

**PASSENGER RAIL AGENCY OF SOUTH AFRICA**

**CONTRACT FOR THE REFURBISHMENT OF BRAAMFONTEIN AND LANGLAAGTE  
TRACTION SUBSTATIONS**

**SPECIFICATION AND SCOPE OF WORK**

**CIDB (Construction Industry Development Board = 4 EP)**

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**NB: This page is for control purposes only and shall not be issued with the specification and scope of work**

# **SCOPE OF WORK AND SPECIFICATIONS**

## **Refurbishment of Braamfontein and Langlaagte traction substations**

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

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

- *Programme of execution*
- *CIDB grading of 4 EP or higher*

### **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 shall be responsible for the removal and transportation of old equipment covered under this scope at Langlaagte substation to Driehoek stores in Germiston.
- 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.
  - Complete the works within a period of one month from date of appointment

### **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 at site at all times.
- 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 0.5% 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. Particular Scope of Work**

### **7.1 Braamfontein scope of work**

- Removal of old equipment covered under this contract from site to Driehoek stores, Germiston
- Supply and installation of telecontrol cabinet
- Supply and install indoor lighting at the substation
- Supply and installation of indoor earthing
- Applying weed killing before removing weeds from the substation yard
- Supply and installation of crusher stones
- Supply and filling of auxiliary transformer oil with virgin oil
- Supply and filling of traction transformer oil with virgin oil
- Supply and install new silica gel breather for traction transformers
- Tightening of traction transformer bolts
- Performing oil purification on the traction transformers
- Cleaning oil contamination around the transformer plinth and dispose the contaminated oil in accordance with environmental legislations
- Supply and install river sand around the traction transformer plinths
- Supply and installation of a feeder cable from the DC busbar chamber to track switches
- Supply and installation of capacitors, lightning arrestors and spark gaps
- Perform annual routine test for the traction substation

### **7.2 Langlaagte scope of work**

- Removal of old equipment covered under this contract from site to Driehoek stores, Germiston
- Supply and installation of telecontrol cabinet
- Supply and install indoor lighting at the substation
- Supply and install AC/DC distribution for tie-station that include protection relay
- Supply and install AC/DC distribution panel for traction substation
- Supply and install battery charger
- Applying weed killing before removing weeds from the substation yard
- Supply and installation of crusher stones
- Supply and filling of auxiliary transformer oil with virgin oil
- Supply and filling of traction transformer oil with virgin oil
- Supply and install new silica gel breather for traction transformers
- Tightening of traction transformer bolts
- Performing oil purification on the traction transformers
- Cleaning oil contamination around the transformer plinth and dispose the contaminated oil in accordance with environmental legislations

- Supply and install river sand around the traction transformer plinths
- Supply and installation of a feeder cable from the DC busbar chamber to track switches including trenching for the cables.
- Supply and installation of capacitors, lightning arrestors and spark gaps
- Perform annual routine test for the traction substation in accordance to specification BBF8128

## **7.3 Detailed scope of work requirements**

### **7.3.1 Specification for telecontrol**

7.3.1.1 The contractor shall remove and transport old telecontrol from the substation and transport to Driehoek stores.

7.3.1.2 The contractors shall Supply and install a tele-control system (Transnet Sys500 with PRASA modifications – 2 x RS232 serial input)

7.3.1.3 The system shall comprise of the following:

7.3.13.1 Meanwell 110V – 24V DC – DC converter installed inside

7.3.13.2 Logic Rack with the following:

7.3.13.2.1 1 X PSU card

7.3.13.2.2 2 X DO cards

7.3.13.2.3 3 X DI cards

7.3.13.2.4 1 X LMCU Digital card

7.3.13.2.5 3 x Pulse Rail Cards

7.3.13.2.6 12 x Latch Rail Cards

7.3.13.2.7 48 x Digital input Rail Cards

7.3.13.2.8 10 X IO Cables 40cm long

7.3.13.2.9 3 X RS232 cable

7.3.13.2.10 3 X Common negative return cable

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

### **7.3.2 Specification for charger**

- 7.3.2.1 The contractor shall supply and install the battery charger equipment as per specification BBB5452 clauses 23 and 24 and specification BBB2502.
- 7.3.2.2 The charger shall be fully capable of charging the battery bank at the substation.
- 7.3.2.3 The contractor shall supply and install all cabling required for the full functioning of the battery charger.
- 7.3.2.4 The battery bank supplied shall have a service life of 20-25 years; this shall be backed up with technical documentation.

### **7.3.3 Traction Transformer refurbishment**

- 7.3.3.1 The Contractor shall fill the transformer's conservator tank with virgin mineral insulating oil.
- 7.3.3.2 The Contractor shall filter the oil when filling the transformer's conservator tank
- 7.3.3.3 The oil shall comply with the requirements specified in SABS 555 edition 4 of 2002.
- 7.3.3.4 Retighten transformer bolts
- 7.3.3.5 Testing of traction transformers
- 7.3.3.6 Clean the oil spill around the transformer plinth
- 7.3.3.7 Replace contaminated soil and stone around the plinth. The contractor shall excavate up to a depth of 2m and up to 1m from the edge of the plinth.
- 7.3.3.8 Purify transformer oil after all the works are completed. Tenderers shall obtain oil quantities from the nameplate during the site briefing
- 7.3.3.9 The Contractor shall perform oil tests for all the transformers upon energizing as well as 48 hours after the completion of the works. The oil samples shall be taken from the top and bottom of the main tank of the transformer.
- 7.3.3.10 Tenderers shall quote for three passes in the purification of the oil as well as three oil samples, testing of samples shall be conducted by a SANAS accredited laboratory

#### **7.3.4 Weed killing and crusher stones**

- 7.3.4.1 The contractor shall apply weed killing and all other associated works in accordance with specification BBB5452 clause 43.0 and all its sub-clauses.
- 7.3.4.2 The contractor shall supply and install crusher stones and all other associated works in accordance with specification BBB5452 clause 43.0 and all its sub-clauses.

#### **7.3.5 XLPE aluminium cable**

- 7.3.5.1 Remove the faulty cable and transport it to Driehoek stores
- 7.3.5.2 Use the same ducts and trenches to install a new cable.
- 7.3.5.3 Supply, install and commission 630 mm<sup>2</sup> XLPE aluminium underground cables, terminations on both ends. The cable shall be a single core (type A) 630mm<sup>2</sup> with a rated voltage of 3.8/6.6kV in accordance with clause 5.2 of specification BBC0198.
- 7.3.5.4 The contractor shall Supply and install suitably rated capacitor and spark gap at the track switch structure

#### **7.3.6 Indoor earthing**

- 7.3.6.1 The contractor shall supply and install all indoor earthing as per specification BBB5452 and drawings **CEE-TBD-0007 and BBB3620**. Specification **BBB2721** is applicable for the supply and installation of the DC earth leakage relay.
- 7.3.6.2 New DC earth leakage relay shall be supplied and installed.
- 7.3.6.3 All metal structures (existing and new) shall be connected to earth as per specification BBB5452 clause 30 and all specifications and drawings referred to.
- 7.3.6.4 The contractor shall renew all insulation between all existing structures as per specification BBB5452.
- 7.3.6.5 All cabling for protection and earthing shall be supplied and installed by the contractor.

## 8. SCHEDULE OF QUANTITIES AND PRICES FOR BRAAMFONTEIN

Item	Description	Unit	Qty	Unit Cost	Total Cost
1.	Removal and transportation of old equipment from site to Driehoek stores	Sum	LOT	R.....	R.....
2.	Supply and install telecontrol complete	Each	1	R.....	R.....
3.	Supply and installation of indoor earthing	SUM	LOT	R.....	R.....
4.	Supply and installation of indoor lighting (10 indoor lights (including emergency lights) as per clause 45 of BBB5452)	SUM	LOT	R.....	R.....
5.	Weed killing	SUM	LOT	R.....	R.....
6.	Crusher stones	M <sup>3</sup>	500	R.....	R.....
7.	Supply and filling of traction transformer oil	Litre	8000	R.....	R.....
8.	Supply and filling of auxiliary transformer oil	Litre	500	R.....	R.....
9.	Traction transformer testing	Each	3	R.....	R.....
10.	Traction transformer oil sampling	Each	9	R.....	R.....



11.	Silica gel breather	Each	3	R.....	R.....
12.	Retighten transformer bolts for all three transformers	SUM	LOT	R.....	R.....
13.	Transformer oil purification (3 pulses per transformer)	Each	3	R.....	R.....
14.	Cleaning oil contamination around the transformer and disposal thereof	SUM	LOT	R.....	R.....
15.	Supply and install river soil around the plinth	M <sup>2</sup>	100	R.....	R.....
16.	Supply and installation of 3,8/6,6kV 630mm <sup>2</sup> XLPE aluminium cable from DC busbar chamber to track switch structures (incl. terminations, lugs and all accessories)	M	2000	R.....	R.....
17.	Supply and installation of capacitors, lightning arrestors and spark gaps	Each	4	R.....	R.....
18.	Annual routine testing of the traction substation	SUM	LOT	R.....	R.....
		<b>TOTAL EXCL. VAT</b>			R.....
		<b>VAT @ 15%</b>			R.....
		<b>GRAND TOTAL</b>			R.....

## 9. SCHEDULE OF QUANTITIES AND PRICES FOR LANGLAAGTE

Item	Description	Unit	Qty	Unit Cost	Total Cost
19.	Removal and transportation of old equipment from site to Driehoek stores	Sum	LOT	R.....	R.....
20.	Supply and install telecontrol complete	Each	1	R.....	R.....
21.	AC/DC distribution panel for the tie-station complete (incl. protection and accessories)	Each	1	R.....	R.....
22.	AC/DC distribution panel complete	Each	1	R.....	R.....
23.	Supply and installation of battery charger complete	Each	1	R.....	R.....
24.	Supply and installation of indoor lighting (10 indoor lights (including emergency lights) as per clause 45 of BBB5452)	SUM	LOT	R.....	R.....
25.	Weed killing	SUM	LOT	R.....	R.....
26.	Crusher stones	M <sup>3</sup>	500	R.....	R.....
27.	Supply and filling of traction transformer oil	Litre	2000	R.....	R.....

28.	Traction transformer testing	Each	1	R.....	R.....
29.	Traction transformer oil sampling	Each	2	R.....	R.....
30.	Silica gel breather	Each	1	R.....	R.....
31.	Retighten transformer bolts	SUM	LOT	R.....	R.....
32.	Transformer oil purification	Pulses	12	R.....	R.....
33.	Cleaning oil contamination around the transformer and disposal thereof	SUM	LOT	R.....	R.....
34.	Supply and install river soil around the plinth	M <sup>2</sup>	100	R.....	R.....
35.	Supply and installation of 3,8/6,6kV 630mm <sup>2</sup> XLPE aluminium cable from DC busbar chamber to track switch structures (incl. terminations, lugs and all accessories)	M	1000	R.....	R.....
36.	Trenching and backfilling for the cables ( incl. laying river sand)	m	50	R.....	R.....
37.	Supply and installation of capacitors, lightning arrestors and spark gaps	Each	4	R.....	R.....

38.	Annual routine testing of the traction substation	SUM	LOT	R.....	R.....
		<b>TOTAL EXCL. VAT</b>			R.....
		<b>VAT @ 15%</b>			R.....
		<b>GRAND TOTAL</b>			R.....

## 10. 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:

Responsive tenders will firstly be evaluated on functionality. The minimum score for functionality is 90 and a bidder who scores below this minimum shall not be considered for further evaluation in terms of the preference point systems.

Functionality and Capabilities	Max Points	Minimum Required
<p><b>Clause by clause compliance</b></p> <p><b>The tenderers shall provide clause by clause compliance with the following specifications. There will be no partial compliance</b></p> <p><b>BBB 2721, BBB 5452, BBC0198, BBB2502</b></p> <p><b>CEE-TBD-0007, BBB3620, BBF8128</b></p> <p>Fully Comply = 50 points</p> <p>Non-compliance= 0 Points</p> <p><b>NB: provide a letter of compliance to specification.</b></p>	50	50
<p><b>Similar Works: provide client list including letter of reference with contactable details</b></p> <p>6 and above similar projects = 20 points</p> <p>3 - 5 similar projects = 15 points</p> <p>1-2 similar projects = 10 points</p> <p><b>NB!! Submit letter of references from your previous clients, with traceable contacts details.</b></p>	20	10
<p><b>Programme of works in line with the scope of work</b></p> <p>≤ 1 month= 30 points</p> <p>&gt; 1 month= 0 points</p>	30	30
<b>GRAND TOTAL</b>	<b>100</b>	<b>90</b>

## 11. Financial evaluation

### Pricing

A maximum of 80 points is allocated for price. The evaluation for price will be done based on the following formula:

$$P_s = 80 \left( 1 - \frac{P_t - P_{min}}{P_{min}} \right)$$

Where

*P<sub>s</sub>* = Points scored for price of tender under consideration

*P<sub>t</sub>* = Rand value of tender under consideration

*P<sub>min</sub>* = Rand value of lowest acceptable tender

### BBBEE Evaluation

The BBBEE component of evaluation is weighted at 20% of the evaluation criteria. Bidders will be awarded the following points based on the level of their BBBEE as per their BBBEE Certificate issued by an agency approved by SANAS:

B-BBEE Contribution Level	80:20 Preference System
1	20
2	18
3	14
4	12
5	8
6	6
7	4
8	2
Non-compliant	0