTTOM LABEL ENTRY
- TO + 44 Lines
- PLA BATING

The vector group and bushings location of the existing transformer being replaced is shown below:



PART Q: CHECKLIST ON MINIMUM REQUIREMENTS

Returnable Documents

Checklist On Minimum Requirements

To assist you with your tendering process, see a checklist on minimum requirements below:

No.	Minimum requirements	Tick	Comment if not attached
1.	Complete original bid document		
2.	Compulsory briefing session		
3.	Proof of payment for tender document, Proof of payment for tender document, including downloaded tender documents (attach receipt) EFT or Manually		
4.	Valid Tax Clearance Certificate or Tax pin		
5.	Latest CSD registration summary report		
6.	CK/Company registration certificate showing percentage of shareholders / membership interest		
7.	Certified ID copies of the shareholders appearing in the CK		
8.	Municipal rates and taxes for both company and directors appearing in CK (not older than 3 months)) if the statement of water and lights is not on your names, please attach affidavit commissioned by oath from SAPS supporting your residential addresses as per attached statement or copy of Lease Agreement with 3 Months proof of payment only (No statements); Certified copies of Permission to Occupy (PTO's) land for bidders residing in Tribal Authority's areas of jurisdiction; proof of residence from Traditional Authority		
9.	CIDB Grading 7EP or Higher		
10.	Appointment letters ,Completion certificates , Stamped and signed reference letters by respective institutions in relation to the project.		
11.	Proof of Plant and Equipment		
12.	Key personnel and Qualifications		
13.	Proof of Registration as an Electrical Contractor with the Department of Labour		
14.	Company's recent Audited 3 years Annual Financial Statements signed off by an Accountant/Registered Auditor with a practice number.		
15.	Contract Period: 36 Months		
16.	Responded as per the scope of work (compliance to specification/ conditions or term of references)		
17.	The Bidder must submit a Tender Guarantee issued by a registered South African bank in terms of the Banks Act 94 of 1990 for a minimum amount of R 3,000,000.00 (Three Million Rand) as proof of financial capacity. The guarantee must be issued on the bank's official letterhead, duly signed by authorised bank representatives, and be payable on demand. The Municipality		

	reserves the right to verify the authenticity of the guarantee with the issuing bank, and failure to submit a valid bank guarantee shall render the bid non-responsive.		
18.	Fully completed Schedule A&B for the transformer		
19.	Fully completed schedule A&B for the NECRT.		
20.	In case of a Joint Venture, Association or Consortium a formal contract agreement signed by both parties		

Company Representative (Name)

Signature

A Green, Healthy, Prosperous and United Municipality that Provides Quality Services to All

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