



## **SCOPE OF WORK AND SPECIFICATIONS**

### **Repairs of Newtown 22kV distribution substation**

#### **1. COMPULSORY REQUIREMENTS:**

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

- *CIDB grading of 3 EP or higher*
- *Requirements as per the technical functionality*

#### **2. 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.*

#### **3. General**

- The contractor is required to repair Newtown 22kV substation by replacing a switchgear panel, battery charger and telecontrol unit and all other material associated with the substation.

#### **4. Subcontracting**

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

#### **5. Health and Safety**

- 5.1 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.

**5.2** The site access certificate shall only be issued (to the successful bidder) after the evaluation and approval of the safety file.

**5.3** 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.

**5.4** The Contractor shall ensure that a safety representative is always at site .

**5.5** 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.

## **6. Financial**

**6.1** Payments shall be made for fully functional equipment only, i.e, all work completed.

**6.2** All prices quoted shall be fixed and firm for the duration of the contract

**6.3** If the Contractor fails to complete the Services within the time stipulated in this Contract for completion of Services or a part or portion of Services, the Contractor shall be liable to the Employer for an amount calculated at 0.3% of the Contract Price per delayed Day per order, which shall be paid for every Day which shall elapse between the time for due completion and completion of the relevant Services. However, the total amount due under this sub-clause shall not exceed the maximum of 10% of the Contract Price.

**6.4** The imposition of such penalty shall not relieve the Contractor from its obligation to complete Services or from any of its obligations and liabilities under the Contract.

**6.5** Rates supplied in the BOQ shall be used to calculate the final payment for equipment.

## **7. Specifications and Scope of works**

**7.1** The contractor shall supply, install and commission a 24KV vacuum metal enclosed switchgear as per the below:

## **7.2 Medium Voltage Switchgear**

- 7.2.1** The indoor, medium voltage metal enclosed switchgear shall be in accordance with Specification No. BBB4182.
  - 7.2.2** All panels shall be labelled with the 'designation' as requested by the technical team on site.
  - 7.2.3** All circuit breakers/ switchgear shall be rated 24kV, 3 phase, 50Hz.
  - 7.2.4** The rated continuous current shall not be less than 800A.
  - 7.2.5** The rated short circuit breaking current shall not be less than 20kA.
  - 7.2.6** The short time withstand current rating for the medium voltage equipment supplied shall not be less than 20kA for 3s.
  - 7.2.7** A minimum clearance of 800mm shall be maintained at the rear of the newly installed panel. The front shall have sufficient space for the breakers to be racked out and withdrawn with ease.
  - 7.2.8** The panel replaced is on the right side of the switchboard.
- Medium Voltage Protection**
- 7.2.9** Protection system and relays shall be in compliance with Clause 11.0 of Specification No. BBB4182.
- Indication Instruments**
- 7.2.10** Indicating instruments shall follow Clause 12.0 of Specification No. BBB4182.
  - 7.2.11** An Ammeter shall be supplied and installed in the panel. The current in all three phases shall be readable.
  - 7.2.12** A Voltmeter shall be supplied and installed.
- Energy meters**
- 7.2.13** All protection relays supplied under this contract shall be capable of energy metering and shall be wired as such.
- Current and Voltage Transformers**
- 7.2.14** Current and voltage transformers shall follow Clauses 14.0 and 15.0 of Specification No. BBB4182.
  - 7.2.15** The current transformer ratio shall be 100/5.
  - 7.2.16** The Contractor shall provide a 10 A rated test winding on protection CTs.
  - 7.2.17** Voltage transformers shall be installed on the cable side.
  - 7.2.18** VTs shall have a secondary output of 110V.

### **Cabling and Wiring**

- 7.2.19** All cabling and wiring shall be in accordance with specification BBC0198 Version 1, CEE0023 and SANS 10142-1.
- 7.2.20** The contractor shall replace the transformer supply cable, from the switchgear, with new cable.
- 7.2.21** The size of the cable shall be a 185mm<sup>2</sup> 3 core XLPE copper. The contractor shall cater for terminations, lugs and all other accessories, for both sides (transformer and switchgear).
- 7.2.22** The quotation for the transformer cable shall include the necessary termination on both sides.
- 7.2.23** All cables shall terminate in compression type glands. These glands shall be fitted with neoprene shrouds.
- 7.2.24** All dissimilar metal connections (Cu to Al) shall be made using bi-metallic clamps that are specifically designed and manufactured to make that connection (ad hoc fabricated clamps are not acceptable).
- 7.2.25** All copper connections to steel (galvanized) shall be tinned.

### **Earthing**

- 7.2.26** Earthing of the substation shall be done in accordance with drawing no. CEE-PA-23. A 95 mm<sup>2</sup> Cu cable shall however be used instead of a 10 mm<sup>2</sup> as indicated on the drawing.
- 7.2.27** Tenderers are encouraged to propose alternatives; however, the main offer shall be for the provision of copper. A separate offer may be submitted for this.
- 7.2.28** A new meter box and earth spike shall be installed at the substation.
- 7.2.29** The earth resistance reading of the earth spike shall be less than 5 ohms. Tenderers shall make provision in their offers for installing trench earthing to achieve the required earth reading, where required.
- 7.2.30** Tenderers shall provide for trenching and earthing. The cable route will be pointed out by the depot.

## **7.3 Tele-control**

- 7.3.1** The contractor shall Supply and install a tele-control system (Transnet Sys500 with PRASA modifications – 2 x RS232 serial input)
- 7.3.2** The system shall comprise of the following:
- 7.3.3** Meanwell 110V – 24V DC – DC converter installed inside

**7.3.4** Logic Rack with the following cards.

- 7.3.4.1.1 1 X PSU card
- 7.3.4.1.2 2 X DO cards
- 7.3.4.1.3 3 X DI cards
- 7.3.4.1.4 1 X LMCU Digital card
- 7.3.4.1.5 3 x Pulse Rail Cards
- 7.3.4.1.6 12 x Latch Rail Cards
- 7.3.4.1.7 48 x Digital input Rail Cards
- 7.3.4.1.8 10 X IO Cables 40cm long
- 7.3.4.1.9 3 X RS232 cable
- 7.3.4.1.10 3 X Common negative return cable

**7.3.5** The contractor shall ensure that the tele-control is fully functional before commissioning can be done.

**7.4 Batteries and Battery chargers**

- 7.4.1** The contractor shall supply and install gel type batteries and the battery charger equipment as per specification BBB5452 clauses 23 and 24 and specification BBB2502.
- 7.4.2** The capacity of the battery supplied shall be 100AH. The charger shall be fully capable of charging the battery bank supplied.
- 7.4.3** The contractor shall supply and install all cabling required for the full functioning of the batteries and battery charger.
- 7.4.4** The battery bank supplied shall have a service life of 20-25 years; this shall be backed up with technical documentation.

**7.5 Protection relays**

- 7.5.1** The contractor shall supply and install an additional nine (9) relays to fit on the panels already installed at the substation. The relay shall be of the same type as the one that will be installed on the MV switchgear above. (clause 7.2)
- 7.5.2** The contractor shall retrofit the relays by removing the old relays and installing the new relays on the switchgear boards. The panel doors may need to be cut or filled depending on the size of the relay provided by the contractor.

**7.6 Cleaning and clearing of carbon**

- 7.6.1** The contractor shall remove each switchgear from the substation and thoroughly clean the carbon that emanated from the flashed breaker.

**7.6.2** The contractor shall also clean the entire substation free from carbon.

## **7.7 Installation of CTs**

**7.7.1** The contractor shall install three 400/5 CTs on the already installed incomer switchgear panel. The CTs will be provided by PRASA. The contractor shall cater for all the necessary components needed to install the CTs.

## **8. Care of the Site**

**8.1** From the date on which the Site is handed over to the Contractor to the date of the issue of a Certificate of Completion, the Contractor shall take full responsibility for the care of the Works and the Employer's Assets on the Site and of all Plant intended for incorporation into the Works and materials on the Site intended for incorporation into the Works.

## **9. Site Overall Staffing and Key Professional Staff**

**9.1** The contractor shall provide qualified and experienced professional staff for the following positions.

- Team Leader/Project Director
- Site Supervisor
- Construction Health and Safety Officer

### **9.1.1 TEAM Leader/Project Engineer**

- Heavy Current Electrical qualification (Degree or National Diploma)

### **9.1.2 Site Supervisor**

- All work shall be supervised by a Site Supervisor in possession of a trade test certificate

### **9.1.3 Construction Health and Safety Officer**

- SAMTRAC qualification

## **10. To be provided by the contractor**

**10.1** Site books (each in triplicate) to record:

**10.2** All incidents as well as the progress of work during the occupation.

**10.3** All instructions pertaining to the technical details of the work being performed at that time.

- 10.4** Upon appointment, the contractor shall supply machinery, equipment, material, labour and consumables, etc. necessary for the undertaking and completion of the works to satisfaction of the client.
- 10.5** The client will require conformance documentation for each item of material procured by the contractor for installation used in this contract.
- 10.6** Any damage caused to the property of PRASA will be for the contractor's account.
- 10.7** Before commencing construction in any particular area, the contractor shall verify the positions of services. Where any underground services are shown on the drawings, the contractor shall have the equipment available on site for as long as is necessary to detect and locate such services and, if so ordered, he or she shall excavate by hand to expose such services in areas and in a manner and at a time agreed upon with the technical officer.
- 10.8** Protection of cables- Before any excavations take place near identified service cables, the contractor shall contact the technical officer. The contractor shall advise the Prasa technical officer at least 7 days in advance of the actual date on which to excavate near any cable. The contractor shall not use mechanical equipment to excavate within 3m of the estimated position of identified cable and shall, if necessary, expose the cable by means of hand excavation carried out under proper supervision.

## **11. Measurement of Quality of Construction**

- 11.1** The works shall be quantified by the contractor with the assistance of PRASA personnel, the payment will be subject to the rates submitted in the tender.
- 11.2** Where the condition of the site is such that the specified performance standards cannot be achieved, the contractor should record all relevant information in conjunction with the Prasa Technical Officer before and after working. Correctness and final approval shall be the responsibility of PRASA.

## **12. Rectification of sub-standard work**

- 12.1** Where the specified standards of workmanship and accuracy are not attained, the Contractor shall rectify at own cost within 7 working days. Should the contractor fail to honor the stipulated notified days he can be reported to the National Treasury for non-performance and may be blacklisted (prevented from doing any business with the state).

### **13. General**

- 13.1** Should any claim arise due to damage caused by any action of work by the Contractor to property of PRASA and his employees or any other person/s, the Contractor shall be held liable to settle such claims at his own cost.
- 13.2** The contractor shall provide transport, equipment, tools, consumables, supervision, protection, and labour necessary to successfully complete the contract.

### **14. Safety**

- 14.1** The Contractor shall comply with requirements of safety legislations and regulations in all respects.
- 14.2** All drivers shall be in possession of valid driver's licenses and Public Drivers Permits (PDP) where applicable. Crane operators will be required to have a valid Crane Operator's certificate. All vehicles shall be roadworthy.
- 14.3** The Contractor shall be responsible for all protective clothing and –equipment for his employees. All employees required to climb structures shall be issued with suitable harnesses.
- 14.4** The contractor shall be responsible for security of personnel and material onsite as well as during transit.
- 14.5** All work shall always comply with the E7/1 Specification attached hereto.
- 14.6** Normal protection measures in accordance with the Protection Manual shall apply.
- 14.7** An effective safety procedure to be followed by all personnel on any work site in the case of approaching rail traffic shall be compiled by the Contractor and implemented before any work commences. This procedure shall be updated whenever the need arises, and any changes shall be communicated to all employees on a works site before work proceeds.
- 14.8** It is the requirement of this contract that the contractor should provide PRASA with a detailed safety plan prior to being issued with a site access certificate, in accordance with the latest version of the OHS Act and the SPK7 and the E4E.

### **15. Measurements and payments**

- 15.1** Claims for payment will be made monthly.
- 15.2** Any rejected and incomplete work will not be paid.
- 15.3** All rates in the schedule of quantities must be made per unit as requested and should be an all-inclusive rate.



- 15.4** The rate quoted by the Tenderer(s) and accepted by PRASA must hold well till the completion of the work and shall not be subject to any escalation due to increase in the local market rates for materials & labour. No claim on this account whatsoever shall be entertained at any stage including the extended period.
- 15.5** The client shall retain 10% of all invoices claimed under this contract, this shall be payable at the end of the guarantee period of 52 weeks after the date of handover.
- 15.6** The amount of the Preliminaries to be included in each monthly payment certificate shall be assessed as an amount prorated to the value of the work duly executed in the same ratio as the preliminaries bears to the total of prices excluding any contingency sum, the amount of the Preliminaries and any amount in respect of contract price adjustment if provided for in the contract.

## **16. Payment Certificate**

- 16.1** On or after the assessment date, the Supervisor and the Contractor will together assess the quantities of the progress on each item in the Bill of Quantities and complete the Progress Assessment Detail form, where after the Progress Assessment Certificate will be issued.
- 16.2** The Contractor shall then submit a VAT invoice and attach the above Progress Certificate for payment by the Employer.
- 16.3** Contractor to provide the Employer with the necessary details regarding banking details to enable the Employer to make electronic payments.

## **17. PRICING AND THE WORKS.**

- 17.1** The contractor is required to provide firm prices/ rates for material and labour for the duration of the contract.
- 17.2** The contract period shall be inclusive of the delivery and installation period as well as an additional period of at least one year starting from the date of acceptance by the client of the last unit.
- 17.3** The costs for normal servicing shall be reflected separately and shall be paid quarterly for the duration of the service period.
- 17.4** The contractor shall make provision for the costs (direct or otherwise) associated with works on, over or adjacent to railway lines. The Contractor is advised to study the requirements of the SPK 7/1 and ensure that all works can be completed in accordance with these requirements.
- 17.5** The contract offer shall be based on the rates as indicated in the bill of quantities. The quantities shall be agreed during construction per section.

## **18. PENALTIES**

- 18.1** If the Contractor fails to complete the Services within the time stipulated in this Contract for completion of Services or a part or portion of Services, the Contractor shall be liable to the Employer for an amount calculated at 0.05% of the Contract Price per delayed Day per order, which shall be paid for every Day which shall elapse between the time for due completion and completion of the relevant Services. However, the total amount due under this sub-clause shall not exceed the maximum of 10% of the Contract Price.
- 18.2** The imposition of such penalty shall not relieve the Contractor from its obligation to complete Services or from any of its obligations and liabilities under the Contract,
- 18.3** PRASA may set off or deduct from the fees due to the Contractor any penalty amounts due and owing by the Contractor in terms of clause 6.3

## **19. Commissioning tests and completion**

- 19.1** The contractor shall carry out the pre-commissioning tests after the installation of the equipment. Thereafter Designated PRASA personnel, in conjunction with the Contractor, will perform the final commissioning tests. The Contractor shall carry out any remedial work, if necessary.

## **20. Handing over**

- 20.1** The handovers shall be for each portion of the work when the Electrical System is tested and commissioned to the satisfaction of the Technical Manager, in accordance with the details as set out in the handing over documentation of PRASA.

## **BILL OF QUANTITIES**

Item	Description	Unit	Qty	Unit Cost	Total Cost
1.	Dismantle and removal of the flashed switchgear panel, telecontrol, batteries and charger and transport to Driehoek stores in Germiston	SUM	1	R.....	R.....
2.	Supply and install a 24KV vacuum circuit breaker switchgear panel (as per clause 7.2)	Each	1	R.....	R.....
3.	Supply and install a telecontrol panel complete	Each	1	R.....	R.....
4.	Supply and install 30A battery charger	Each	1	R.....	.....
5.	Supply and install 100Ah batteries, 110V	Each	1	R.....	R.....
6.	Earthing complete for the entire substation (both 6,6KV and 22KV)	SUM	1	R.....	R.....
7.	Cleaning out carbon complete on each switchgear panel and making neat the entire substation	SUM	1	R.....	R.....
8.	Supply and delivery of protection relay (clause 7.5)	Each	9	R.....	R.....
9.	Installing and retrofitting of protection relays (clause 7.5)	Each	9	R.....	R.....
10	Supply and install 185mm <sup>2</sup> 3 core copper XLPE cable (including terminations,	Meter	300	R.....	R.....

	lugs. etc.)				
11	Supply and install control cables for the full functioning of the switchgear panel under this contract	SUM	1	R.....	R.....
12	Installation of the 400/5 CTs to one of the switchgear panels	Each	3	R.....	R.....
13	Security for the period of site construction	SUM	1	R.....	R.....
14	Testing and commissioning	SUM	1	R.....	R.....
15	Ps and Gs (the works will only be carried out on Sundays between 06:00 and 18:00)	SUM	1	R.....	R.....
		<b>TOTAL EXCL. VAT</b>			R.....
		<b>VAT @ 15%</b>			R.....
		<b>GRAND TOTAL</b>			R.....

### Technical functionality

CRITERIA	WEIGHT	SCORES
<p><b>Organizational Experience</b></p> <p>(N.B. 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.</p> <p>Furthermore, attach completion certificate signed by client or letter from the client confirming successful completion of the project.)</p>	40	<p>Score will be based on successfully executed and completed similar projects on the repair of 12,24 or 33KV switchgear panels within a period of 10 years.</p> <p>1: Zero (0) Similar Projects/non-submission/incomplete submission= <b>0</b></p> <p>2: 1 Similar project = <b>8 points</b></p> <p>3: 2 Similar projects =<b>16 points</b></p> <p>4: 3 Similar projects= <b>24 points</b></p> <p>5: 4 Similar projects = <b>32 points</b></p> <p>6: 5 and above Similar projects=<b>40 points</b></p>
<p><b>Qualifications and Technical Experience (based on Submitted CVs) of Key Staff</b></p> <ul style="list-style-type: none"> <li>Team leader / project director</li> <li>Site supervisor</li> </ul> <p>(N.B. Provide copies of original qualifications and certificates of professional bodies. The copies must be certified by commissioner of oath. The date on the stamp shall be three months or less old, before the closing date of the tender. Please provide <b>SAQA</b> accredited qualification.</p> <p>(team leader / project director qualification shall be Electrical qualification)</p>	40	<p>Detailed CVs of the team members who will be used in completing the works. Years of experience should be related to cable jointing and terminations.</p> <p>No information provided/incomplete submission = 0 points</p> <p>1: Average &lt; 5 years of experience of Key Staff = 8 points</p> <p>2: Average &gt; = 5 up to 8 years of experience of Key Staff = 16 points</p> <p>3: Average &gt; 8 up to 10 years of experience of Key Staff = 24 points</p> <p>4: Average &gt; = 10 up to 15 years of experience of Key Staff = 32 points</p> <p>5: Average &gt; = 15 years of experience of Key Staff = 40 points</p>

<p>(Site supervisor qualification shall be a trade test certificate)</p> <p>Evaluation will be done on all 2 personnel and maximum points shall be obtained on all 2.</p>		
<p><b>Project program (Work plan)</b></p> <p>Provide project schedule in MS projects or MS excel that meets the client's timeline requirements and the schedule to cover the following key Milestones:</p> <ul style="list-style-type: none"> <li>• Project duration within the targeted duration of 3 months.</li> <li>• Resource allocation</li> <li>• Critical Path clearly highlighted</li> <li>• Activities showing safety measures to be taken, activities included.</li> </ul> <p>The overall schedule should clearly indicate sequencing of activities with clear understanding of scope.</p>	20	<p>Score will be allocated for MS Project or MS excel Schedule provided.</p> <p><b>No information provided = 0 points.</b></p> <p>1: Project schedule provided with relevant activities and 1 of the indicated elements addressed = 4.</p> <p>2: Project schedule provided with relevant activities and 2 of the indicated elements addressed = 8.</p> <p>3. Project schedule provided with relevant activities and 3 of the indicated elements addressed = 12.</p> <p>5. Project schedule provided with relevant activities and all the indicated elements addressed = 20.</p>

**Bidders shall score a minimum of 60% on each criterion to proceed to the next stage of evaluation**