


| LOCATION | | NOT ELECTRIFIED | ELECTRIFIED (PRESENT OR FUTURE) | |
|--|----------------|--------------------|------------------------------------|-----------|
| | | | 3kV & 25kV | 50kV |
| | RADIUS (mm) | S (mm) | V (mm) | V (mm) |
| ALL AREAS OTHER THAN THOSE INDICATED BY * BELOW | 100 | 4 470 | 5 050 | 5 400 |
| | 300 | 4 410 | 5 020 | 5 370 |
| | 600 | 4 370 | 5 000 | 5 350 |
| | 1 000 | 4 350 | 4 990 | 5 340 |
| | 1 500 | 4 310 | 4 960 | 5 310 |
| | 2 000 | 4 290 | 4 940 | 5 290 |
| | >3 000 | 4 270 | 4 930 | 5 280 |
| * OVER OR NEAR POINTS AND CROSSING IF REQUIRED BY ELECTRICAL IRRESPECTIVE OF RADIUS | | | 5 650 | 6 000 |

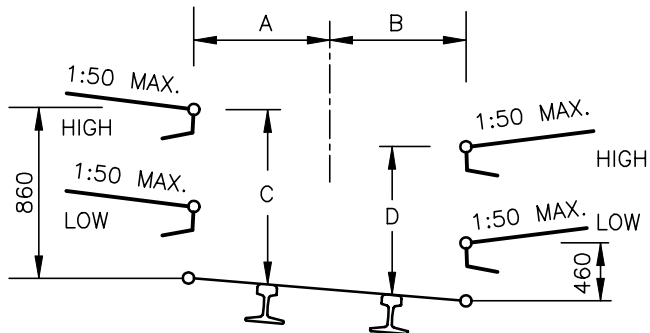
REMARKS:

1. **V** IS THE REQUIRED VERTICAL CLEARANCE EXCEPT WHERE REDUCED CLEARANCE **S** APPLIES.
2. **S** IS THE MINIMUM VERTICAL CLEARANCE FOR STRUCTURES AND TEMPORARY WORK OVER NON-ELECTRIFIED LINES.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR APPLICATION AT CURVES
 - 4.1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 3m BEYOND THE ENDS OF THE CIRCULAR CURVE.
 - 4.2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
 - 4.3 FOR NON-TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 15m ALONG STRAIGHTS.
5. NEW STRUCTURES: SEE BRIDGE CODE.
6. TUNNELS: SEE DRAWING BE 82-35.
7. FOULING POINTS: SEE CLAUSE 8.1.
8. CLEARANCES ARE BASED ON 15m BOGIE CENTRES AND 21,2m VEHICLE BODY LENGTH.
9.  SEE ANNEXURE 1 SHEET 3 FOR PLATFORM CLEARANCES.

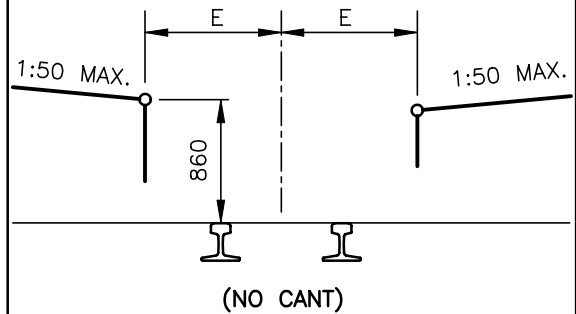
CLEARANCES : PLATFORMS

PLATFORMS : TRACK GAUGE 1 065mm

PASSENGERS




GOODS

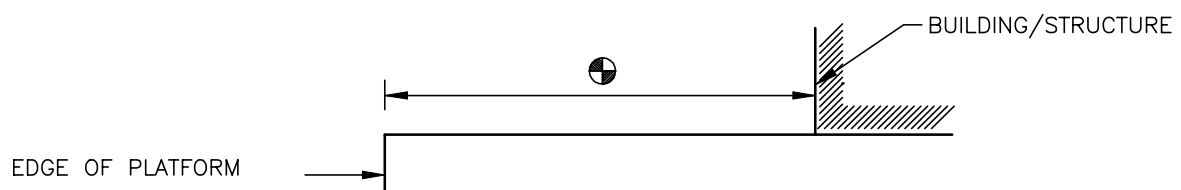


| RADIUS (m) | A (mm) | B (mm) | C (mm) | D (mm) | E (mm) |
|---------------|-----------|-----------|-----------|-----------|-----------|
| 90 | 1 690 | 1 820 | 890 | 810 | 1 840 |
| 100 | 1 650 | 1 790 | 890 | 810 | 1 810 |
| 120 | 1 610 | 1 740 | 890 | 810 | 1 760 |
| 140 | 1 580 | 1 700 | 890 | 810 | 1 720 |
| 170 | 1 550 | 1 660 | 890 | 810 | 1 690 |
| 200 | 1 530 | 1 630 | 890 | 820 | 1 670 |
| 250 | 1 520 | 1 600 | 890 | 820 | 1 640 |
| 300 | 1 520 | 1 580 | 890 | 830 | 1 620 |
| 350 | 1 520 | 1 560 | 880 | 830 | 1 600 |
| 400 | 1 520 | 1 550 | 880 | 840 | 1 590 |
| 500 | 1 520 | 1 540 | 880 | 850 | 1 580 |
| 600 | 1 520 | 1 530 | 870 | 850 | 1 570 |
| 800 | 1 520 | 1 520 | 860 | 860 | 1 560 |
| 1 200 | 1 520 | 1 520 | 860 | 860 | 1 550 |
| 2 000 | 1 520 | 1 520 | 860 | 860 | 1 540 |
| 3 000 | 1 520 | 1 520 | 860 | 860 | 1 530 |
| STRAIGHT | 1 520 | 1 520 | 860 | 860 | 1 520 |

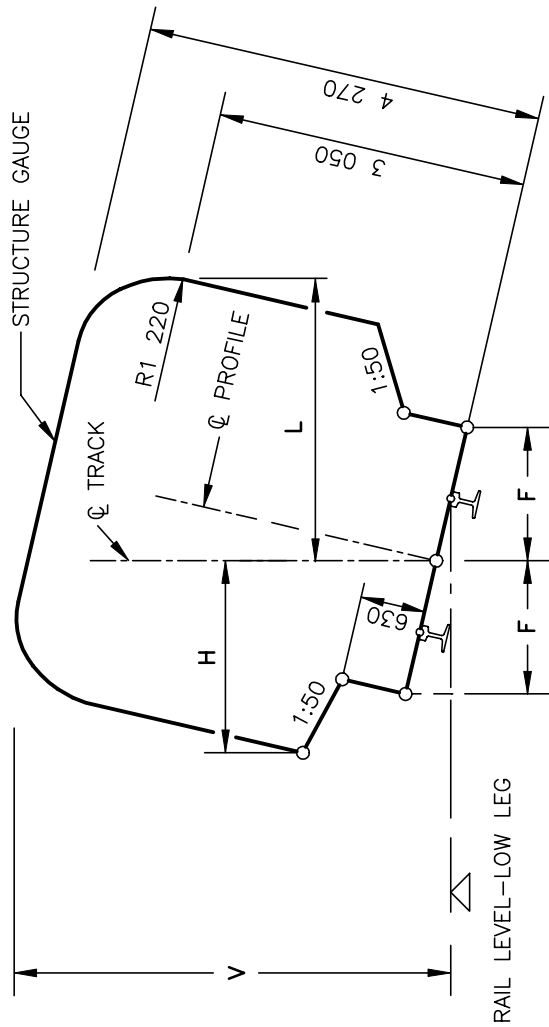
REMARKS:

1. NO CANT TO BE APPLIED EXCEPT WHEN THE GOODS PLATFORM IS ON A RUNNING LINE.
2. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
3.  8m TO MAIN STATION-BUILDINGS AND 3m TO ALL OTHER STRUCTURES.
4. TOLERANCES : SEE CLAUSE 8.0.10.

STRUCTURES ON PLATFORMS : 1 065mm AND 610mm TRACK GAUGE

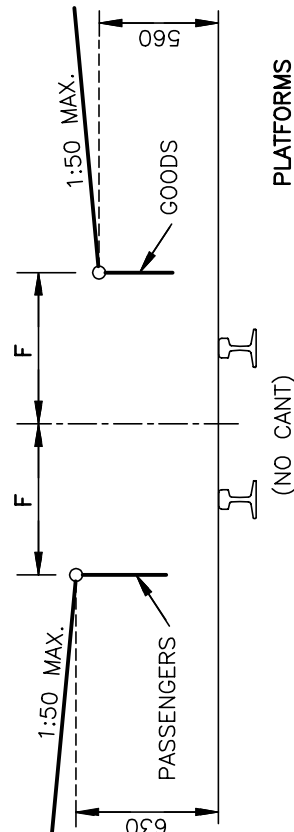


CLEARANCES : 610mm TRACK GAUGE



| RADIUS (m) | F (mm) |
|------------|--------|
| 50 | 1 550 |
| 60 | 1 510 |
| 80 | 1 460 |
| 100 | 1 430 |
| 120 | 1 410 |
| 140 | 1 390 |
| 170 | 1 380 |
| 200 | 1 370 |
| 250 | 1 360 |
| 300 | 1 350 |
| 600 | 1 330 |
| 1 000 | 1 320 |
| >2 000 | 1 320 |
| STRAIGHT | 1 310 |

CLEARANCES



REMARKS:

- H IS THE MINIMUM HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
- L IS THE MINIMUM HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
- V IS THE MINIMUM VERTICAL CLEARANCE.
- FOR APPLICATION AT CURVES:
 - 1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 2m BEYOND THE ENDS OF THE CIRCULAR CURVE.
 - 2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
 - 3 FOR NON-TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 18m ALONG STRAIGHTS.
- INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
- ALSO REFER TO REMARKS 5, 6 AND 7 OF ANNEXURE 1 SHEET 2.
- CLEARANCES ARE BASED ON 9 700mm BOGIE CENTRES AND 13 700mm VEHICLE BODY LENGTH.
- SEE ANNEXURE 1 SHEET 3 FOR STRUCTURES ON PLATFORMS.



C1.2 Contract Data

Part one - Data provided by the *Employer*

| Clause | Statement | Data |
|--------|--|--|
| 1 | General | |
| | The <i>conditions of contract</i> are the core clauses and the clauses for main Option | |
| | | B: Priced contract with bill of quantities |
| | dispute resolution Option | W1: Dispute resolution procedure |
| | and secondary Options | |
| | | X1: Price adjustment for inflation |
| | | X2: Changes in the law |
| | | X7: Delay damages |
| | | X13: Performance Bond |
| | | X16: Retention |
| | | X18: Limitation of liability |
| | | Z: <i>Additional conditions of contract</i> |
| | of the NEC3 Engineering and Construction Contract June 2005 (amended June 2006 and April 2013) | |
| 10.1 | The <i>Employer</i> is: | Transnet SOC Ltd (Registration No. 1990/000900/30) |
| | Address | Registered address: Transnet Corporate Centre 138 Eloff Street Braamfontein Johannesburg 2000 |



TRANSNET FREIGHT RAIL

TENDER NUMBER: SIE21015CIDB (HOAC_HO_36727)

DESCRIPTION OF THE WORKS: FOR DESIGN, SUPPLY, INSTALL, TEST AND COMMISSIONING OF OUTDOOR AND INDOOR TRACTION SUBSTATION EQUIPMENT INCLUDING THE REMOVAL OF OLD AND OBSOLETE ELECTRICAL EQUIPMENT AT VARIOUS TRACTION SUBSTATIONS UNDER HEIDELBERG, LADYSMITH AND DURBAN DEPOTS.

| | | |
|----------|---|--|
| 10.1 | The <i>Project Manager</i> is: (Name) | Selby Mathebula |
| | Address | 138 Eloff Street |
| | Tel | 011 583 0136 |
| | e-mail | Selby.Mathebula@transnet.net |
| 10.1 | The <i>Supervisor</i> is: (Name) | Sinethemba Gqibisa |
| | Address | 138 Eloff Street |
| | Tel No. | 011 583 0154 |
| | e-mail | Sinethemba.Gqibisa@transnet.net |
| 11.2(13) | The <i>works</i> are | For the design, supply, install, test and commissioning of outdoor and indoor Traction Substation equipment including the removal of old and obsolete electrical equipment at various traction Substations under Heidelberg, Ladysmith and Durban Depots |
| 11.2(14) | The following matters will be included in the Risk Register | Safety risk (electrocution, injuries etc.), security risk (theft, vandalism etc.); planning risk (scope creep, budget overrun etc.), Environmental risk (oil spillage, soil pollution etc.) and technical risk (compromised quality, nuisance tripping etc.) |
| 11.2(15) | The <i>boundaries of the site</i> are | As stated in Part C4.1. "Description of the Site and its surroundings" |
| 11.2(16) | The Site Information is in | Part C4 |
| 11.2(19) | The Works Information is in | Part C3 |
| 12.2 | The <i>law of the contract</i> is the law of | the Republic of South Africa subject to the jurisdiction of the Courts of South Africa. |
| 13.1 | The <i>language of this contract</i> is | English |
| 13.3 | The <i>period for reply</i> is | 2weeks |
| 2 | The <i>Contractor's</i> main responsibilities | No additional data is required for this section of the <i>conditions of contract</i> . |
| 3 | Time | |
| 11.2(3) | The <i>completion date</i> for the whole of the <i>works</i> is | 31 May 2025 |
| 11.2(9) | The <i>key dates</i> and the <i>conditions</i> to be met are: | <i>Condition</i> to be met <i>key date</i> |



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| | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|--|---|---------------------------------|-------------------|------------------|------|------------------------------------|-----------------|-----------------------------------|------------------|-----------------------------------|-------------|---------------------------------------|-------------------|------------------------------------|-----------------|--------------------------------------|------------|------------------------------------|----------------|-----------------------------------|-----------------|-----------------------------|--------------|
| | | 1 | Equipment ordering | 30 September 2022 | | | | | | | | | | | | | | | | | | | | |
| | | 2 | Site Establishment | 31 October 2022 | | | | | | | | | | | | | | | | | | | | |
| | | 3 | Site works commence | 1 November 2022 | | | | | | | | | | | | | | | | | | | | |
| | | 4 | Project completion and handover | 30 May 2025 | | | | | | | | | | | | | | | | | | | | |
| 30.1 | The <i>access dates</i> are | <table><tr><td>Part of the Site</td><td>Date</td></tr><tr><td>1 - Georgedale Traction Substation</td><td>1 November 2022</td></tr><tr><td>2 - Umbulwana Traction Substation</td><td>15 February 2023</td></tr><tr><td>3 - Stilwater Traction Substation</td><td>1 June 2023</td></tr><tr><td>4 - Hattingspruit Traction Substation</td><td>15 September 2023</td></tr><tr><td>5 - Dannhauser Traction Substation</td><td>15 January 2024</td></tr><tr><td>6 - Alcockspruit Traction Substation</td><td>1 May 2024</td></tr><tr><td>7 - Vooruitsig Traction Substation</td><td>15 August 2024</td></tr><tr><td>8 - Kromdraai Traction Substation</td><td>1 December 2024</td></tr><tr><td>9 - Val Traction Substation</td><td>1 March 2025</td></tr></table> | | | Part of the Site | Date | 1 - Georgedale Traction Substation | 1 November 2022 | 2 - Umbulwana Traction Substation | 15 February 2023 | 3 - Stilwater Traction Substation | 1 June 2023 | 4 - Hattingspruit Traction Substation | 15 September 2023 | 5 - Dannhauser Traction Substation | 15 January 2024 | 6 - Alcockspruit Traction Substation | 1 May 2024 | 7 - Vooruitsig Traction Substation | 15 August 2024 | 8 - Kromdraai Traction Substation | 1 December 2024 | 9 - Val Traction Substation | 1 March 2025 |
| Part of the Site | Date | | | | | | | | | | | | | | | | | | | | | | | |
| 1 - Georgedale Traction Substation | 1 November 2022 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 - Umbulwana Traction Substation | 15 February 2023 | | | | | | | | | | | | | | | | | | | | | | | |
| 3 - Stilwater Traction Substation | 1 June 2023 | | | | | | | | | | | | | | | | | | | | | | | |
| 4 - Hattingspruit Traction Substation | 15 September 2023 | | | | | | | | | | | | | | | | | | | | | | | |
| 5 - Dannhauser Traction Substation | 15 January 2024 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 - Alcockspruit Traction Substation | 1 May 2024 | | | | | | | | | | | | | | | | | | | | | | | |
| 7 - Vooruitsig Traction Substation | 15 August 2024 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 - Kromdraai Traction Substation | 1 December 2024 | | | | | | | | | | | | | | | | | | | | | | | |
| 9 - Val Traction Substation | 1 March 2025 | | | | | | | | | | | | | | | | | | | | | | | |
| 31.1 | The <i>Contractor</i> is to submit a first programme for acceptance within | 2 weeks of the Contract Date. | | | | | | | | | | | | | | | | | | | | | | |
| 31.2 | The <i>starting date</i> is | 01 June 2022 | | | | | | | | | | | | | | | | | | | | | | |
| 32.2 | The <i>Contractor</i> submits revised programmes at intervals no longer than | 4weeks. | | | | | | | | | | | | | | | | | | | | | | |
| 35.1 | The <i>Employer</i> is not willing to take over the <i>works</i> before the Completion Date. | Employer will take over works that are fully completed, commissioned and handed over for operation and maintenance. | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Testing and Defects | | | | | | | | | | | | | | | | | | | | | | | |
| 42.2 | The <i>defects date</i> is | 52 (fifty two) weeks after Completion of the whole of the <i>works</i> . | | | | | | | | | | | | | | | | | | | | | | |



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| | | |
|----------|---|--|
| 43.2 | The <i>defect correction period</i> is | 2 weeks |
| 5 | Payment | |
| 50.1 | The <i>assessment interval</i> is monthly | 25 th (twenty fifth) day of each successive month. on the |
| 51.1 | The <i>currency of this contract</i> is the | South African Rand. |
| 51.2 | The period within which payments are made is | 30 days from invoice date. |
| 51.4 | The <i>interest rate</i> is | the prime lending rate of Standard Bank of South Africa. |
| 6 | Compensation events | |
| 60.1(13) | The <i>weather measurements</i> to be recorded for each calendar month are, | the cumulative rainfall (mm) the number of days with rainfall more than 10 mm the number of days with minimum air temperature less than 0 degrees Celsius the number of days with snow lying at 08:00 hours South African Time and these measurements: N/A |
| | The place where weather is to be recorded (on the Site) is: | The Contractor's Site establishment area at Georgedale, Umbulwana, Stilwater, Hattingspruit, Dannhausser, Alcockspruit, Vooruitsig, Kroomdraai and Val or at an area closer to the sites mentioned above. |
| | The <i>weather data</i> are the records of past <i>weather measurements</i> for each calendar month which were recorded at: | the sites mentioned above, or if not so issued the national weather data available from the South African Weather Services |
| | and which are available from: | South African Weather Service 012 367 6023 or info3@weathersa.co.za . |
| 7 | Title | No additional data is required for this section of the <i>conditions of contract</i> . |
| 8 | Risks and insurance | |
| 80.1 | These are additional <i>Employer's</i> risks | Included in the risk register and baseline risk assessment |



| | | |
|------|--|--|
| 84.1 | The <i>Employer</i> provides these insurances from the Insurance Table | |
| 1 | Insurance against: | Loss of or damage to the <i>works</i> , Plant and Materials is as stated in the Insurance policy for Contract Works/ Public Liability. |
| | Cover / indemnity: | to the extent as stated in the insurance policy for Contract Works / Public Liability |
| | The deductibles are: | as stated in the insurance policy for Contract Works / Public Liability |
| 2 | Insurance against: | Loss of or damage to property (except the <i>works</i> , Plant and Materials & Equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Contractor</i>) arising out of or in connection with the performance of the Contract as stated in the insurance policy for Contract Works / Public Liability |
| | Cover / indemnity | Is to the extent as stated in the insurance policy for Contract Works / Public Liability |
| | The deductibles are | as stated in the insurance policy for Contract Works / Public Liability |
| 3 | Insurance against: | Loss of or damage to Equipment (Temporary Works only) as stated in the insurance policy for contract Works and Public Liability |
| | Cover / indemnity | Is to the extent as stated in the insurance policy for Contract Works / Public Liability |
| | The deductibles are: | As stated in the insurance policy for Contract Works / Public Liability |
| 4 | Insurance against: | Contract Works SASRIA insurance subject to the terms, exceptions and conditions of the SASRIA coupon |
| | Cover / indemnity | Cover / indemnity is to the extent provided by the SASRIA coupon |
| | The deductibles are | The deductibles are, in respect of each and every theft claim, 0,1% of the contract value subject to a minimum of R2,500 and a maximum of R25,000. |



Note:

The deductibles for the insurance as stated above are listed in the document titled "Certificate of Insurance: Transnet (SOC) Limited Principal Controlled Insurance."

84.1

The minimum limit of indemnity for insurance in respect of death of or bodily injury to employees of the *Contractor* arising out of and in the course of their employment in connection with this contract for any one event is

The *Contractor* must comply at a minimum with the provisions of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 as amended.

The *Contractor* provides these 1 additional Insurances

Where the contract requires that the design of any part of the *works* shall be provided by the *Contractor* the *Contractor* shall satisfy the *Employer* that professional indemnity insurance cover in connection therewith has been affected

2 Where the contract involves manufacture, and/or fabrication of Plant & Materials, components or other goods to be incorporated into the *works* at premises other than the site, the *Contractor* shall satisfy the *Employer* that such plant & materials, components or other goods for incorporation in the *works* are adequately insured during manufacture and/or fabrication and transportation to the site.

3 Should the *Employer* have an insurable interest in such items during manufacture, and/or fabrication, such interest shall be noted by endorsement to the *Contractor's* policies of insurance as well as those of any sub-contractor

4 Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger and Unauthorised Passenger Liability indemnity with a minimum indemnity limit of R5 000 000.



| | | |
|---------|--|--|
| 84.2 | The minimum limit of indemnity for insurance in respect of loss of or damage to property (except the works, Plant, Materials and Equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Contractor</i>) caused by activity in connection with this contract for any one event is | Whatever the <i>Contractor</i> requires in addition to the amount of insurance taken out by the <i>Employer</i> for the same risk. |
| 84.2 | The insurance against loss of or damage to the works, Plant and Materials as stated in the insurance policy for contract works and public liability selected from: | Principal Controlled Insurance policy for Contract |
| 9 | Termination | There is no additional Contract Data required for this section of the <i>conditions of contract</i> . |
| 10 | Data for main Option clause | |
| B | Priced contract with Bill of Quantities | No additional data is required for this Option. |
| 60.6 | The <i>method of measurement</i> is | The Bill of Quantities have been measured in accordance with SANS 1200 unless indicated otherwise. |
| 11 | Data for Option W1 | |
| W1.1 | The <i>Adjudicator</i> is | Both parties will agree as and when a dispute arises. If the parties cannot reach an agreement on the <i>Adjudicator</i> , the Chairman of the Association of Arbitrators will appoint an <i>Adjudicator</i> . |
| W1.2(3) | The <i>Adjudicator nominating body</i> is: | The Chairman of the Association of Arbitrators (Southern Africa) |
| | If no <i>Adjudicator nominating body</i> is entered, it is: | the Association of Arbitrators (Southern Africa) |
| W1.4(2) | The <i>tribunal</i> is: | Arbitration |
| W1.4(5) | The <i>arbitration procedure</i> is | The Rules for the Conduct of Arbitrations of the Association of Arbitrators (Southern Africa) |
| | The place where arbitration is to be held is | Johannesburg, South Africa |



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| | | | |
|---------|---|--|---|
| | The person or organisation who will choose an arbitrator | | |
| | <div><div><div>- if the Parties cannot agree a choice or</div><div>- if the arbitration procedure does not state who selects an arbitrator, is</div></div><div>The Chairman of the Association of Arbitrators (Southern Africa)</div></div> | | |
| 12 | Data for secondary Option clauses | | |
| X1 | Price adjustment for inflation | | |
| X1.1(a) | The <i>base date</i> for indices is | 30 May 2022 | |
| X1.1(b) | The <i>latest date</i> for indices is | One (1) calendar month prior to date of measurement. | |
| X1.1(c) | The proportions used to calculate the Price Adjustment Factor are: | | |
| | Pro-portion | linked to index for | Index prepared by |
| | 0.30 | Labour (People) | The Consumer Price Index (CPI) for "All Items" in Table 1 (Consumer price indices for the total country) of the Statistical Release P0141 "Consumer Price Index - Additional Tables" published by Statistics South Africa. (Link- http://www.statssa.gov.za/?page_id=1854&PPN=P0141) |

| | | | | |
|------|--|--|--------------------------|---|
| | | 0.10 | Plant (Equipment) | The "Plant and Equipment" index in Table 4 (Mining and construction plant and equipment price index) of the Statistical Release P0151.1 "Construction Materials Price Indices" published by Statistics South Africa. (Link - http://www.statssa.gov.za/?page_id=1854&PPN=P0151.1) |
| | | 0.40 | Material (Electrical) | The "Electrical Engineering" index in Table 5 (Mechanical and Electrical Engineering Input Price Indices) of the Statistical Release P0151.1 "Construction Materials Price Indices" published by Statistics South Africa. |
| | | 0.10 | Fuel | The "Diesel" index in Table 1 (PPI for final manufactured goods) of the Statistical Release P0142.1 "Producer Price Index" published by Statistics South Africa. (Link - http://www.statssa.gov.za/?page_id=1854&PPN=P0142.1) |
| | | 1.00 | | |
| | | 0.10 | Non-adjustable | |
| | *Statistical release P0151 – Contract Price Adjustment Provisions (CPAP) Work Group and Selected Materials Indices | | | |
| X2 | Changes in the law | No additional data is required for this Option | | |
| X7 | Delay damages | | | |
| X7.1 | Delay damages for Completion of the whole of the <i>works</i> are | R5000 per day | | |
| X13 | Performance bond | | | |



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| | | |
|-------|---|--|
| X13.1 | The amount of the performance bond is 5 (five)% of the total of the Prices at Contract Date | The performance bond need to be issued by a financial institution/bank with a minimum long term credit rating of A3 (Moody's), A- (Standard and Poors) and or A- (Fitch Ratings) and need acceptance by Transnet before such bonds are issued" |
| X16 | Retention | |
| X16.1 | The retention percentage is | 10% on all payments certified. |
| X18 | Limitation of liability | |
| X18.1 | The <i>Contractor's</i> liability to the <i>Employer</i> for indirect or consequential loss is limited to: | Nil (this is the default position depending on a risk assessment, therefore this can go up to Total of the Prices) |
| X18.2 | For any one event, the <i>Contractor's</i> liability to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property is limited to: | The deductible of the relevant insurance policy |
| X18.3 | The <i>Contractor's</i> liability for Defects due to his design which are not listed on the Defects Certificate is limited to: | The cost of correcting the Defect |
| X18.4 | The <i>Contractor's</i> total liability to the <i>Employer</i> for all matters arising under or in connection with this contract, other than excluded matters, is limited to: | The Total of the Prices |
| X18.5 | The <i>end of liability date</i> is | 5 years after Completion of the whole of the <i>works</i> |
| Z | <i>Additional conditions of contract are:</i> | |



| | | |
|------|---|---|
| Z1 | Obligations in respect of Job Creation | |
| Z1.1 | | It will be a material term of this contract that the <i>Contractor</i> must contribute to the <i>Employer's</i> job-creation objectives as set out in Returnable Schedule T2.2-25 |
| Z1.2 | | The <i>Contractor's</i> undertaking as to the number of new jobs created due to the award of this contract as set out in Returnable Schedule T.2.2-25 will constitute a binding agreement throughout the duration of the contract until Completion, if not, it will be deemed that the <i>Contractor</i> has failed in full to meet this specific material term of the contract, which may constitute a reason for termination.. |
| Z1.3 | | The <i>Contractor</i> shall provide to the <i>Employer</i> , on a monthly basis or upon receiving an instruction to do so by the <i>Project Manager</i> , any documentation and/or evidence required by the <i>Employer</i> , which in the <i>Employer's</i> opinion would be necessary to verify whether the <i>Contractor</i> has maintained the job-creation undertaking as stipulated in Returnable Schedule T.2.2 -25 The <i>Contractor</i> shall provide the said documentation and/or evidence within the period stated or as instructed. The provision of the documentation and/or evidence shall not constitute a compensation event. |
| Z2 | Additional clause relating to Performance Bonds and/or Guarantees | |
| Z2.1 | | The Performance Guarantee under X13 above shall be an irrevocable, on-demand performance guarantee, to be issued exactly in the form of the Pro Forma documents provided for this purpose under C1.3 (Forms of Securities), in favour of the <i>Employer</i> by a financial institution reasonably acceptable to the <i>Employer</i> . |



Z3 Additional clauses relating to Joint Venture

Z3.1

Insert the additional core clause 27.5

27.5. In the instance that the *Contractor* is a joint venture, the *Contractor* shall provide the *Employer* with a certified copy of its signed joint venture agreement, and in the instance that the joint venture is an 'Incorporated Joint Venture,' the Memorandum of Incorporation, within 4 (four) weeks of the Contract Date.

The Joint Venture agreement shall contain but not be limited to the following:

- A brief description of the Contract and the Deliverables;
- The name, physical address, communications addresses and domicilium citandi et executandi of each of the constituents and of the Joint Venture;
- The constituent's interests;
- A schedule of the insurance policies, sureties, indemnities and guarantees which must be taken out by the Joint Venture and by the individual constituents;
- Details of an internal dispute resolution procedure;
- Written confirmation by all of the constituents:
 - i. of their joint and several liabilities to the *Employer* to Provide the Works;
 - ii. identification of the lead partner in the joint venture confirming the authority of the lead partner to bind the joint venture through the *Contractor's* representative;
 - iii. Identification of the roles and responsibilities of the constituents to provide the Works.
- Financial requirements for the Joint Venture:
 - iv. the working capital requirements for the Joint Venture and the extent to which and manner whereby this will be provided and/or guaranteed by the constituents from time to time;
 - v. the names of the auditors and others, if any, who will provide



auditing and accounting services to the Joint Venture.

Z3.2

Insert additional core clause 27.6

27.6. The *Contractor* shall not alter its composition or legal status of the Joint Venture without the prior approval of the *Employer*.

Z4

Additional obligations in respect of Termination

Z4.1

The following will be included under core clause 91.1: In the second main bullet, after the word 'partnership' add 'joint venture whether incorporate or otherwise (including any constituent of the joint venture)' and

Under the second main bullet, insert the following additional bullets after the last sub-bullet:

- commenced business rescue proceedings (R22)
- repudiated this Contract (R23)

Z4.2

Termination Table

The following will be included under core clause 90.2 Termination Table as follows:

Amend "A reason other than R1 – R21" to "A reason other than R1 – R23"

Z4.3

Amend "R1 – R15 or R18" to "R1 – R15, R18, R22 or R23."

Z5

Right Reserved by the *Employer* to Conduct Vetting through SSA

Z5.1

The *Employer* reserves the right to conduct vetting through State Security Agency (SSA) for security clearances of any *Contractor* who has access to National Key Points for the following without limitations:

1. Confidential – this clearance is based on any information which may be used by malicious, opposing or hostile elements to harm the objectives and functions of an organ of state.



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DESCRIPTION OF THE WORKS: FOR DESIGN, SUPPLY, INSTALL, TEST AND COMMISSIONING OF OUTDOOR AND INDOOR TRACTION SUBSTATION EQUIPMENT INCLUDING THE REMOVAL OF OLD AND OBSOLETE ELECTRICAL EQUIPMENT AT VARIOUS TRACTION SUBSTATIONS UNDER HEIDELBERG, LADYSMITH AND DURBAN DEPOTS.

| | | |
|------|--|--|
| | | <ol style="list-style-type: none"> 2. Secret – clearance is based on any information which may be used by malicious, opposing or hostile elements to disrupt the objectives and functions of an organ of state. 3. Top Secret – this clearance is based on information which may be used by malicious, opposing or hostile elements to neutralise the objectives and functions of an organ of state. |
| Z6 | Additional Clause Relating to Collusion in the Construction Industry | |
| Z6.1 | | The contract award is made without prejudice to any rights the <i>Employer</i> may have to take appropriate action later with regard to any declared tender rigging including blacklisting. |
| Z7 | Protection of Personal Information Act | |
| Z7.1 | | The <i>Employer</i> and the <i>Contractor</i> are required to process information obtained for the duration of the Agreement in a manner that is aligned to the Protection of Personal Information Act. |



Z8 Foreign Exchange Rate Fluctuation

- Z8.1 The amount payable to the Contractor in respect of rate exchange will be adjusted for increases and decreases in costs of imported materials, due to fluctuations in foreign currency exchange rates after the conclusion of the Contract. Tenderers shall indicate whether or not their tenders or part(s) thereof are subject to variation on account of exchange rate fluctuations.
- Z8.2 Where no particulars are furnished, such tenders will be deemed to be not subject to variation on account of exchange rate fluctuations.
- Z8.3 Bidders must show the currency and currency amount of imported content rather than only the rand equivalent amount. For this procurement event to be easily evaluated, all foreign currency will be converted to the local currency (ZAR) as per the rates at close business on dd/mm/yy on the Reserve Banks' website
(<https://www.resbank.co.za/Research/Rates/Pages/SelectedHistoricalExchangeAndInterestRates.aspx>)
- Z8.4 The Contractor at its own cost obtains forward exchange cover on foreign currency to protect itself against any currency rate fluctuation risks from the date of tender submission until the end of the service period. The cost of foreign exchange rate hedging executed by the Contractor need to be accepted by Transnet Freight Rail before a final rand Price is established. The Employer does not accept any fluctuations in the rate of exchange at the time when payments are made. The contractor to complete Returnable Schedule **T2.2-18**
- Z8.5 Forward cover to be arranged by the contractor within 2 weeks after notification of award
-



| Z9 | Contract price adjustment factor additional clauses |
|------|---|
| Z9.1 | A contract price adjustment factor to be determined in accordance with Contract Price Adjustment Provision will be applied to allow for all increases or decreases in costs, from any cause whatsoever, which may occur after the closing date of the submission of tenders and before the date of completion. The factor shall be rounded off to four decimal places |
| Z9.2 | When the value of an index at the time of calculation is not known the latest available index shall be used and any correction necessary shall be made by addition or subtraction in subsequent monthly payment certificates. |
| Z9.3 | The amounts to be added to or subtracted from the monthly payment certificates shall be calculated by multiplying the amount certified for payment for that month (but excluding amounts not subject to price adjustment) by the contract price adjustment factor for that month. |
| Z9.4 | Any additions to or deductions from the amount payable, brought about by the application of the contract price adjustment factor, shall be deemed to have made full allowance for all increases or decreases in cost from any cause whatsoever, including all overhead costs as well as any increases and decreases therein, and profit. |
| Z9.5 | Value added tax shall be excluded from individual payment item rates and price adjustment indices as it will be added to the total of the month's measurement, after price adjustment has been made in terms hereof. |
| Z9.6 | <p>The formulae to be used for calculating the contract price adjustment factor (PAF) is given below as:</p> $PAF = 0.3 \left(\frac{Lt}{Lo} - 1 \right) + 0.1 \left(\frac{Pt}{Po} - 1 \right) + 0.4 \left(\frac{Mt}{Mo} - 1 \right) + 0.1 \left(\frac{Ft}{Fo} - 1 \right)$ <p>Where: Lo, Po, Mo and Fo are respectively labour, machinery, material and diesel fuel indices ruling for the calendar</p> |

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month one (1) month prior to closing date of the tender and;

Lt, Pt, Mt and Ft are respectively labour, machinery, material and diesel fuel indices ruling for the calendar month one (1) month prior to the date of measurement

C1.2 Contract Data

Part two - Data provided by the *Contractor*

The tendering *Contractor* is advised to read both the NEC3 Engineering and Construction Contract - June 2005 (with amendments June 2006 and April 2013) and the relevant parts of its Guidance Notes (ECC3-GN) in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on pages 156 to 158 of the ECC3 Guidance Notes.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

| Clause | Statement | Data |
|----------|--|--|
| 10.1 | The <i>Contractor</i> is (Name): | |
| | Address | |
| | Tel No. | |
| | Fax No. | |
| 11.2(8) | The <i>direct fee percentage</i> is | % |
| | The <i>subcontracted fee percentage</i> is | % |
| 11.2(18) | The <i>working areas</i> are the Site and | |
| 24.1 | The <i>Contractor's</i> key persons are: | |
| | 1 Name: | |
| | Job: | |
| | Responsibilities: | |
| | Qualifications: | |
| | Experience: | |
| | 2 Name: | |
| | Job | |
| | Responsibilities: | |
| | Qualifications: | |
| | Experience: | |
| | | CV's (and further key persons data including CVs) are appended to Tender Schedule entitled . |

| | | |
|----------|---|--|
| 11.2(14) | The following matters will be included in the Risk Register | |
| B | Priced contract with bill of quantities | |
| 11.2(21) | The <i>bill of quantities</i> is in | |
| | | |
| | Data for Schedules of Cost Components | <i>Note "SCC" means Schedule of Cost Components starting on page 60 of ECC, and "SSCC" means Shorter Schedule of Cost Components starting on page 63 of ECC.</i> |

| | | | | |
|------------|--|--|------------------|-------------|
| B | Priced contract with bill of quantities | Data for the Shorter Schedule of Cost Components | | |
| 41 in SSCC | The percentage for people overheads is: | % | | |
| 21 in SSCC | The published list of Equipment is the last edition of the list published by | | | |
| | The percentage for adjustment for Equipment in the published list is | % (state plus or minus) | | |
| 22 in SSCC | The rates of other Equipment are: | Equipment | Size or capacity | Rate |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 61 in SSCC | The hourly rates for Defined Cost of design outside the Working Areas are | Category of employee | | Hourly rate |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 62 in SSCC | The percentage for design overheads is | % | | |

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| | | |
|---------------|--|--|
| 63 in SSCC | The categories of design employees whose travelling expenses to and from the Working Areas are included in Defined Cost are: | |
| | | |

C1.3 Forms of Securities

Pro forma Performance Guarantee

For use with the NEC3 Engineering & Construction Contract - June 2005 (with amendments June 2006 and April 2013)

The *conditions of contract* stated in the Contract Data Part 1 include the following Secondary Option:

Option X13: Performance bond

The pro forma document for this Guarantee is provided here for convenience but is to be treated as part of the *Works Information*.

The organisation providing the Guarantee does so by copying the pro forma document onto its letterhead without any change to the text or format and completing the required details. The completed document is then given to the *Employer* within the time stated in the contract.

The Performance Bond needs to be issued by an institution that are reasonably acceptable to the *Employer*.

Transnet may choose to not to accept an Issuer. Should the issuer not being accepted, the performance bond needs to be replaced by an issuer that are acceptable to Transnet. Issuers need to be verified for acceptance by Transnet before a performance bond is issued.

Pro-forma Performance Bond (for use with Option X13)

(to be reproduced exactly as shown below on the letterhead of the Surety)

Transnet SOC Ltd
C/o Transnet Freight Rail
Transnet Corporate Centre
138 Eloff Street
Braamfontein
Johannesburg

Date:

Dear Sirs,

Performance Bond for Contract No. SIE21015CIDB (HOAC_HO_36727)

With reference to the above numbered contract made or to be made between

Transnet SOC Limited, Registration No. 1990/000900/30 (the *Employer*) and

{Insert registered name and address of the Contractor} (the *Contractor*), for

{Insert details of the works from the Contract Data} (the *works*).

I/We the undersigned

on behalf of the
Guarantor

of physical address

and duly authorised thereto do hereby bind ourselves as Guarantor and co-principal debtors in solidum for the due and faithful performance of all the terms and conditions of the Contract by the *Contractor* and for all losses, damages and expenses that may be suffered or incurred by the *Employer* as a result of non-performance of the Contract by the *Contractor*, subject to the following conditions:

1. The terms *Employer*, *Contractor*, *Project Manager*, *works* and Completion Certificate have the meaning as assigned to them by the *conditions of contract* stated in the Contract Data for the aforesaid Contract.
2. We renounce all benefits from the legal exceptions "Benefit of Excussion and Division", "No value received" and all other exceptions which might or could be pleaded against the validity of this bond, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted.
3. The *Employer* has the absolute right to arrange his affairs with the *Contractor* in any manner which the *Employer* deems fit and without being advised thereof the Guarantor shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the Guarantor. Without derogating from the foregoing compromise, extension of the construction period, indulgence, release or variation of the *Contractor's* obligation shall not affect the validity of this performance bond.

4. This bond will lapse on the earlier of

- the date that the Guarantor receives a notice from the *Project Manager* stating that the Completion Certificate for the whole of the *works* has been issued, that all amounts due from the *Contractor* as certified in terms of the contract have been received by the *Employer* and that the *Contractor* has fulfilled all his obligations under the Contract, or
- the date that the Surety issues a replacement Performance Bond for such lesser or higher amount as may be required by the *Project Manager*.

5. Always provided that this bond will not lapse in the event the Guarantor is notified by the *Project Manager*, (before the dates above), of the *Employer's* intention to institute claims and the particulars thereof, in which event this bond shall remain in force until all such claims are paid and settled.

6. The amount of the bond shall be payable to the *Employer* upon the *Employer's* demand and no later than 7 days following the submission to the Guarantor of a certificate signed by the *Project Manager* stating the amount of the *Employer's* losses, damages and expenses incurred as a result of the non-performance aforesaid. The signed certificate shall be deemed to be conclusive proof of the extent of the *Employer's* loss, damage and expense.

7. Our total liability hereunder shall not exceed the sum of:

(say) _____

R _____

8. This Performance Bond is neither negotiable nor transferable and is governed by the laws of the Republic of South Africa, subject to the jurisdiction of the courts of the Republic of South Africa

Signed at _____ on this _____ day of _____ 201_

Signature(s)

Name(s) (printed)

Position in Guarantor company

Signature of Witness(s)

Name(s) (printed)



C1.1: Form of Offer & Acceptance

Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

FOR DESIGN, SUPPLY, INSTALL, TEST AND COMMISSIONING OF OUTDOOR AND INDOOR TRACTION SUBSTATION EQUIPMENT INCLUDING THE REMOVAL OF OLD AND OBSOLETE ELECTRICAL EQUIPMENT AT VARIOUS TRACTION SUBSTATIONS UNDER HEIDELBERG, LADYSMITH AND DURBAN DEPOTS

The tenderer, identified in the Offer signature block, has

| | |
|---------------|---|
| <i>either</i> | examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender. |
| <i>or</i> | examined the draft contract as listed in the Acceptance section and agreed to provide this Offer. |

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Contractor* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the *conditions of contract* identified in the Contract Data.

| | |
|---|----------|
| The offered total of the Prices exclusive of VAT is | R |
| Value Added Tax @ 15% is | R |
| The offered total of the Prices inclusive of VAT is | R |
| (in words) | |

This Offer may be accepted by the Employer by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the *conditions of contract* identified in the Contract Data.

Signature(s)

Name(s)

Capacity

**For the
tenderer:**

(Insert name and address of organisation)

Name &
signature of
witness

Date

Tenderer's CIDB registration number:



Acceptance

By signing this part of this Form of Offer and Acceptance, the *Employer* identified below accepts the tenderer's Offer. In consideration thereof, the *Employer* shall pay the *Contractor* the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the *Employer* and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

| | |
|---------|--|
| Part C1 | Agreements and Contract Data, (which includes this Form of Offer and Acceptance) |
| Part C2 | Pricing Data |
| Part C3 | Scope of Work: Works Information |
| Part C4 | Site Information |

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any).

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s)

Name(s)

Capacity

**for the
Employer**

Transnet SOC Ltd

(Insert name and address of organisation)

Name &
signature of
witness

Date



Schedule of Deviations

Note:

1. To be completed by the Employer prior to award of contract. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

| No. | Subject | Details |
|-----|---------|---------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

| | For the tenderer: | For the Employer |
|-----------------------------|--|------------------|
| Signature | _____ | _____ |
| Name | _____ | _____ |
| Capacity | _____ | _____ |
| On behalf of | <i>(Insert name and address of organisation)</i> | Transnet SOC Ltd |
| Name & signature of witness | _____ | _____ |
| Date | _____ | _____ |



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PART 2: PRICING DATA

| Document reference | Title | No of pages |
|--------------------|--------------------------------|-------------|
| C2.1 | Pricing instructions: Option B | 3 |
| C2.2 | The <i>bill of quantities</i> | |

C2.1 Pricing instructions: Option B

1. The *conditions of contract*

1.1. How the contract prices work and assesses it for progress payments

Clause 11 in NEC3 Engineering and Construction Contract, June 2005 and 2013 (ECC) Option B states:

| | | |
|-------------------------------------|------|---|
| Identified and defined terms | 11 | |
| | 11.2 | <p>(21) The Bill of Quantities is the <i>bill of quantities</i> as changed in accordance with this contract to accommodate implemented compensation events and for accepted quotations for acceleration.</p> <p>(22) Defined Cost is the cost of the components in the Shorter Schedule of Cost Components whether work is subcontracted or not excluding the cost of preparing quotations for compensation events.</p> <p>(28) The Price for Work Done to Date is the total of</p> <ul style="list-style-type: none"> the quantity of the work which the <i>Contractor</i> has completed for each item in the Bill of Quantities multiplied by the rate and a proportion of each lump sum which is the proportion of the work covered by the item which the <i>Contractor</i> has completed. <p>Completed work is work without Defects which would either delay or be covered by immediately following work.</p> <p>(31) The Prices are the lump sums and the amounts obtained by multiplying the rates by the quantities for the items in the Bill of Quantities.</p> |

This confirms that Option B is a re-measurement contract and the bill comprises only items measured using quantities and rates or stated as lump sums. Value related items are not used. Time related items are items measured using rates where the rate is a unit of time.



1.2. Function of the Bill of Quantities

Clause 55.1 in Option B states, "Information in the Bill of Quantities is not Works Information or Site Information". This confirms that instructions to do work or how it is to be done are not included in the Bill, but in the Works Information. This is further confirmed by Clause 20.1 which states, "The *Contractor* Provides the Works in accordance with the Works Information". Hence the *Contractor* does **not** Provide the Works in accordance with the Bill of Quantities. The Bill of Quantities is only a pricing document.

1.3. Guidance before pricing and measuring

Employers preparing tenders or contract documents, and tendering contractors are advised to consult the sections dealing with the bill of quantities in the NEC3 Engineering and Construction Contract (June 2005) Guidance Notes before preparing the *bill of quantities* or before entering rates and lump sums into the *bill*.

Historically bill of quantities based contracts in South Africa have been influenced by the different approaches of the civil engineering and building sectors of the industry through their respective discipline based standard forms of contract and methods of measurement. This is particularly apparent in the approach to the Preliminary and General bill. On the other hand, because ECC caters for a number of disciplines in the same contract, including electrical works, a different approach not currently found in local methods of measurement to the Preliminary & General bill items may have been used.

The NEC approach to the P & G bill assumes use will be made of method related charges for Equipment applied to Providing the Works based on durations shown in the Accepted Programme, fixed charges for the use of Equipment that is required throughout the construction phase, time related charges for people working in a supervisory capacity for the period required, and lump sum charges for other facilities or services not directly related to performing work items typically included in other parts of the bill.



2. Measurement and payment

2.1. Symbols

The units of measurement described in the Bill of Quantities are metric units abbreviated as follows:

| Abbreviation | Unit |
|-----------------------|-----------------|
| % | percent |
| h | hour |
| kg | kilogram |
| kl | kilolitre |
| km | kilometre |
| kW | kilowatt |
| l | litre |
| m | metre |
| mm | millimetre |
| m ² | square metre |
| m ³ | cubic metre |
| No. | number |
| Prov sum ¹ | provisional sum |
| kV | kilovolt |
| R/only | Rate only |

¹ Provisional Sums should not be used unless absolutely unavoidable. Rather include specifications and associated bill items for the most likely scope of work, and then change later using the compensation event procedure if necessary. This is because tenderers cannot programme effectively for unknown scopes of work



| | |
|-------|----------|
| sum | Lump sum |
| W/day | Work day |

2.2. General assumptions

- 2.2.1. Unless otherwise stated, items are measured net in accordance with the drawings, and no allowance has been made in the quantities for waste.
- 2.2.2. The Prices and rates stated for each item in the Bill of Quantities shall be treated as being fully inclusive of all work, risks, liabilities, obligations, overheads, profit and everything necessary as incurred or required by the *Contractor* in carrying out or providing that item.
- 2.2.3. Clause 63.13 in Option B provides that these rates and Prices may be used as a basis for assessment of compensation events instead of Defined Cost.
- 2.2.4. Where this contract requires detailed drawings, designs or other information to be provided, and no rates or prices are included in the *bill* specifically for such matters, then the *Contractor* is deemed to have allowed for all costs associated with such requirements within the tendered rates and Prices in the Bill of Quantities.
- 2.2.5. An item against which no Price is entered will be treated as covered by other Prices or rates in the *bill of quantities*. If a number of items are grouped together for pricing purposes, this will be treated as a single lump sum.
- 2.2.6. The quantities contained in the Bill of Quantities may not be final and do not necessarily represent the actual amount of work to be done. The quantities of work assessed and certified for payment by the *Project Manager* at each assessment date will be used for determining payments due and not the quantities given in the Bill of Quantities.
- 2.2.7. The short descriptions of the items of payment given in the *bill of quantities* are only for the purposes of identifying the items. More detail regarding the extent of the work entailed under each item is provided in the Works Information.

TOTAL AND IMPORTED CONTENT - TABLE 2

ContainerCor

| A - TOTALS | |
|---------------------|--|
| Georgedale Total | |
| Umbulwana Total | |
| Stillwater Total | |
| Hattingspruit Total | |
| Dannhauser Total | |
| Alcockspruit Total | |
| Vooruitsig Total | |
| Kroomdraai Total | |
| Val Total | |
| Training | |
| GRAND TOTAL | |

| B - IMPORTED CONTENT | | | | | | |
|----------------------|-------------|-------------------|---------------|--------------|----------|-------------|
| Item No. | Description | Country of Origin | Exchange Rate | Rates | Quantity | Amount/Cost |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | TOTAL | | |

| C - RATES | | | | |
|-----------|--|----------------|--------|------------------------|
| No. | Item | Unit | Rates | |
| | | | Labour | Material and Equipment |
| 1 | Cleaning/Sreening of existing crusher stones and putting them back | Per Substation | | |
| 2 | Cast foundation for primary surge arresters | Per Substation | | |
| 3 | Supply and Install new steelwork for primary surge arresters | Per Substation | | |
| | | | | |

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>ALCOCKSPRUIT SUBSTATION (DOUBLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment including existing current transformer steel structure | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 1,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 2,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 3,0 | <u>AC Earth Leakage</u> | | | | | | | | |
| 3,1 | Supply and install AC Earth Leakage Protection | each | N/A | N/A | | 2 | | | |
| 4,0 | <u>Substation interlocking</u> | | | | | | | | |
| 4,1 | Supply and install outdoor and indoor equipment mechanical interlocking | sum | N/A | N/A | | 1 | | | |
| 5,0 | <u>Secondary Surge Arrestors</u> | | | | | | | | |
| 5,1 | Supply and install secondary freestanding 88kV surge arrestors complete with foundations and steel structures on main transformer HV side | each | Steel Substation Structures | 100% | | 6 | | | |
| 6,0 | <u>Main Current Transformers</u> | | | | | | | | |
| 6,1 | Supply and install outdoor 88kV Current Transformers between primary circuit breaker and secondary surge arrestors | each | N/A | N/A | | 4 | | | |
| 6,2 | Cast new foundations, supply and install new lattice structure to mount the new CT's | each | Steel | 100% | | 4 | | | |
| 7,0 | <u>AC Disconnect and earthing switches</u> | | | | | | | | |
| 7,1 | Supply and install new 88kV AC disconnects | sum | N/A | N/A | | 2 | | | |
| 8,0 | <u>Auxilliary Transformer</u> | | | | | | | | |

| | | | | | | | | | |
|------|---|------|-----------------------|------|--|----|--|--|--|
| 8,1 | Supply and install 50kVA auxilliary transformer | each | Transformer (class 0) | 100% | | 2 | | | |
| 9,0 | Main Traction Transformer | | | | | | | | |
| 9,1 | Supply and Install new 5MVA traction transformer | each | Transformer (Class 1) | 80% | | 2 | | | |
| 9,2 | Demolish the existing transformer plinth and cast a new transformer plinth with a bundwall system | each | Steel | 100% | | 2 | | | |
| 9,3 | Supply and install PVC mesh grid drain cover to secure the concrete gutter (Bundwall). | each | N/A | N/A | | 2 | | | |
| 10,0 | Fencing | | | | | | | | |
| 10,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicuit Breaker | m | Steel | 100% | | 28 | | | |
| 10,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 2 | | | |
| 11,0 | Gate Switch and Spark Gap | | | | | | | | |
| 11,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 12,0 | Security lighting | | | | | | | | |
| 12,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 12,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| | Other, (Specify) | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|---------|---|------|-------------------|-----|--|----------|-----------------------|-------------------|----------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | 3kV DC High Speed Circuit Breaker | | | | | | | | |
| 1,1 | Supply and install trucks, modular cells and high speed cirucit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 4 | | | |
| 1,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 2,0 | Substation Wavefilter | | | | | | | | |
| 2,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 2 | | | |
| 3,0 | Substation Light and Power Distribution | | | | | | | | |
| 3,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |

| | | | | | | | | | |
|-----|---|------|-------------------|------|--|---|--|--------------------|--|
| 4,0 | <u>Traction Substation Battery Charger</u> | | | | | | | | |
| 4,1 | Supply and install new battery charger | each | N/A | N/A | | 1 | | | |
| 5,0 | <u>Substation Ventilation and Cooling</u> | | | | | | | | |
| 5,1 | Design, supply and install building ventilation (including battery room ventilation) | sum | Steel | 100% | | 1 | | | |
| 6,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 6,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| 7,0 | <u>Traction Substation Batteries</u> | | | | | | | | |
| 7,1 | Supply and Install Substation batteries | sum | N/A | N/A | | 1 | | | |
| 8,0 | <u>Automatic Changeover Facility</u> | | | | | | | | |
| 8,1 | Supply and install automatic changeover facility with cabling and interconnections for the unit A and B auxilliary supply | each | Electrical Cables | 90% | | 1 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Alcockspruit Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>DANNHAUSER SUBSTATION (DOUBLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment including existing current transformer steel structure | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 1,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 2,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 3,0 | <u>Secondary Surge Arrestors</u> | | | | | | | | |
| 3,1 | Supply and install secondary freestanding 88kV surge arrestors complete with foundations and steel structures on main transformer HV side | each | Steel Substation Structures | 100% | | 6 | | | |
| 4,0 | <u>AC Disconnect and earthing switches</u> | | | | | | | | |
| 4,1 | Supply and install new 88kV AC disconnects | sum | N/A | N/A | | 2 | | | |
| 5,0 | <u>Auxilliary Transformer (unit A & B)</u> | | | | | | | | |
| 5,1 | Supply and install 50kVA auxullary transformer | each | Transformer (class 0) | 100% | | 2 | | | |
| 6,0 | <u>Main Current Transformers</u> | | | | | | | | |
| 6,1 | Supply and install outdoor 88kV Current Transformers between primary circuit breaker and secondary surge arrestors | each | N/A | N/A | | 4 | | | |
| 6,2 | Cast new foundations, supply and install new lattice structure to mount the new CT's | each | Steel | 100% | | 4 | | | |
| 7,0 | <u>Fencing</u> | | | | | | | | |
| 7,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicut Breaker | m | Steel | 100% | | 28 | | | |
| 7,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 2 | | | |

| | | | | | | | | | |
|------|---|------|--------------------------|------|--|---|--|--|--|
| 8,0 | <u>AC Earth Leakage</u> | | | | | | | | |
| 8,1 | Supply and install AC Earth Leakage Protection | each | N/A | N/A | | 2 | | | |
| 9,0 | <u>Main Traction Transformer</u> | | | | | | | | |
| 9,1 | Supply and Install new 5MVA traction transformer | each | Transformer (Class 1) | 80% | | 2 | | | |
| 9,2 | Demolish the existing transformer plinth and cast a new transformer plinth with a bundwall system | each | Steel | 100% | | 2 | | | |
| 9,3 | Supply and install PVC mesh grid drain cover to secure the concrete gutter (Bundwall). | each | N/A | N/A | | 2 | | | |
| 10,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 10,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 11,0 | <u>Security lighting</u> | | | | | | | | |
| 11,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 11,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|---------|---|------|----------------------|-----|--|----------|--------------------------|----------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>3kV DC High Speed Circuit Breaker</u> | | | | | | | | |
| 1,1 | Supply and install trucks, modular cells and high speed cirucit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 4 | | | |
| 1,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 2,0 | <u>Substation Wavefilter Equipment</u> | | | | | | | | |
| 2,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 2 | | | |
| 3,0 | <u>Traction Substation Batteries</u> | | | | | | | | |
| 3,1 | Supply and Install Substation batteries | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 4,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |

| | | | | | | | | | |
|-----|---|------|-------------------|------|--|---|--|------------------|--|
| 5,0 | <u>Substation interlocking</u> | | | | | | | | |
| 5,1 | Supply and install outdoor and indoor equipment mechanical interlocking | sum | N/A | N/A | | 1 | | | |
| 6,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 6,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| 7,0 | <u>Substation Ventilation and Cooling</u> | | | | | | | | |
| 7,1 | Design, supply and install building ventilation (including battery room ventilation) | sum | Steel | 100% | | 1 | | | |
| 8,0 | <u>Automatic Changeover Facility</u> | | | | | | | | |
| 8,1 | Supply and install automatic changeover facility with cabling and interconnections for the unit A and B auxilliary supply | each | Electrical Cables | 90% | | 1 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Dannhauser Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|---------|---|------|--------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>GEORGEDALE SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment including existing current transformer steel structure | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 1,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 2,0 | <u>Main Current Transformers</u> | | | | | | | | |
| 2,1 | Supply and install outdoor 88kV Current Transformers between primary circuit breaker and secondary surge arrestors | each | N/A | N/A | | 2 | | | |
| 2,2 | Cast new foundations, supply and install new lattice structure to mount the new CT's | each | Steel | 100% | | 2 | | | |
| 3,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 3,1 | Supply and install new cabling and interconnections in outdoor yard | sum | Electrical Cables | 90% | | 1 | | | |
| 4,0 | <u>Fencing</u> | | | | | | | | |
| 4,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicuit Breaker | m | Steel | 100% | | 12 | | | |
| 4,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 1 | | | |
| 5.0 | <u>Substation Buildings Refurbishment(x2)</u> | | | | | | | | |
| 5,1 | Design, supply and install a steel IBR roof for the building | sum | Steel | 100% | | 2 | | | |
| 5,2 | Supply and install the substation's single standard doors | each | Steel | 100% | | 3 | | | |
| 5,3 | Supply and install the substation's double standard doors | each | Steel | 100% | | 2 | | | |
| 5,4 | Close the two single doors at the back with bricklaying (busbar chamber and battery rooms) | sum | N/A | N/A | | 1 | | | |
| 5,5 | Supply and install standard double door at isolation transformer room | each | Steel | 100% | | 1 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| | | | | | | | | | |
|-----|---|-----|--|--|--|---|-----------------|--|--|
| C | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | | | | 1 | | | |
| | | | | | | | GeorgedaleTotal | | |

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>HATTINGSPRUIT SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment. | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Main Traction Transformer Primary Bushings</u> | | | | | | | | |
| 1,1 | Supply and install main traction transformer 88kV primary bushings | each | Transformer (Class 1) | 100% | | 3 | | | |
| 2,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 2,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Security lighting</u> | | | | | | | | |
| 3,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 3,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| Item No. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|----------------------|-----|--|----------|--------------------------|----------------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 1,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>Positive Isolator</u> | | | | | | | | |
| 2,1 | Supply and Install Positive Isolator and Earth Switch | each | N/A | N/A | | 1 | | | |
| 3,0 | <u>3kV DC High Speed Circuit Breakers</u> | | | | | | | | |
| 3,1 | Supply and install trucks, modular cells and high speed circuit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 4 | | | |
| 3,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 4,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| 5,0 | <u>Wavefilter equipment</u> | | | | | | | | |
| 5,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |
| | <i>Other(Specify):</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Hattingspruit Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>KROOMDRAAI SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 1,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>AC Disconnect and earthing switches</u> | | | | | | | | |
| 2,1 | Supply and install new 88kV AC disconnects | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Substation interlocking</u> | | | | | | | | |
| 3,1 | Supply and install outdoor and indoor equipment mechanical interlocking | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Fencing</u> | | | | | | | | |
| 4,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicut Breaker | m | Steel | 100% | | 14 | | | |
| 4,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 1 | | | |
| 4,3 | Supply and install 2.4m high steel palisade fence complete with foundations and poles | m | Steel | 100% | | 98 | | | |
| 4,4 | Supply and Install 2.4m high steel palisade gate | each | Steel | 100% | | 1 | | | |
| 5,0 | <u>AC Earth Leakage</u> | | | | | | | | |
| 5,1 | Supply and install AC Earth Leakage Protection | each | N/A | N/A | | 1 | | | |
| 6,0 | <u>Auxilliary Transformer</u> | | | | | | | | |
| 6,1 | Supply and install 50kVA auxullary transformer | sum | Transformer (class 0) | 100% | | 1 | | | |
| 7,0 | <u>Foundation for all steel structures</u> | | | | | | | | |

| | | | | | | | | | |
|-------------|---|------|--------------------------|------|--|------|--|--|--|
| 7,1 | Desing, supply and cast new foundations replacing all structures with cracked foundations | sum | N/A | N/A | | 1 | | | |
| 8,0 | <u>Transformer refurbishment work</u> | | | | | | | | |
| 8,1 | Oil sampling, Testing and analysis prior work commencement | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,2 | Clean, treat (rust), oil and re-paint transformer and conservator. | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,3 | Complete re-gasketing of the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,4 | Supply and replace winding, oil temperature gauges with their probe pockets | each | Transformer (class 1) | 100% | | 2 | | | |
| 8,5 | Supply and replace breather & silica gel | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,6 | Supply and install main transformer with Resin Impregnated Paper Synthetic Primary Bushings | each | Transformer (class 1) | 100% | | 3 | | | |
| 8,7 | Supply Aluminium bus bar & flexibles from secondary insulators to wall bushings | sum | Electrical Cables | 100% | | 1 | | | |
| 8,8 | Top up transformer with virgin oil (210L) | sum | Transformer (class 1) | 100% | | 210L | | | |
| 8,9 | Oil purification process at 4 passes | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,10 | Repair oil leaks on all other parts of the transformer (If any) | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,11 | Chemically treat polluted ballast. | sum | N/A | N/A | | 1 | | | |
| 8,12 | Treat plinth for oil pollution. | sum | N/A | N/A | | 1 | | | |
| 8,13 | Supply and install new insulation under the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,14 | Generator utilisation | sum | N/A | N/A | | 1 | | | |
| 8,15 | Crane Truck utilisation | sum | N/A | N/A | | 1 | | | |
| 9,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 9,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 10,0 | <u>Substation Buildings Refurbishment</u> | | | | | | | | |
| 10,1 | Design, supply and install a steel IBR roof for the building | sum | Steel | 100% | | 1 | | | |
| 11,0 | <u>Security lighting</u> | | | | | | | | |
| 11,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 11,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| 11,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 11,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| | <i>Other(Specify):</i> | | | | | | | | |

| | | | | | | | | | |
|--|--------------------|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|---------|--|------|----------------------|-----|--|----------|--------------------------|----------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>Positive Isolator</u> | | | | | | | | |
| 1,1 | Supply and Install Positive Isolator and Earth Switch | each | N/A | N/A | | 1 | | | |
| 2,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 2,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| 3,0 | <u>Substation Wavefilter Equipment</u> | | | | | | | | |
| 3,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 4,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| 5,0 | <u>3kV DC Under Voltage</u> | | | | | | | | |
| 5,1 | Supply and Install 3kV DC Under-Voltage Relay | each | N/A | N/A | | 1 | | | |
| 10,0 | <i>Other(Specify):</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Kroomdraai Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>STILLWATER SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment. | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 1,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>Main Traction Transformer Primary Bushings</u> | | | | | | | | |
| 2,1 | Supply and install main traction transformer 88kV primary bushings | each | Transformer (class 1) | 100% | | 3 | | | |
| 3,0 | <u>Substation Interlocking</u> | | | | | | | | |
| 3,1 | Supply and install outdoor equipment interlocking | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Main Current Transformers</u> | | | | | | | | |
| 4,1 | Supply and install outdoor 88kV Current Transformers between primary circuit breaker and secondary surge arrestors | each | N/A | N/A | | 2 | | | |
| 5,0 | <u>Auxilliary Transformer</u> | | | | | | | | |
| 5,1 | Supply and install 50kVA auxullary transformer | each | Transformer (class 0) | 100% | | 1 | | | |
| 6,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 6,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 7,0 | <u>AC Disconnect and earthing switches</u> | | | | | | | | |
| 7,1 | Supply and install new 88kV AC disconnects | sum | N/A | N/A | | 1 | | | |
| 8,0 | <u>Security lighting</u> | | | | | | | | |
| 8,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |

| | | | | | | | | | |
|-----|---|------|-------------------|-----|--|---|--|--|--|
| 8,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| | Other, (Specify) | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----|-----|--|----------|--------------------------|----------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>Substation Interlocking</u> | | | | | | | | |
| 1,1 | Supply and install indoor equipment interlocking system | sum | N/A | N/A | | 1 | | | |
| 2,0 | <u>Positive Isolator</u> | | | | | | | | |
| 2,1 | Supply and Install Positive Isolator and Earth Switch | each | N/A | N/A | | 1 | | | |
| 3,0 | <u>3kV DC High Speed Circuit Breaker</u> | | | | | | | | |
| 3,1 | Supply and install trucks, modular cells and high speed circuit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 2 | | | |
| 3,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Traction Substation Batteries</u> | | | | | | | | |
| 4,1 | Supply and Install Substation batteries | sum | N/A | N/A | | 1 | | | |
| 5,0 | <u>Wavefilter equipment</u> | | | | | | | | |
| 5,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |
| 6,0 | <u>3kV DC Traction Rectifier</u> | | | | | | | | |
| 6,1 | Supply and Install 6MW traction rectifier | each | N/A | N/A | | 1 | | | |
| 7,0 | <u>3kV DC Earth Leakage</u> | | | | | | | | |
| 7,1 | Supply and Install 3kV DC Earth leakage Protection system | each | N/A | N/A | | 1 | | | |
| 8,0 | <u>AC Primary Circuit Breaker control Panel</u> | | | | | | | | |
| 8,1 | Supply and Install AC Primary Circuit Breaker Control Panel complete with all protection equipment | each | N/A | N/A | | 1 | | | |
| 9,0 | <u>AC/DC Distribution Panel</u> | | | | | | | | |
| 9,1 | Supply and Install AC/DC Distribution Panel complete with all necessary protection equipment | each | N/A | N/A | | 1 | | | |

| | | | | | | | | | |
|------|--|------|-------------------|-----|--|---|--|-----------------|--|
| 10,0 | 3kV DC Under Voltage | | | | | | | | |
| 10,1 | Supply and Install 3kV DC Under-Voltage Relay | each | N/A | N/A | | 1 | | | |
| 11,0 | Cabling and Interconnection | | | | | | | | |
| 11,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| 12,0 | Substation Light and Power Distribution | | | | | | | | |
| 12,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| | Other(Specify): | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Stilwater Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|----------------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | UMBULWANA SUBSTATION (SINGLE UNIT) | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 1,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 2,0 | <u>AC Earth Leakage</u> | | | | | | | | |
| 2,1 | Supply and install AC Earth Leakage Protection | each | N/A | N/A | | 1 | | | |
| 3,0 | <u>Main Current Transformers</u> | | | | | | | | |
| 3,1 | Supply and install outdoor 88kV Current Transformers between primary circuit breaker and secondary surge arrestors | each | N/A | N/A | | 2 | | | |
| 4,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 4,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 5,0 | <u>Secondary Surge Arrestors</u> | | | | | | | | |
| 5,1 | Supply and install secondary freestanding 88kV surge arrestors complete with foundations and steel structures on main transformer HV side | each | Steel Substation Structure | 100% | | 3 | | | |
| 6,0 | <u>AC Disconnect and earthing switches</u> | | | | | | | | |
| 6,1 | Supply and install new 88kV AC disconnects | sum | N/A | N/A | | 1 | | | |
| 7,0 | <u>Substation Outdoor Interlocking</u> | | | | | | | | |
| 7,1 | Supply and install outdoor and indoor equipment interlocking | sum | N/A | N/A | | 1 | | | |
| 8,0 | <u>Fencing</u> | | | | | | | | |
| 8,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicut Breaker | m | Steel | 100% | | 14 | | | |

| | | | | | | | | | |
|-------------|---|------|-----------------------|------|--|------|--|--|--|
| 8,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 1 | | | |
| 9,0 | <u>Transformer refurbishment work</u> | | | | | | | | |
| 9,1 | Oil sampling, Testing and analysis prior work commencement | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,2 | Clean, treat (rust), oil and re-paint transformer and conservator. | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,3 | Complete re-gasketing of the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,4 | Supply and replace winding, oil temperature gauges with their probe pockets | each | Transformer (class 1) | 100% | | 2 | | | |
| 9,5 | Supply and replace breather & silica gel | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,6 | Supply and install main transformer with Resin Impregnated Paper Synthetic Primary Bushings | each | Transformer (class 1) | 100% | | 3 | | | |
| 9,7 | Supply Aluminium bus bar & flexibles from secondary insulators to wall bushings | sum | Electrical Cables | 90% | | 1 | | | |
| 9,8 | Top up transformer with virgin oil (210L) | sum | Transformer (class 1) | 100% | | 210L | | | |
| 9,9 | Oil purification process at 4 passes | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,10 | Repair oil leaks on all other parts of the transformer (If any) | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,11 | Chemically treat polluted ballast. | sum | N/A | N/A | | 1 | | | |
| 9,12 | Treat plinth for oil pollution. | sum | N/A | N/A | | 1 | | | |
| 9,13 | Supply and install new insulation under the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 9,14 | Generator utilisation | sum | N/A | N/A | | 1 | | | |
| 9,15 | Crane Truck utilisation | sum | N/A | N/A | | 1 | | | |
| 10,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 10,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 11,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 11,1 | Supply and install new cabling and interconnections in outdoor yard | sum | Electrical Cables | 90% | | 1 | | | |
| 12,0 | <u>Security lighting</u> | | | | | | | | |
| 12,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 12,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| | <i>Other, (Specify)</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|---------|---|------|----------------------|------|--|----------|--------------------------|----------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>3kV DC High Speed Circuit Breaker</u> | | | | | | | | |
| 1,1 | Supply and install trucks, modular cells and high speed cirucit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 4 | | | |
| 1,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 2,0 | <u>Wavefilter equipment</u> | | | | | | | | |
| 2,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Traction Substation Battery Charger</u> | | | | | | | | |
| 3,1 | Supply and install new battery charger | sum | N/A | N/A | | 1 | | | |
| 4,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 4,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| 5,0 | <u>Substation Ventilation and Cooling</u> | | | | | | | | |
| 5,1 | Design, supply and install building ventilation (including battery room ventilation) | sum | Steel | 100% | | 1 | | | |
| 6,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 6,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| | <i>Other(Specify):</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Umbulwana Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>VAL SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment. | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>AC Earth Leakage</u> | | | | | | | | |
| 1,1 | Supply and install AC Earth Leakage Protection | each | N/A | N/A | | 1 | | | |
| 2,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 2,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 3,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 4,0 | <u>Secondary Surge Arrestors</u> | | | | | | | | |
| 4,1 | Supply and install secondary freestanding 88kV surge arrestors complete with foundations and steel structures on main transformer HV side | each | Steel | 100% | | 3 | | | |
| 5,0 | <u>Security lighting</u> | | | | | | | | |
| 5,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 5,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| 6,0 | <u>Transformer refurbishment work</u> | | | | | | | | |
| 6,1 | Oil sampling, Testing and analysis prior work commencement | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,2 | Clean, treat (rust), oil and re-paint transformer and conservator. | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,3 | Complete re-gasketing of the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,4 | Supply and replace winding, oil temperature gauges with their probe pockets | each | Transformer (class 1) | 100% | | 2 | | | |

| | | | | | | | | | |
|------|---|------|--------------------------|------|--|------|--|--|--|
| 6,5 | Supply and replace breather & silica gel | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,6 | Supply and install main transformer with Resin Impregnated Paper Synthetic Primary Bushings | each | Transformer (class 1) | 100% | | 3 | | | |
| 6,7 | Supply Aluminium bus bar & flexibles from secondary insulators to wall bushings | sum | Electrical Cables | 90% | | 1 | | | |
| 6,8 | Top up transformer with virgin oil (210L) | sum | Transformer (class 1) | 100% | | 210L | | | |
| 6,9 | Oil purification process at 4 passes | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,10 | Repair oil leaks on all other parts of the transformer (If any) | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,11 | Chemically treat polluted ballast. | sum | N/A | N/A | | 1 | | | |
| 6,12 | Treat plinth for oil pollution. | sum | N/A | N/A | | 1 | | | |
| 6,13 | Supply and install new insulation under the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 6,14 | Generator utilisation | sum | N/A | N/A | | 1 | | | |
| 6,15 | Crane Truck utilisation | sum | N/A | N/A | | 1 | | | |
| | Other(Specify): | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|----------------------|-----|--|----------|--------------------------|----------------------|-------------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>3kV DC High Speed Circuit Breakers</u> | | | | | | | | |
| 1,1 | Supply and install trucks, modular cells and high speed cirucit breakers with feeder protection relays and associated equipment | each | N/A | N/A | | 4 | | | |
| 1,2 | Supply and install electronic busbar interlocking system | sum | N/A | N/A | | 1 | | | |
| 2,0 | <u>Traction Substation Batteries</u> | | | | | | | | |
| 2,1 | Supply and Install Substation Batteries | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 3,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| 4,0 | <u>Wavefilter equipment</u> | | | | | | | | |
| 4,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |

| | | | | | | | | | |
|-----|---|-----|-------------------|-----|--|---|--|-----------|--|
| 5,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 5,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| | <i>Other(Specify):</i> | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Val Total | |

* Contractor to determine

BILL OF QUANTITIES

| ItemNo. | Description | Unit | Local Content (LC) | LC % | LC | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|---|------|-----------------------|------|----|----------|-----------------------|-------------------|----------------------------|
| | <u>VOORUITSIG SUBSTATION (SINGLE UNIT)</u> | | | | | | | | |
| A | GENERAL | | | | | | | | |
| 1,0 | Preliminary and General /Site Establishment. | sum | | | | 1 | | | |
| 2,0 | The contractor shall provide three sets of drawings and manuals and an electronic version in accordance with CEE0224. | sum | | | | 1 | | | |
| 3,0 | Dismatle/remove old equipment. | sum | | | | 1 | | | |
| 4,0 | Transport old equipment to depot. | sum | | | | 1 | | | |
| | | | | | | | | | |
| B | OUTDOOR YARD EQUIPMENT | | | | | | | | |
| 1,0 | <u>Primary Surge Arrestors</u> | | | | | | | | |
| 1,1 | Supply and install 88kV primary surge arresters | each | N/A | N/A | | 3 | | | |
| 2,0 | <u>Outdoor Earthing</u> | | | | | | | | |
| 2,1 | Renew outdoor earthing, crusher stones etc. complete including earthmat renewal | sum | Electrical Cables | 90% | | 1 | | | |
| 3,0 | <u>Auxilliary Transformer</u> | | | | | | | | |
| 3,1 | Supply and install 50kVA auxullary transformer | each | Transformer (class 0) | 100% | | 1 | | | |
| 4,0 | <u>Substation interlocking</u> | | | | | | | | |
| 4,1 | Supply and install outdoor and indoor equipment mechanical interlocking | sum | N/A | N/A | | 1 | | | |
| 5,0 | <u>Fencing</u> | | | | | | | | |
| 5,1 | Supply and install 1.2m high diamond mesh fence between the AC disconnect and Primary Cicut Breaker | m | Steel | 100% | | 14 | | | |
| 5,2 | Supply and install 1.2m high diamond mesh gate | each | Steel | 100% | | 1 | | | |
| 6,0 | <u>Gate Switch and Spark Gap</u> | | | | | | | | |
| 6,1 | Supply and install 450V spark gap and gate switch | sum | N/A | N/A | | 1 | | | |
| 7,0 | <u>Security lighting</u> | | | | | | | | |
| 7,1 | Supply and install 250W high pressure sodium vapour lamp in yard(including wiring) | sum | Electrical Cables | 90% | | 1 | | | |
| 7,2 | Supply and install a double tube fluorescent light including fittings on the outside of the building wall (all sides) | each | Electrical Cables | 90% | | 4 | | | |
| 8,0 | <u>Transformer refurbishment work</u> | | | | | | | | |
| 8,1 | Oil sampling, Testing and analysis prior work commencement | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,2 | Clean, treat (rust) and re-paint transformer and conservator. | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,3 | Complete re-gasketing of the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,4 | Supply and replace winding, oil temperature gauges with their probe pockets | each | Transformer (class 1) | 100% | | 2 | | | |
| 8,5 | Supply and replace breather & silica gel | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,6 | Supply and install main transformer with Resin Impregnated Paper Synthetic Primary Bushings for both transformers | each | Transformer (class 1) | 100% | | 3 | | | |

| | | | | | | | | | |
|------|---|-----|-----------------------|------|--|------|--|--|--|
| 8,7 | Supply Aluminium bus bar & flexibles from secondary insulators to wall bushings | sum | Electrical Cables | 90% | | 1 | | | |
| 8,8 | Top up transformer with virgin oil (210L) | sum | Transformer (class 1) | 100% | | 210L | | | |
| 8,9 | Oil purification process at 4 passes | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,10 | Repair oil leaks on all other parts of the transformer (If any) | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,11 | Chemically treat polluted ballast. | sum | N/A | N/A | | 1 | | | |
| 8,12 | Treat plinth for oil pollution. | sum | N/A | N/A | | 1 | | | |
| 8,13 | Supply and install new insulation under the transformer | sum | Transformer (class 1) | 100% | | 1 | | | |
| 8,14 | Generator utilisation | sum | N/A | N/A | | 1 | | | |
| 8,15 | Crane Truck utilisation | sum | N/A | N/A | | 1 | | | |
| | Other(Specify): | | | | | | | | |
| | | | | | | | | | |
| | TOTAL OUTDOOR WORK | | | | | | | | |

* Contractor to determine

| ItemNo. | Description | Unit | | | | Quantity | Mat./Equip Unit Rates | Labour Unit Rates | Total (Labour + Equipment) |
|------------|--|------|-------------------|-----|--|----------|-----------------------|-------------------------|----------------------------|
| C | INDOOR EQUIPMENT | | | | | | | | |
| 1,0 | <u>3kV DC Positive Isolator</u> | | | | | | | | |
| 1,1 | Supply and Install Positive Isolator and Earth Switch | each | N/A | N/A | | 1 | | | |
| 2,0 | <u>Traction Substation Batteries</u> | | | | | | | | |
| 2,1 | Supply and Install Substation batteries | sum | N/A | N/A | | 1 | | | |
| 3,0 | <u>Substation Light and Power Distribution</u> | | | | | | | | |
| 3,1 | Supply and install electrical wiring (including indoor and outdoor lighting) | sum | Electrical Cables | 90% | | 1 | | | |
| 4,0 | <u>Substation Wavefilter Equipment</u> | | | | | | | | |
| 4,1 | Supply and install Wave filter equipment and necessary interlocking | sum | N/A | N/A | | 1 | | | |
| 5,0 | <u>Cabling and Interconnection</u> | | | | | | | | |
| 5,1 | Supply and Install new cabling, wiring and interconnections | sum | Electrical Cables | 90% | | 1 | | | |
| | Other(Specify): | | | | | | | | |
| | | | | | | | | | |
| | TOTAL INDOOR WORK | | | | | | | | |
| | | | | | | | | | |
| D | COMMISSIONING | | | | | | | | |
| 1,0 | Conduct Site Tests and Commissioning the substation | sum | N/A | N/A | | 1 | | | |
| | | | | | | | | Vooruitsig Total | |

* Contractor to determine

PART C3: SCOPE OF WORK

| Document reference | Title | No of page |
|-----------------------|-------------------------------------|------------|
| C3.1 | This cover page | 1 |
| | <i>Employer's Works Information</i> | 13 |
| Total number of pages | | 14 |

C3.1 EMPLOYER'S WORKS INFORMATION

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SECTION 1

1 Description of the works

1.1 Executive overview

The *works* that the *Contractor* is to perform *involve*

- 1.1.1 Decommissioning, dismantling and transportation of 3kV DC Traction substation electrical equipment from the substations to the depots designated scrap yard/s.
- 1.1.2 Design, Supply, Install, Test and Commission of 3 kV DC Traction substation equipment.
- 1.1.3 The area of deployment is Transnet Freight Rail Natal Corridor line.
- 1.1.4 Implementation requirements will differ from site to site, depending on the scope of work per site. However, adherence to the project's technical specification is mandatory.

1.2 Employer's objectives

The *Employer's* objectives are

- 1.2.1 To replace old and obsolete equipment at traction substation located in the Natal Corridor with new equipment that is maintainable and reliable.
- 1.2.2 To ensure that *works* is carried out in good quality and in a safety manner in line with Transnet Freight Rail internal safety specification (E4E) and Occupational Health and Safety Act 85 of 1993 and its regulations. Preferred bidder will be required to adhere to the above.
- 1.2.3 The *Contractor* shall ensure that there's minimal interruption to the electrical network and functioning/ movement of trains is not affected whilst performing the *works*.

1.3 Interpretation and terminology

The following abbreviations are used in this Works Information:

| Abbreviation | Meaning given to the abbreviation |
|--------------|-----------------------------------|
| TFR | Transnet Freight Rail |
| AC | Alternating Current |
| DC | Direct Current |
| kV | Kilo Volt |
| SCS | Supply Chain Services |
| PFMA | Public Finance Management Act |
| SANS | South African National Standard |
| IP | Intellectual Property |
| SMP | Safety Management Plan |
| QA | Quality Assurance |
| | |

2 Engineering and the *Contractor's* design

2.1 Employer's design

- 2.1.1 The *Employer's* designs are already contained in relevant Transnet specifications. Should the *Contractor* need to use the relevant specifications, reference will be made as and when required.
- 2.1.2 Section 5, below, contains the specifications the contractor can use.
- 2.1.3 The *Employer* grants the *Contractor* a licence to use the copyright in design data presented to the *Contractor* for the purpose of the *works*.

2.2 Parts of the *works* which the *Contractor* is to design

- 2.2.1 The *Contractor* is to design the outdoor yard equipment and indoor substation equipment as specified on the specification, "Refurbishment and replacement of substations equipment on the Container Corridor.
- 2.2.2 The *Contractor* is responsible in his design for the overall integration of the design of the *works* with the design of the *Employer*.
- 2.2.3 Unless expressly stated to form part of the design responsibility of the *Employer*, all residual design responsibility and overall responsibility for the total design solution for the *works* rests with the *Contractor*.

2.3 Procedure for submission and acceptance of *Contractor's* design

- 2.3.1 The *Contractor* shall, before installation or implementation, supply the *Employer* with the design to be reviewed.
- 2.3.2 All as built drawings shall be supplied in electronic format (Micro station / Acad). The successful *Contractor* shall be required to submit all drawings (paper prints) within four weeks of award tender, to the *Project Manager* or *Supervisor* for approval. No construction or manufacturing activity will be allowed prior to the associated drawings having been approved.
- 2.3.3 During the duration of the contract period, the successful *Contractor* will be required to inform the *Project Manager* or *Supervisor* of any changes to these drawings and will have to submit the affected drawings for approval prior to it being used to this contract.
- 2.3.4 The *Contractor* undertakes design safety reviews.
- 2.3.5 In undertaking the '*Works*' (including all incidental services required), the *Contractor* shall conform and adhere to the requirements of the 'Contractor Document Submittal Requirements'

- 2.3.6 The *Contractor* submits documentation as the 'Works Information' requires to the *Project Manager* for review and acceptance.
- 2.3.7 All final as built drawings shall be provided to Transnet Freight Rail within Four Weeks after commissioning.
- 2.3.8 Three sets of A3 schematic wiring diagrams shall be supplied in hard copy and electronic format for approval.
- 2.3.9 The list of drawings to be provided by *Employer* are found in section 5 of this document.

2.4 Other requirements of the *Contractor's* design

- 2.4.1 The *Contractor's* design shall comply with Transnet's specifications BBB 5452 version 7.

2.5 Use of *Contractor's* design

- 2.5.1 The *Contractor* grants the *Employer* a licence to use the copyright in all design data presented to the *Employer* in relation to the *works*, for any purpose in connection with the construction, re-construction, refurbishment, repair, maintenance and extension of the *works*, with such licence being capable of transfer to any third party without the consent of the *Contractor*.
- 2.5.2 The *Contractor* vests in the *Employer* full title guarantee in the intellectual property and copyright in the design data created in relation to the *works*.

2.6 Equipment required to be included in the *works*

- 2.6.1 Calibration and Testing equipment will be as per the specification BBF 8128.

2.7 As-built drawings, operating manuals and maintenance schedules

- 2.7.1 The *Contractor* provides design, installation and as built drawings, instruction manuals and spare parts catalogues in accordance with Transnet specification CEE.0224 of 2002.

3 Construction

3.1 Temporary *works*, Site services & construction constraints

- 3.1.1 The *Contractor* shall only use entrances and exits specified on site access certificate and/or those agreed with the *Employer*.
- 3.1.2 In addition to the above, there may be other restrictions once on the site, plus rules relating to roads, walkways and the provision of barricades.
- 3.1.3 The *Contractor* shall only work on and/or occupy space/area within the *Employers* boundaries.
- 3.1.4 Any site outside what the *Employer* allowed the *Contractor* to work on shall be deemed off limits, to the *Contractor*, his people and/or his sub-contractors.
- 3.1.5 The hours of work for the *Contractor* on site shall be as agreed with the *Employer*.
- 3.1.6 The *Contractor* keeps daily records of his people engaged on the Site and Working Areas (including Subcontractors) with access to such daily records available for inspection by the *Project Manager* at all reasonable times.
- 3.1.7 Health and Safety compliance will be evaluated as per the Tenderer Safety Plan.
- 3.1.8 All material arising from excavation and demolition shall be dealt with in accordance with Transnet specification E7/1.
- 3.1.9 The *Contractor* performs the *works* and co-operates with the *Employer*, and/or *Others (third parties)* where the *Contractor's* work may affect or interfere with their activities.
- 3.1.10 The *Contractor* does not advertise the contract or the project to any third party, nor communicate directly with the media (in any jurisdiction) whatsoever without the express written notification and consent of the *Project Manager*.

- 3.1.11 *Contractor's* Equipment shall be handled in accordance with the Transnet specification E7/1.
- 3.1.12 The *Contractor* keeps daily records of his Equipment used on Site and the Working Areas (distinguishing between owned and hired Equipment) with access to such daily records available for inspection by the *Project Manager* at all reasonable times.
- 3.1.13 The *Contractor* shall handle his/her equipment in accordance with specification E4E.
- 3.1.14 The *Employer* shall provide no equipment for the *Contractor* to use.
- 3.1.15 The *Contractor* under any conditions shall not use *Employer's* Equipment
- 3.1.16 The *Contractor* shall ensure he/she makes provision for power, water, waste disposal, telecoms, ablutions, fire protection, lighting etc.
- 3.1.17 The *Contractor*, will provide no facilities to the *Employer*, except the work agreed upon as stipulated in the contract.
- 3.1.18 Unless expressly stated as a responsibility of the *Employer*, all residual requirements for the provision of facilities and all items of equipment necessary for the *Contractor* to Provide the Works remains the responsibility of the *Contractor*.
- 3.1.19 The *Contractor* inspects and surveys the buildings / premises / facilities adjacent to the Site in accordance with and in conjunction with the *Project Manager*.
- 3.1.20 The *Employer* provides the following information and survey controls for the *Contractor*:
 - i) Works specifications,
 - ii) Site instruction book, and
 - iii) Site diaries.
- 3.1.21 The *Contractor's* deep foundations and controlling of water from excavations will be dealt with in accordance with Transnet specification E7-1.
- 3.1.22 Underground services, other existing services, cable and pipe trenches and covers will be dealt with in accordance with Transnet specification E7-1.
- 3.1.23 Where the *Contractor* encounters existing underground services / existing services cables / pipe trenches. The *Contractor* shall not block, obstruct or damage any existing drains either above or below ground level unless he has made adequate prior arrangements to deal with such.
- 3.1.24 Control of noise, dust, water and waste, shall be dealt with in as per the Transnet specification E4E.
- 3.1.25 For sequences of construction or installation, the *Contractor* complies with all Transnet specifications and instructions provided him/her.
- 3.1.26 The Constraints will be site specific and will be determined between the *Contractor* and the *Employer* or *Project Manager* for the project.

3.2 Completion, testing, commissioning and correction of Defects.

- 3.2.1 Commissioning and Testing of substations shall be as per the Transnet specification BBF 8128, applicable standards, generic and particular specifications.
- 3.2.2 The *Contractor* ensures that the documentation of the *commissioning and testing* is presented to the *Project Manager* before Completion.
- 3.2.3 The *Contractor* ensures that the *Project Manager* has a full and accurate dossier of As-built documents that represent the status of the completed works to present to the *Employer*.
- 3.2.4 The *Contractor* ensures that the *Project Manager* has a full and accurate dossier of maintenance and operating manuals before take-over or Completion.
- 3.2.5 The *Contractor* performs *performance tests* after completion of the works as specified in specification BBF8128.
- 3.2.6 The *Contractor* facilitates training workshops after completion of works where an equipment the *Employer* is not familiar with is installed.
- 3.2.7 When, in the opinion of the *Supervisor*, any part of the work done or any items of material used is not in accordance with the requirements of the *Contract*, whether or not payment for such work

or material has been made, he may order the *Contractor* in writing to remove any objectionable part, item or component thereof, to replace it with an acceptable part, item or component and to rectify or reconstruct the *Works* without cost to Transnet.

- 3.2.8 The equipment shall be inspected/tested and approved by Transnet Freight Rail Quality Assurance at the *Contractor's* workshop prior to it being taken to site. Only once the approval has been granted can the equipment be taken to site for installation.
- 3.2.9 Functional on-site tests shall be conducted on all items of equipment and circuitry to prove the proper functioning and installation thereof.
- 3.2.10 The *Contractor* shall submit a detailed list of on-site tests for the approval of the *Project Manager* or *Supervisor*.
- 3.2.11 The on-site tests and subsequent commissioning will not commence until ALL CONSTRUCTION work has been completed. Construction staff, material and equipment shall be removed from site prior to the commencement of testing.
- 3.2.12 The on-site tests shall include the following:
 - i) Test for the functionality of all electrical circuitry.
 - ii) Trip test on relays.
 - iii) Test on equipment as per manufacturer's instructions.
 - iv) Insulation test.
- 3.2.13 At the completion of the on-site tests, the *Project Manager* or *Supervisor* or his representative shall either sign the tests sheets (supplied by the *Contractor*) as having witnessed the satisfactory completion thereof, or hand to the *Contractor* a list of defects requiring rectification.
- 3.2.14 Upon rectification of defects, the *Contractor* shall arrange for the *Project Manager* or *Supervisor* or his representative to certify satisfactory completion of on-site tests.
- 3.2.15 The *Works* will not be accepted by Transnet as complete until all defects of every kind have been made good to the satisfaction of the *Supervisor*.
- 3.2.16 Transnet Freight Rail shall be notified at least 14 days prior to performing these tests.
- 3.2.17 Within a reasonable time after receipt of written instructions from the *Project Manager/Supervisor*, the *Contractor* shall make good to the satisfaction of the *Supervisor* all the defective material and workmanship which are not in accordance with the contract and which may appear within a period of 12 months, or such other period as stipulated in the *Contract Data*, after the date stated in the CERTIFICATE OF COMPLETION, and shall repair all damage caused thereby.
- 3.2.18 Should the *Contractor* fail to comply with the above provisions, Transnet may cause the required work to be carried out at the expense of the *Contractor* and may recover the cost thereof from the *Contractor*.
- 3.2.19 The commissioning of protection equipment by Transnet Freight Rail will in no way absolve the *Contractor* from any of his responsibilities during the guarantee period.
- 3.2.20 The *Contractor* shall be responsible for carrying out of on-site tests and commissioning of all equipment supplied and installed in terms of this specification and the contractual agreement.
- 3.2.21 The *Contractor* shall be present during the testing and setting of the protection to rectify any faults found.
- 3.2.22 Commissioning will only take place after all defects have been rectified to the satisfaction of the *Project Manager* or *Supervisor*.
- 3.2.23 On completion of commissioning, the *Contractor* will hand the equipment over to the *Project Manager* or *Supervisor* in terms of relevant instruction.

4 Plant and Materials Standards and Workmanship

4.1 Investigation, Survey and Site Clearance

- 4.1.1 The *Contractor* carries out the investigations on site as specified on the contract or as requested by the *Employer*.

4.2 Civil Engineering and Structural Works

- 4.2.1 All Civil engineering and structural works will be dealt with in accordance with Transnet's specification E7/1.

5 List of SPECIFICATIONS AND DRAWINGS

5.1 Specifications and Drawings issued by the *Employer*

The list of specifications and drawings issued by the *Employer* at or before the Contract Date, which apply to this contract is given below. The *Contractor* shall undertake to comply fully with all issued specifications and drawings. The submission of tender documents confirms full compliance to specifications and drawings issued by the *Employer* to the *Contractor*.

| Specification/Drawing number | Revision | Title |
|------------------------------|----------|---|
| BBC0198 | 2 | REQUIREMENTS FOR THE SUPPLY OF ELECTRIC CABLES |
| BBB0496 | 15 | 3 KV RECTIFIER FOR TRACTION SUBSTATIONS |
| BBB0845 | 4 | REQUIREMENTS FOR METAL OXIDE SURGE ARRESTERS WITHOUT GAPS FOR TRACTION AND POWER DISTRIBUTION SUBSTATIONS IN ACCORDANCE WITH SANS 60099-4 |
| BBB0937 | 4 | REQUIREMENTS FOR OUTDOOR POST TYPE CURRENT TRANSFORMERS FOR TRACTION AND DISTRIBUTION SUBSTATIONS |
| BBB0938 | 9 | CONNECTION OF HIGH VOLTAGE SURGE ARRESTER INSTALLED ON CROSS ARM |
| BBB1616 | 3 | 450 VOLT GAS ARRESTER SPARKGAP FOR TRACTION POWER SUPPLIES |
| BBB2502 | 6 | REQUIREMENTS FOR BATTERY CHARGERS FOR 3 KV DC TRACTION SUBSTATIONS |
| BBB2721 | 11 | AC PRIMARY CIRCUIT BREAKER CONTROL PANEL AND AC/DC DISTRIBUTION PANEL FOR 3 KV TRACTION SUBSTATIONS |
| BBB3005 | 2 | 3 KV DC UNDER VOLTAGE RELAY MANUFACTURING SPECIFICATION |
| BBB3139 | 2 | WAVE FILTER CAPACITOR FOR 3 KV DC TRACTION SUBSTATIONS |
| BBB3162 | 2 | WAVE FILTER INDUCTORS FOR 3 KV DC TRACTION SUBSTATIONS |
| BBB3483 | 1 | WAVE FILTER HARMONIC COIL CARRIER ASSEMBLY 3 KV DC SUBSTATIONS |
| BBB3620 | 6 | 3 KV DC EARTHING ARRANGEMENT FOR HIGH VOLTAGE OUTDOOR YARDS |
| BBB5019 | 6 | REQUIREMENTS FOR TRACTION TRANSFORMERS FOR 3 KV DC TRACTION SUBSTATIONS IN ACCORDANCE WITH SANS 60076 |
| BBB5452 | 7 | TRANSNET FREIGHT RAIL'S REQUIREMENTS FOR THE INSTALLATION OF ELECTRICAL |

| | | |
|--------------|------|---|
| | | EQUIPMENT FOR 3 KV DC TRACTION SUBSTATIONS |
| BBB7842 | 1 | OUTDOOR, HIGH VOLTAGE, ALTERNATING CURRENT DISCONNECTORS COMBINED WITH EARTHING SWITCHES |
| BBB4724 | | REQUIREMENT FOR POSITIVE ISOLATOR FOR 3KV DC TRACTION SUBSTATIONS |
| BBD5994 | | TECHNICAL DOCUMENTATION MANGEMENT POLICY |
| BBH5026 | | REFURBISHMENT AND REPLACEMENT OF SUBSTATIONEQUIPMENT ON THE CONTAINER CORRIDOR |
| BBF8128 | | HANDBOOK FOR TESTING AND CALIBRATION OF RAILWAY ELECTRICAL PROTECTION EQUIPMENT |
| BBF3690 | 1 | ELECTRICAL SAFETY INSTRUCTIONS |
| CEE0023 | 2012 | INSTALLATION OF LOW AND MEDIUM VOLTAGE CABLES |
| CEE045 | 2014 | PAINTING OF STEEL COMPONENTS OF ELECTRICAL EQUIPMENT |
| CEE0099 | 2013 | 3 KILO VOLTS DC HIGH SPEED CIRCUIT BREAKERS FOR TRACTION SUBSTATIONS |
| CEE0224 | 2002 | DRAWINGS, CATALOGUES, INSTRUCTION MANUALS AND SPARES LISTS FOR ELECTRICAL EQUIPMENT SUPPLIED UNDER CONTRACT |
| CEE0227 | 2018 | THE MANUFACTURE OF 3 KV DC BREAKER CELLS AND TRUCKS |
| E4E | 2 | TRANSNET FREIGHT RAIL SAFETY HEALTH AND ENVIRONMENT (SHE) SPECIFICATION FOR CONTRACTORS |
| BBD8210 | 1 | E7/1 –SPECIFICATION FOR GENERAL WORK AND WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT |
| CEE-PA-0023 | | SUBSTATION EARTHING |
| CEE-PA-0013 | | TEST BLOCK FOR HV SWITCHGEAR |
| CEE-PA-0056 | | PROTECTIVE RELAYS TO CURRENT TRANSFORMERS |
| CEE-TDF-0016 | | CONCRETE FENCING |
| CEE-TBD-0007 | 10 | EARTHING ARRANGEMENTS TRACTION SUBSTATIONS |
| CEE-TU-0041 | | NEGATIVE RETURN CABLE TERMINATING BOX |
| CEE-TBP-0001 | | WIRING DIAGRAM FOR AUTO-RECLOSURE FOR HSCB |
| CEE-TBP-0039 | | CIRCUIT DIAGRAM FOR AUTO-RECLOSURE FOR HSCB |
| CEE-TBP-0035 | 4 | CONNECTION DIAGRAM FOR HSCB AND ELECTRONIC CONTROL RELAY |
| CEE-TBP-0038 | 1 | SCHEMATIC DIAGRAM OF 3KV HV PROTECTION |
| CEE-TCL-0063 | | 3KV BUSBAR CHAMBER ARRANGEMENT: CABLE FEEDERS |

| | | |
|--------------------|---|---|
| CEE-TCQ-0208 | | DC HIGH SPEED CIRCUIT BREAKER CELL PANEL (CELL SLABS) (SHEETS 1 TO 10) |
| CEE-TBP-0033 | 3 | DC TRACK BREAKER AND TRUCK WIRING DIAGRAM |
| BBF1615 | | BUSBAR CONNECTION ASSEMBLY |
| BBG0894 | | 3kV DC TRACTION FEEDER PROTECTION RELAY |
| BBF9986 | | 10MW 3kV RECTIFIER FOR TRACTION SUBSTATIONS |
| BBF1338 | | EMC 3kV DC CIRCUIT BREAKER |
| BBC5872 | | DIRT COVER PLATE DIRECT TRIPPING DEVICE FOR SECHERON TRACK BREAKERS |
| BBB3059 | | 3kV DC TRACTION SUBSTATION EARTHING SYSTEM FOR HIGH VOLTAGE OUTDOOR YARDS |
| S420 | | CONCRETE WORK |
| BBB2007 | | ENVIRONMENTAL GUIDELINES AND SPECIFICATIONS FOR ELECTRICAL CONSTRUCTION WORK |
| BBC7616 | | POLICY AND GUIDELINES FOR THE MANAGEMENT OF POLYCHLORINATED BIPHENYLS IN TRANSNET FREIGHT RAIL |
| BBC9921 | | TEST SHEET:3KV TRACTION SUBSTATION.COMMISSIONING TEST BY CONTRACTOR (PRIOR TO FINAL COMMISSIONING BY TRANSNET FREIGHT RAIL) |
| JEE-TBB-159 | | WAVE FILTER 3kV DC TRACTION SUBSTATION |
| CEE-TWN-32 Sheet 2 | | SIGN, WARNING EXPOSED LIVE HIGH VOLTAGE EQUIPMENT, PEDESTRIAN DANGER SIGN FOR VERTICAL OBJECTS |
| BBB0041 | 4 | PREPARATION OF DRAWINGS FOR TRANSNET FREIGHT RAIL |
| CEE0177 | | CODE OF PRACTICE: EARTH SYSTEMS FOR ELECTRIC LIGHT AND POWER AND TRACTION INSTALLATIONS |
| CEE0229 | | DRY-OUT AND REGENERATION OF INSULATING OIL AND RECLAIMING AND DE-SLUDGING OF TRANSFORMERS |
| CEE0085 | | SELF- CONTAINED BATTERY AND CHARGER UNITS FOR ELECTRIC LIGHT AND POWER SUBSTATIONS |
| CEE0183 | | HOT DIP GALVANISING AND PAINTING OF ELECTRIFICATION STEELWORK |

SECTION 2

6 Management and start up

6.1 Management meetings

- 6.1.1 The *Contractor* will be expected to attend meetings relating to maintenance, operations, contract management and other issues that may arise from time to time on monthly basis or any other prescribed terms. As far as is practicable, the *Contractor* will make all required persons available for these meetings.
- 6.1.2 The *Contractor* shall not submit claims for payment for staff attending any of these meetings. There will be minutes kept for this meeting for record purposes.
- 6.1.3 Risk reduction meetings: These meetings can form part of the regular/progress site meetings or be held as separate meetings. At these meetings the following issues will be discussed:
- (i) Compensation events
 - (ii) Early warnings
 - (iii) Contractual claims
 - (iv) Risk register
- 6.1.4 The *Contractor* shall attend ad hoc site meetings when convened by the Transnet Freight Rail *Contract Supervisor*. Such meetings will be for the purpose of discussing specific issues or problems relating to specifications and adherence thereto, quality and contractual matters.
- 6.1.5 *Contractor's* representatives at these meetings shall have the necessary delegated authority in respect of aspects such as planning, change management, health and safety.

6.2 Documentation Control

- 6.2.1 All contractual communications will be in the form of properly compiled letters or forms attached to e-mails and not as a message in the email itself.
- 6.2.2 The *Contractor* will submit inspection reports after each service in report format agreed between the *Project Manager* and the *Contractor*.

6.3 Safety risk management

- 6.3.1 The safety management plan (SMP) will be site specific and will be dealt with in accordance with Transnet's specification E4E.
- 6.3.2 The *Contractor* ensures that its Subcontractors comply with the requirements of the SMP.

6.4 Environmental constraints and management

- 6.4.1 Environmental constraints and management shall be dealt with in accordance with Transnet specifications E7/1, BBB2007, S417, E4B and E4E.

6.5 Quality assurance requirements

- 6.5.1 The *Contractor's* Quality Management System shall conform to International Standard ISO 9001 (or an equivalent standard acceptable to the *Project Manager*).
- 6.5.2 The *Contractor* submits his Quality Management System documents to the *Project Manager* as part of his programme to include details of:
- Quality Plan for the contract;
 - Quality Policy
 - Index of Procedures to be used; and
 - A schedule of internal and external audits during the contract

- 6.5.3 The *Contractor* develops and maintains a comprehensive register of documents that will be generated throughout the contract including all quality related documents as part of its Quality Plan.
- 6.5.4 The *Project Manager* indicates those documents required to be submitted for either information, review or acceptance and the *Contractor* indicates such requirements within his register of documents. The register shall indicate the dates of issue of the documents with the *Project Manager* responding to documents submitted by the *Contractor* for review or acceptance within the *period for reply* prior to such documents being used by the *Contractor*.
- 6.5.5 The Quality Plan means the *Contractor's* statement, which outlines strategy, methodology, resources allocation, QA and Quality Control co-ordination activities to ensure that the *works* meet the standards stated in the *Works Information*.
- 6.5.6 The *Contractor* shall submit with his tender his proposed QC plan and procedures. This plan shall indicate how the necessary quality assurance and control will be carried out in order to meet the requirements of the contract documents. The *Contractor* shall have his Quality Control plan approved by *Supervisor* prior to the start of any work or ordering of material.
- 6.5.7 The *Contractor* may also be required to use standard quality and control forms supplied by the *Supervisor*.
- 6.5.8 The *Contractor* shall notify the *Supervisor* of all inspections at least 21 working days in advance of such inspections. The *Contractor* shall have the relevant quality control plans available at inspections and tests.
- 6.5.9 Transnet Freight Rail reserves the right to inspect the equipment covered by this specification at any stage during manufacture and to be represented at any tests.
- 6.5.10 Where the *Contract* provides for tests on the premises of the *Contractor* or of his subcontractor or on site, the *Contractor* shall provide assistance such as labour, materials, electricity, fuel, stores, apparatus and instruments as may be a requisite and as may be reasonably demanded to carry out such tests efficiently.
- 6.5.11 As and when the equipment has passed these tests, the *Supervisor* shall furnish the *Contractor* with a certificate in writing to this effect.
- 6.5.12 If as a result of an inspection, examination or test, the Transnet Freight Rail *Contract Supervisor* decides that the equipment is defective or not in accordance with the requirements, he shall notify the *Contractor* accordingly stating in writing his objections and reasons thereof. The *Contractor* shall timeously make good the defect to ensure that the equipment complies with the requirements.
- 6.5.13 Thereafter, if required by the Transnet Freight Rail *Contract Supervisor*, the tests shall be repeated under the same terms and conditions save that all reasonable expenses to which Transnet Freight Rail may be put by the repetition of these tests will be deducted from the contract sum.
- 6.5.14 Unless the Transnet Freight Rail *Contract Supervisor* otherwise directs, no equipment or materials are to be delivered to site until the Transnet Freight Rail *Contract Supervisor* issues an inspection certificate in respect of such equipment or material. The *Contractor* shall be responsible for the reception of all equipment and material delivered to site for the purpose of the contract.
- 6.5.15 Transnet Freight Rail reserves the right to conduct a quality assurance audit on the *Contractor's* quality control system at regular intervals.
- 6.5.16 If at any stage during manufacture, repair, installation or commissioning of equipment or material it becomes evident that the requirements of this specification are not being adhered to, Transnet Freight Rail reserves the right to halt such manufacture, repair, installation or commissioning until such time as the *Contractor* or his subcontractor conforms to the requirements of this specification.
- 6.5.17 Details of any additional tests or inspections proposed by the Tenderer shall be attached and submitted with his tender.
- 6.5.18 Acceptance by the Transnet Freight Rail *Supervisor* of satisfactory completion of on-site tests in no way relieves the *Contractor* of his obligation to rectify defects which may have been overlooked or become evident at a later stage.

6.6 Training workshops and technology transfer

- 6.6.1 The *Contractor* shall provide Training to Transnet staff on any new equipment installed as specified on the contract specification.
- 6.6.2 Technology transfer from the *Contractor* to the *Employer* will be as required per contract specification.

6.7 The *Contractor's* Invoices

- 6.7.1 When the *Project Manager* certifies payment (see ECC Clause 51.1) following an assessment date, the *Contractor* complies with the *Employer's* procedure for invoice submission.
- 6.7.2 The invoice must correspond to the *Project Manager's* assessment of the amount due to the *Contractor* as stated in the payment certificate.
- 6.7.3 Payment will be paid within 30 days from date of receipt of the approved Invoice been received in the financial office in Johannesburg.
- 6.7.4 Invoice addressed to Transnet Freight Rail;

Transnet Freight Rail VAT Registration No: 4720103177;

The invoice must contain the following minimum information and/or be substantiated by the following documentation:

Description of service provided for each item invoiced based on the Price List;

The *Contractor's* VAT Registration No.; and

The Contract number [SIE21015CIDB] SAP No:

Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT;

6.8 People

- 6.8.1 Minimum requirements of people employed on the Site will be work and site specific and will be determine by the duration of the works.
- 6.8.2 The *CONTRACTOR's* LIABILITY is given as follows:
 - a) The *Contractor* warrants that it will be liable to Transnet for any loss or damage caused by strikes, riots, lockouts or any labour disputes by and/or confined to the *Contractor's* employees, which loss will include any indirect or consequential damages;
 - b) The *Contractor* warrants that no negotiations or feedback meetings by the *Contractor's* employees shall take place on Transnet premises, whether owned or rented by Transnet.
 - c) The *Contractor* shall give notice to Transnet of any industrial action by the *Contractor's* employees immediately upon becoming aware of any actual or contemplated action that is or may be carried out on Transnet's premises, whether owned or rented, and shall notify Transnet of all matters associated with such action that may potentially affect Transnet.
 - d) The *Contractor* is responsible for educating its employees on relevant provisions of the Labour Relations Act which deal with industrial action processes, and the risks of non-compliance.
 - e) The *Contractor* is required to develop a Contingency Strike Handling Plan, which plan the *Contractor* is obliged to update on a three monthly basis. The *Contractor* must provide Transnet with this plan and all updates to the Plan. The *Contractor* is responsible to communicate with its employees on site details of the plan.

6.8.3 INDUSTRIAL ACTION BY *CONTRACTOR* EMPLOYEES

- a) In the event of any industrial action by the *Contractor's* employees, the *Contractor* is required to provide competent contingency resources permitted in law to carry out any of the duties that are or could potentially be interrupted by industrial action in delivering the Service. The *Contractor* warrants that it will compensate Transnet for any costs Transnet incurs in providing additional security to deal with any industrial action by the *Contractor's* employees.
- b) In the event of any industrial action by the *Contractor's* employees, *the Contractor* is obliged:
 - i) To prepare and deliver to Transnet, within two (2) hours of the commencement of industrial action an Industrial Action Report. If the industrial action persists the *Contractor* is required to deliver the report at 8h30 each day.
- c) The Industrial Action Report must provide at least the following information:
 - i) Industrial incident report,
 - ii) Attendance register,
 - iii) Productivity / progress to schedule reports,
 - iv) Operational contingency plan,
 - v) Site security report,
 - vi) Industrial action intelligence gathered.
- d) The final Industrial Action Report is to be delivered 24 hours after finalisation of the industrial action.
- e) The management of the *Contractor* is required to hold a daily industrial action teleconference with personnel identified by Transnet to discuss the industrial action, settlement of the industrial action, security issues and the impact on delivery under the contract.
- f) The resolution of any disputes or industrial action by the *Contractor's* employees is the sole responsibility of the *Contractor*.
- g) Access to Transnet premises by the *Contractor* and its employees is only provided for purposes of the *Contractor* delivering its services to Transnet. Should the *Contractor* and its employees not, for any reason, be capable of delivering its services Transnet is entitled to restrict or deny access onto its premises and unless otherwise authorized; such person will be deemed to be trespassing.

6.9 Plant and Material

- 6.9.1 *Employer* provides no Plant and materials for the *Contractor* to use.
- 6.9.2 Procurement and use of Plant and material shall be sole responsibility of the *Contractor*.
- 6.9.3 Procurement shall be as specified on the contract.
- 6.9.4 Plant and material handling, shall be accordance with Transnet specification E4E and E7/1.

6.10 Tests and inspections before delivery

- 6.10.1 Tests and inspections will site and work specific and will be dealt with in accordance with Transnet specification BBF8128.



PART 4: SITE INFORMATION

1. Description of the Site and its surroundings

1.1. General description

Replacement and refurbishment of obsolete substation equipment shall be carried out at various Transnet Freight Rail traction substations located on the Natal corridor. The corridor conveys railway services between Gauteng and KwaZulu-Natal, under the jurisdiction of Depot Engineers of Heidelberg, Ladysmith and Durban.

Names of traction substations where replacement work will be carried out are listed in 'Bill of Quantities' Prices (Part C2.2). Drawing CEE-TVD-2 Sht 1-2 is a map that shows the location of some of these sites, this may be requested from the Supervisor of this project. Accessibility of the sites from the main roads is sometimes via a service road, which its condition may vary depending on amongst other things, vegetation and rainfall. Tenderers are advised to take note of this during the site visits.

The security requirements at each site shall be discussed with the relevant Depot. The access to these sites can only be granted under supervision from the relevant Depot, due to the nature of work that is involving High Voltage isolation.

Substation are located mainly at remote areas where supply of water and electricity supplies and ablution facilities cannot be guaranteed or totally unavailable, therefore tenderers shall make provision for his/her water and power supply as well as ablution facilities on site.

1.2. Existing buildings, structures, and plant & machinery on the Site

High Voltage Steel Structures, Eighty Eight kilo Volts (88kV) Primary Electrical Supply Plant inclusive of High Voltage Electrical Aerial Conductors, 88kV /3kV Primary Step Down Plant, Substation Building, Fencing and gates, 3kV Aerial Conductors, Railway Level Crossings and Overhead Track Equipment.

1.3. Subsoil information

N/A

1.4. Hidden services

Electrical services, Underground Cables and Water services

1.5. Other reports and publicly available information

N/A