

PASSENGER RAIL AGENCY OF SOUTH AFRICA

**Supply, installation and commissioning of three cross overs at Pretoria North station for
Metrorail Gauteng Province**

SPECIFICATION AND SCOPE OF WORK

CIDB (Construction Industry Development Board = 3 EP)

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 supply, install and commission three crossovers at Pretoria North station.
- The contractor shall
 - Perform the services as outlined by the scope of work below
 - be responsible for the supply and installation of all material.
 - be responsible for the Supply, delivery and installation of bonding where required.
 - Be responsible for cleaning up of the site after completion of the works.
 - always Work under Prasa supervision.
 - The works will be carried out under permit conditions which can only be granted on Sundays from 06:00 to 18:00
 - Be responsible for security and safety of their staff and equipment during the duration of the contract.

1.1. Subcontracting

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

2. Financial

- 2.1. Payments shall be made for fully functional equipment only, i.e, all work completed.
- 2.2. All prices quoted shall be fixed and firm for the duration of the contract.
- 2.3. 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.
- 2.4. Rates supplied in the BOQ shall be used to calculate the final payment for equipment.

3. Scope of works and areas of focus

3.1. Wire works.

- 3.1.1. Any conductors supplied as supplementary to the existing system shall match the existing unless specified otherwise. New make-off wiring shall be spliced onto the existing wiring where new termination structures are required. Standard conductor sizes are:
 - 3.1.1.1. **Contact wire:** 161 mm² copper wire shall be supplied in continuous lengths of 1830 meter accordance with BBD 7267 Version 2 and installed in accordance with CEE 241.
 - 3.1.1.2. **Catenary wire:** 160mm² Aluminium Conductor Steel Reinforced (ACSR).
 - 3.1.1.3. **Feeder wire:** 800mm² hard drawn Aluminium in accordance with SABS 182.
 - 3.1.1.4. **Feeder Catenary Contact Jumpers (FCC's):** 160mm² to be replaced with a 160mm² all-aluminium soft stranded jumper in accordance with BBH 2161 Version 1 in line with drawing BBH 2164.
 - 3.1.1.5. **Earth wire:** 61mm² ACSR Conductor shall be supplied and installed.
- 3.1.2. Dropper wire: shall be the stainless-steel type.
- 3.1.3. The maximum span length in the Gauteng region is 67m.
- 3.1.4. All terminations shall comply with Drawing CEE-TPB-3.
- 3.1.5. Spring terminations devices shall be supplied and installed, all thimbles and Crosby clamps shall be stainless steel throughout.

3.2. Section insulators

- 3.2.1. The contractor shall supply and install Section Insulators at identified locations, these shall conform to the specification CEE-0054-83.
- 3.2.2. Section insulators shall only be cut into the overhead wires where the separation between contact and catenary wires is not less than 750 mm after installation of the section insulator.
- 3.2.3. The contractor shall supply and install numbering plates for all section insulators supplied under this contract.
- 3.2.4. It is the contractor's responsibility to smooth out kinks on contact wire because of tensioning or other activities.

3.3. Earthing, Bonding and Suppression

- 3.3.1. Before any welding connection, the surface(s) shall be thoroughly prepared as per detailed instructions to ensure a strong and continuous bond. The galvanizing of the structures shall be removed with a grinder, and the surface where the exothermic weld is to be performed should be thoroughly cleaned.
- 3.3.2. The area where the galvanizing was removed shall be treated with zinc spraying, hot – patch soldering, or coated with zinc-rich paint complying with the requirements of SABS 920.
- 3.3.3. All welded joints shall be “hammer tested” to ensure that the mechanical strength of the joints is sound. Welded joints shall also be painted.
- 3.3.4. PRASA's Technical Officer shall inspect and approve the work before any Grading Ring is covered by soil.
- 3.3.5. Rail continuity Bonds – All joints in the rail shall be bonded with 4 x 96 mm² PVC sheeted steel cables. The continuity bonds shall be bolted to the web of the rail using the Expanding collar system. The ends of the bonds shall have lugs crimped to it, which shall then be fastened to the rail using the Expanding collar system.
- 3.3.6. Cross bonds – are applied between various tracks that share the return current. It consists of a 96 mm² PVC sheeted composite bond that is fastened to the web of the rail using the Expanding collar system. Cross bonds shall be provided at intervals not exceeding 500 m.

- 3.3.7. Mast to rail bonds – shall exist in spacing not exceeding 350 m (5 spans). They shall consist of a 2 x 96 mm² PVC sheathed bond that is fastened with WAM Stud and Lug to the mast and fastened to the web of the rail using the Expanding collar system. The end bolted to the rail shall have a lug crimped to it, which shall be fastened to the rail with a WAM stud. Where no earth wire is connected to the mast, 4 Mast to rail bonds shall be provided.
- 3.3.8. Switch Structure – shall be provided with double mast to rail bonds of 96 mm² PVC sheath steel cable.
- 3.3.9. 3kV DC insulators shall be insulated from the structure either by means of an additional disc insulator or insulating pads, bushes or washers between the insulator support bracket and the fixing bolts, the insulator support brackets then being connected to rail either directly or via a common earth wire, with two earth paths. Where only one earth cross span exists, a second shall be installed. The earth conductor protecting each set of “live” cross-spans shall be so arranged as to provide a ring connection with dual connections for every earth point.
- 3.3.10. Spark gaps to be supplied as per specification BBB1616 and installed as indicated on drawing CEE-TU-100.
- 3.3.11. A 95mm² composite cable shall be supplied and installed for all mast to rail bonds. Rail bonding fasteners shall comply with BBB6017.
- 3.3.12. Lightning arrestors compliant to specification BBB2141 shall be supplied and installed as per specification BBB2144.

3.4. Small Part Components (SPC)

- 3.4.1. The contractor shall supply and install the following small parts in accordance with the specifications as indicated:
- 3.4.2. Cross Spans to DB's shall be to Drawing CEE-TMGC-13
- 3.4.3. Vertical members shall be to CEE-TMF-106.
- 3.4.4. Cross arms: Intermediate transmission line X-arms shall be to Drawing CEE-TPF-4
- 3.4.5. Suspension arm arrangements for supporting Aerial Bundled Conductors on concrete masts and through bridges shall be to drawing CEE-TMGC-22.

- 3.4.6. The Contractor shall allow for the clamping brackets (back-straps) to be modified (i.e., extended) to include a 14 mm ø hole for bonding cable.
- 3.4.7. Shop drawings of all the SPC shall be required for approval prior to manufacture.

3.5. Small Part Components (SPC) Scrapping of Material

- 3.5.1. PRASA staff shall be allowed to scrutinize the scrap material and have first choice to remove re-useable materials to the depot supervised stores.
- 3.5.2. The contractor shall be responsible for the safe movement of salvaged scrap to Rebecca Depot.
- 3.5.3. Abandoned steel components shall not be left unattended on site. The steel shall be removed from the track side after each occurrence, safely stored temporarily (if required) and transported to the Driehoek stores as soon as practically possible. All care shall be taken to avoid unlawful removal of these components from site.
- 3.5.4. All occurrences shall be documented in the site diary and signed by both parties.
- 3.5.5. The cost to be allowed for here is:
 - a. Administration
 - b. Transport
 - c. Loading and off-loading

4. Care of the Site

- 4.1.1. 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.

5. Site Overall Staffing and Key Professional Staff

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

- 5.1.1.1. Team Leader/Project Director
- 5.1.1.2. Site Supervisor
- 5.1.1.3. Traction Linesmen
- 5.1.1.4. Erectors
- 5.1.1.5. Flagman
- 5.1.1.6. Construction Health and Safety Officer

5.2. Minimum Qualification of Key Professional Staff

5.2.1. Team Leader/Project Engineer

5.2.1.1. Heavy Current Electrical qualification (Degree, Diploma or N-level certificate).

5.2.2. Site Supervisor

5.2.2.1. All work shall be supervised by a Site Supervisor in possession of a Traction Linesmen qualification.

5.2.3. Erectors

5.2.3.1. All staff that will climb on structures shall be in possession of a valid "C" green certificate.

5.2.4. Flagman

5.2.4.1. A minimum of three qualified flagmen shall be deployed for each occupied section.

5.2.5. Construction Health and Safety Officer

5.2.5.1. Industry experience as a health and safety officer.

5.3. To be provided by the contractor

5.3.1. Site books (each in triplicate) to record:

5.3.2. All incidents as well as the progress of work during the occupation.

- 5.3.3. All instructions pertaining to the technical details of the work being performed at that time.
- 5.3.4. 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.
- 5.3.5. The client will require conformance documentation for each item of material procured by the contractor for installation used in this contract.
- 5.3.6. Any damage caused to the property of PRASA will be for the contractor's account.
- 5.3.7. 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.
- 5.3.8. 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.

6. Measurement of Quality of Construction

- 6.1. 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.
- 6.2. 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.

7. Rectification of sub-standard work

- 7.1. 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).

8. General

- 8.1. 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.
- 8.2. The contractor shall provide transport, equipment, tools, consumables, supervision, protection, and labour necessary to successfully complete the contract.

9. Safety

- 9.1. The Contractor shall comply with requirements of safety legislations and regulations in all respects.
- 9.2. 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.
- 9.3. 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.
- 9.4. The contractor shall be responsible for security of personnel and material onsite as well as during transit.
- 9.5. All work shall always comply with the E7/1 Specification attached hereto.
- 9.6. Normal protection measures in accordance with the Protection Manual shall apply.
- 9.7. 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.

- 9.8. 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.

10. Measurements and payments

- 10.1. Claims for payment will be made monthly.
- 10.2. Any rejected and incomplete work will not be paid.
- 10.3. All rates in the schedule of quantities must be made per unit as requested and should be an all-inclusive rate.
- 10.4. 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.
- 10.5. 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.
- 10.6. 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.

11. Payment Certificate

- 11.1. 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.
- 11.2. The Contractor shall then submit a VAT invoice and attach the above Progress Certificate for payment by the Employer.
- 11.3. Contractor to provide the Employer with the necessary details regarding banking details to enable the Employer to make electronic payments.

12. PRICING AND THE WORKS.

- 12.1. The contractor is required to provide firm prices/ rates for material and labor for the duration of the contract.
- 12.2. 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.
- 12.3. The costs for normal servicing shall be reflected separately and shall be paid quarterly for the duration of the service period.
- 12.4. 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.
- 12.5. 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.

13. PENALTIES

- 13.1. 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.
- 13.2. 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,
- 13.3. 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 13.1

14. Commissioning tests and completion

- 14.1. Designated PRASA personnel, in conjunction with the Contractor, shall carry out the final commissioning test. The Contractor shall carry out any remedial work, if necessary.

15. Handing over

- 15.1. 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.

16. List of Transnet/ PRASA specifications that form part of this scope of work.

6.1. BBB2141	Lightning Arrester on 3kV DC Cantilever Structure
6.2. BBB3569	Symbols
6.3. BBC 1678	Bonding on All Types of Rails
6.4. CEE-0054 ISS 83	Section Insulators for 3kV DC OHTE for both High and Low Speed Traffic
6.5. CEE 0057.90	Supply of Cables
6.6. CEE 0059.84	Earthing and Bonding 3KV DC Electrification
6.7. CEE-0241	Specification for hard drawn, grooved, copper contact wire for electrical traction purposes
6.8. BBH2161	Requirements for 160 square millimetre All Aluminium Jumper Conductor
6.9. BBH 2164	Typical layout of FCC's and C-Jumper
6.10. CEE-0054 ISS 83	Section Insulators for 3kV DC OHTE for both High and Low Speed Traffic
6.11. SABS 920	Galvanising
6.12. BBB 1616	450 Volt gas arrestor spark gap for traction power supply
6.13. CEE TU 100	Spark gap drawing
6.14. BBB 6017	Rail and Mast bond Fasteners
6.15. BBB2141	Lightning Arrestors Arrangement on 3kV DC Cantilever Structures

6.16. CEE TMGC 13

Cross span to DB

6.17. BBB2141

Lightning Arrestor on 3kV DC Cantilever Structure

Bill of Quantities

Item No.	Description	Unit	Qty	Rate/unit (Excl. VAT)	Total Price (Excl. VAT)
1.	Removal of feeder wires between masts 14/398 and 14/167 and transport old material to Rebecca Stores	sum	1		
2.	Supply and install section insulators complete with contact and tiger wires on both sides, with new number boards/insulating straps (section insulators number 26, 16 and 19) with splices for both contact and tiger	Each	3		
3.	Supply and install of 161mm ² copper contact wire	m	730		
4.	Supply and install 160mm ² tiger wire aluminium	m	730		
5.	Supply and install tiger dropper clips(160mm ²)	each	100		
6.	Supply and install droppers	each	100		
7.	Supply and install make off for contact and tiger wires complete (incl. brackets, insulators, buckles, fittings, and all other accessories) at ML 14/398	each	1		
8.	Supply and install cross spans under the bridge complete with accessories	each	4		
9.	Supply and install bridge fitting	each	1		
10.	supply and install single suspension complete (for both contact and tiger) with accessories	each	17		
11.	Supply and install contact knuckles	each	9		
12.	Supply and install cross contact knuckles	each	10		
13.	Supply and installation of push pull pipes	each	4		
14.	supply and install steady arm attachment complete with accessories	each	17		
15.	Supply and install contact dropper clips	each	100		
Sub Total Excl. Vat					
VAT (15%)					
Total					

TECHNICAL FUNCTIONALITY

CRITERIA	WEIGHT	SCORES
<p>Organizational Experience</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 in the installation of 3 kV OHTE in the last fifteen (15) years from the presented details in the tender document.</p> <p>1: Zero (0) Similar Projects/non-submission/incomplete submission= 0</p> <p>2: 1 Similar project = 8 points</p> <p>3: 2 Similar projects =16 points</p> <p>4: 3 Similar projects= 28 points</p> <p>5: 4 Similar projects = 34 points</p> <p>6: 5 and above Similar projects=40 points</p>
<p>Qualifications and Technical Experience (based on Submitted CVs) of Key Staff</p> <ul style="list-style-type: none"> • Site Supervisor (SS) • Traction Linesman (TM) <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 SAQA accredited 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 3kV DC OHTE system installation.</p> <p>No information provided/incomplete submission = 0 points</p> <p>1: Average < 5 years of experience of Key Staff = 8 points</p> <p>2: Average > = 5 up to 8 years of experience of Key Staff = 16 points</p> <p>3: Average > 8 up to 10 years of experience of Key Staff = 24 points</p> <p>4: Average > = 10 up to 15 years of experience of Key Staff = 32 points</p>

<p>(Site supervisor qualification shall be category A-Red)</p> <p>(Linesman qualification shall be C-Green)</p> <p>Evaluation will be done on all 2 personnel and maximum points shall be obtained on all 2.</p>		<p>5: Average > = 15 years of experience of Key Staff = 40 points</p>
<p>Project program (Work plan)</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"> • Project duration within the targeted duration of 3 weeks. • Resource allocation • Critical Path clearly highlighted • Activities showing safety measures to be taken activities included. <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>No information provided = 0 points.</p> <p>1: Project schedule provided with relevant activities and 1 of the indicated elements addressed = 5.</p> <p>2: Project schedule provided with relevant activities and 2 of the indicated elements addressed = 5.</p> <p>3. Project schedule provided with relevant activities and 3 of the indicated elements addressed = 15.</p> <p>5. Project schedule provided with relevant activities and all the indicated elements addressed = 20.</p>

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