

PASSENGER RAIL AGENCY OF SOUTH AFRICA

Transportation, and installation of 11KV Distribution Transformer at Cor delfos Traction Substation.

SPECIFICATION AND SCOPE OF WORK

CIDB (Construction Industry Development Board = 3 EP)

COMPULSORY REQUIREMENTS:

The following schedules shall be returned with the tender document which shall be evaluated:

- *Programme of execution with clear duration of project execution.*

SAFETY REQUIREMENTS:

All work in this contract shall comply with the Occupational Safety Act, 1993 (Act No: 85 of 1993). These items shall all be included in the tendered rates. A copy of the act as well as an approved safety file shall be kept on site for the duration of the project.

1. General

- The contractor shall be responsible for the removal and transportation of the existing 44/11KV distribution transformer and its associated components from Cor Delfos Substation to Rebeca stores.
- The Contractor shall be responsible for the transportation of the new 44/11KV transformer From Capital Park Depot to Cor Delfos substation.
- The contractor shall be responsible for the Installation and commissioning of the 44/11KV Transformer at Cor Delfos.
- The contractor shall be responsible for the trenching for cabling and backfilling of soil. The trench shall at least be 500mm deep. The cable to be laid in a sleeve.
- The contractor shall be responsible for the Supply, delivery, installation and commissioning of the 3-core (95mm²) XLPE copper cable from the 44/11KV Transformer to the 11KV switch gear complete with terminations and all the associated works.

- The Contractor shall be responsible for the removal of oil spillage (existing as well as that which occurs during construction) and the contaminated soil shall be disposed of at an approved disposal site.
- The Contractor shall be responsible for the filling up of Transformer oil in the Main Distribution Transformer with virgin oil compliant to specification SANS 555
- The contractor shall be responsible for the testing and commission of the 3000KVA, 44KV/11KV Main Distribution Transformer at Cor Delfos Traction substation.
- The contractor shall be responsible for the cleaning of oil spillages and Necessary soil Re-instating after completion of the job.

Transformer Oil Testing

The contractor shall:

- Ensure that oil sampling is carried out with utmost care, as incorrect sampling procedures can result in wrong analysis/diagnosis of the oil.
- Ensure that the sample is taken from the transformer as close as practical to the bottom.
- Ensure that samples are never taken while it is raining.
- Note that care shall always be taken when obtaining and handling samples to avoid contamination and to ensure accurate test results.
- Provide all the tools and equipment required to draw oil from the transformers.
- The oil tests shall be done by an accredited laboratory. The copy of the accreditation certificate shall be submitted together with the oil results.
- The Contractor shall provide containers for sampling and labels for the information to be supplied with the sample.
- The labels shall make provision for the following information:
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 - District / Depot
 - Location (of substation)
 - Date of sample
 - Sampled by: (name)
 - Unit Duty (Traction/ Auxiliary Transformers)
 - Unit Make
 - Unit Serial Number

- Unit Voltage (kV)
 - Unit Capacity (MVA)
 - Sampling Point
 - Gauge Temperature
 - Contract Number
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 - NB: PRASA shall not accept samples unless all the information has been provided.
 - The Contractor shall provide a hard copy of the results to the Project Manager and Technical officer.
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- The contractor shall
 - Perform the services as outlined by the scope of work below.
 - Be responsible for cleanliness of site after the work is done.
 - Work under Prasa supervision at all times
 - Be responsible for security and safety of their staff and equipment during the duration of the contract.

2. Particulars of scope of work

2.1. Specs of the Distribution Transformer from the Depot to be installed at Cor Delfos

- Rated Power: 3 MVA
- Rated Voltages: 44 KV/11 KV/ 6.5 KV
- Frequency: 50 Hz
- Vector Group: Dyn11
- Total weight: 7000 kg
- Oil quantity: 2000 litres
- Dimensions: 2350 mm x 1950 mm

2.2. Specs of the Distribution Transformer to be removed from Cor Delfos to Rebecca Stores

- Rated Power: 1 MVA
- Rated Voltages: 44 KV/11 KV
- Frequency: 50 Hz
- Vector Group: Dyn11

- Total weight: 4600 kg
- Oil quantity: 1860 litres
- Dimensions: 1000 mm x 2030 mm

2.3. Specs of the Type A Medium voltage XLPE Copper Cable

- Rated Voltage: 12 KV / 22 KV
- Cores: 3-core
- Size: 95 mm²
- Material: copper
- Applications Type: The cable shall be suited for lying direct on the soil and concrete tranches
- Specification: SANS 1339
- The cable shall be copper tape screened, galvanised steel wire armoured, and provided with a PVC outer sheath.
- The cable shall be tested in accordance with SANS 1339. Time Test Certificate shall be submitted the cable offered.

2.4. TESTING AND ANALYSIS OF TRANSFORMER OIL

- The Contractor shall sample and test the oil in accordance with the specification as shown below on Table 1.

Table 1. Tests to be done on virgin oil after delivery to site:

Oil	Unit	Specification	Reference and / or test method
Aromatic content	%	6 to 14 max	IEC 60590
Total fufural and furans	mg/kg	Not detectable	BS 148
Poly aromatics hydrocarbons	%	≤ 3,0 max	IP 346
Aniline point	°C	63 to 84	ASTM D611
Interfacial tension @ 20 °C	mN/m	≥ 40 min	ISO 6295
Neutralization value	mg KOH/g	≤ 0,03 max	BS 148
Corrosive sulphur		Noncorrosive	Cigre CCD - method
Moisture	mg/kg	≤ 20 max	IEC 60814
Anti- oxidant additives	% by mass	No additives	IEC 60666
Oxidation stability acidity after 164 h @ 120 °C	mg KOH/g	≤ 0,4 max	IEC 60074
Oxidation stability sludge after 164 h@ 120 °C	% by mass	≤ 0,1 max	IEC 60074
Dielectric Strength	kV/ 2,5 mm	≥ 60 min	IEC 60156
Dissipation factor @ 90 °C		≤ 0,005 max	IEC 60247
Gassing Tendency	mm ³ /min	≤ 5	BS 148
Particles contamination and fibres per 100 ml	Particles size <15 µm	≤ 1000 particles/dm ³	ISO 4406 of 2000
Silicon Content	ppm	Not detectable	

Polychlorinated biphenyl	mg/kg	Not detectable	EPA 608b
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2.5. Purification of Transformer Oil

- The oil should be purified up to 11PPM as per (IEC 60814) and dielectric strength of at least 45KV as per (IEC 60156)
- The contractor must provide test report on the condition of the purified oil.
- The contractor must top up oil.
- The contractor must check for any leaks, bucholz oil level and irregular voltage readings
- The contractor must do oil sampling (top & bottom samples), perform DGA using Rogers ratio, key gas method and duval triangle method.

3. Subcontracting

- 3.1.1. The Contractor shall not make use of any sub-Contractor to perform the works or parts thereof without prior permission from the Project Manager.

4. Health and Safety

- 4.1.1. The contractor shall be responsible for the safety of personnel on site; a detailed safety plan shall therefore be submitted by the appointed contractor upon award. The safety file requirements are provided to assist the tenderers to cater for the safety aspects.
- 4.1.2. The site access certificate shall only be issued (to the successful bidder) after the evaluation and approval of the safety file.
- 4.1.3. The Contractor shall comply with all applicable legislation and Metrorail's safety requirements adopted from time to time and instructed by the Project Manager / Technical Officer. Such compliance shall be entirely at his own cost, and shall be deemed to have been allowed for in the rates and prices in the contract.
- 4.1.4. The Contractor shall ensure that a safety representative is at site at all times.
- 4.1.5. The Contractor shall report all incidents in writing to the Project Manager / Technical Officer. Any incident resulting in the death of or injury to any person on the works shall be reported within 24 hours of its occurrence and any other incident shall be reported within 48 hours of its occurrence.

5. Financial

- 5.1. Payments shall be made for fully functional equipment only, i.e., all work completed.
- 5.2. All prices quoted shall be fixed and firm for the duration of the contract
- 5.3. Penalties shall be applicable for late completion of work and the rate shall be as stipulated in the contract terms and conditions for each day the completion is delayed. Terms and conditions in this contract are applicable in this regard.
- 5.4. Rates supplied in the BOQ shall be used to calculate the final payment for equipment.

6. ANNEXURE "A": EVALUATION MATRIX

NOTE: The Technical or Functionality criteria must be guided by the project scope of works and area of focus.

Scoring of Functionality:

Technical Scoring Methodology

Technical Scoring Methodology CRITERIA	WEI GHT	SCORES
Organizational Experience Provide for each successfully completed project/s in the following sequence: Copy of an appointment letter/s on a company letterhead, description of the project, Client name, Client contact (i.e., email and office number), Project start date, project end date, extension of time where applicable, contract value inclusive of VAT. Furthermore, attach completion certificate signed by client or letter from the client confirming successful completion of the project.	50	Score will be based on successfully executed and completed similar projects in the installation of 22-132KV/6.6-11KV Transformer, as well as similar works in the 11KV and 6.6KV substation and transmission equipment in the rail network in the last fifteen (15) years from the presented details in the RFQ document. Zero (0) Similar Projects/non-submission/incomplete submission = 0 1: 1 Similar project = 10 points 2: 2 Similar projects = 20 points 3: 3 Similar projects = 30 points 4: 4 Similar projects = 40 points 5: 5 similar projects = 50 points
Key Personnel Experience (based on Submitted CVs) of Key Staff a) Electrical Installation Supervisor b) Electrician Provide copies of original qualifications and certificates of	50	Detailed CVs of the team members who will be used in completing the works must be submitted. Scores would be based on the experience in the installation of 11 and 6.6 KV substation and transmission equipment in the rail network of proposed personnel. The points will be based on the two key personnel listed here. No information provided/incomplete

professional bodies. The copies must be certified by the commissioner of oath. The date on the stamp shall be three months or less old, before the closing date of the tender. If the qualification has been awarded in other language than English, please provide translation in English. Evaluation will be done on all 2 personnel and maximum points shall be obtained on 2 personnel. Each must have a minimum of 5 years. All educational qualifications should be SAQA accredited.	submission = 0 points 1: Average < 5 years of experience of Key Staff = 10 points 2: Average > = 5 up to 8 years of experience of Key Staff = 20 points 3: Average > 8 up to 10 years of experience of Key Staff = 30 points 4: Average > = 10 up to 15 years of experience of Key Staff = 40 points 5: Average > = 15 years of experience of Key Staff = 50 points
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A minimum of 60 points shall be attained for the bidder to be evaluated further.

Bill of Quantity

Item	Description	Unit	Qty	Unit Cost	Total Cost
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1	Removal and transportation of old Transformer, and its associated components from Cor Delfos to Rebecca stores	Sum	1	R.....	R.....
2	Transportation of existing Transformer and its associated components from Capital Park Depot to Cor Delfos Substation	Sum	1	R.....	R.....
3	Supply, delivery and installation and commission of the 3-core (95mm ²) XLPE copper cable from the 44/11KV Transformer to the 11KV switch gear complete with terminations and all the associated works, Trenching and backfilling of soil.	M	80	R.....	R.....
4	Testing of transformer oil in accordance to clause 2.4	SUM	1	R.....	R.....
5	Purification of transformer oil in accordance to clause 2.5	Litres	2000	R.....	R.....
6	Supply and deliver and fill-up transformer oil into the Transformer	Liters	2000	R.....	R.....
7	Cutting out and remodelling of the	SUM	1	R.....	R.....

	concrete slab to accommodate the new distribution transformer				
8	Modification and extension of fence in line with the existing fence	Sum	1	R.....	R.....
9	Testing and commissioning	Sum	1	R.....	R.....
TOTAL EXCL. VAT VAT @ 15%					R.....
GRAND TOTAL (Including VAT@15%)					R.....

Note: This service requires CIDB Grading EP level 3.

NB! For the briefing session, attendees are required to wear PPE, that is, a reflective vest and safety boots. Failure to comply will result in the attendee being removed from the briefing session and the attendance certificate will not be signed.