

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:

SUPPLY AND INSTALLATION OF ANODE GROUND-BEDS, TRANSFORMER RECTIFIER UNITS AND FORCED DRAINAGE UNITS IN THE MPUMALANGA PROVINCE

The tenderer, identified in the Offer signature block, has 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.

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		

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

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	
		X2 Changes in the law
		X3: Multiple currencies
		X7: Delay damages
		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
	Having elected its Contractual Address for the purposes of this contract as:	Transnet Pipelines 202 Anton Lembede Durban 4001
10.1	The <i>Project Manager</i> is: (Name)	Lucas Molemi

	Address	202 Anton Lembede, Durban	
	Tel	TBA	
	e-mail	TBA	
11.2(13)	The <i>works</i> are	The Supply And Installation Of Anode Ground-Beds, Transformer Rectifier Units And Forced Drainage Units In The Mpumalanga Province	
11.2(14)	The following matters will be included in the Risk Register	None	
11.2(15)	The <i>boundaries of the site</i> are	As stated in Part C4.1."Description of the Site and it 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	1 week	
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	18 April 2024	
30.1	The <i>access dates</i> are	Part of the Site	Date
		1 Whole of the works	Contractor's programme
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	10 July 2023	
32.2	The <i>Contractor</i> submits revised programmes at intervals no longer than	2 weeks.	

35.1	The <i>Employer</i> is not willing to take over the <i>works</i> before the Completion Date.	
4	Testing and Defects	
42.2	The <i>defects date</i> is	26 (twenty six) weeks after Completion of the whole of the <i>works</i>.
43.2	The <i>defect correction period</i> is	2 weeks
5	Payment	
50.1	The <i>assessment interval</i> is monthly on the	25th (twenty fifth) day of each successive month.
51.1	The <i>currency of this contract</i> is the	South African Rand.
51.2	The period within which payments are made is	Payment will be effected on or before the last day of the month following the month during which a valid Tax Invoice and Statement were received.
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
	The place where weather is to be recorded (on the Site) is:	
	The <i>Contractor's</i> Site establishment area	

The *weather data* are the records of past *weather measurements* for each calendar month which were recorded at:

and which are available from:

The closest weather station to the Contractor's Site establishment area

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	
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 <i>Contractor</i> arising out of and in the course of their employment in connection with this contract for any one event is	The <i>Contractor</i> must comply at a minimum with the provisions of the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 as amended.
	The <i>Contractor</i> provides these additional Insurances	1 Where the contract requires that the design of any part of the <i>works</i> shall be provided by the <i>Contractor</i> the <i>Contractor</i> shall satisfy the <i>Employer</i> 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 <i>works</i> at premises other than the site, the <i>Contractor</i> shall satisfy the <i>Employer</i> that such plant & materials, components or other goods for incorporation in the <i>works</i> 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 R 5 000 000**
 - 5 Protection and Indemnity Insurance in respect of all marine craft or vessels utilised in performance of the Works extended for Specialist Operations with a minimum indemnity limit of R 20,000,000**
 - 6 The insurance coverage referred to in 1, 2, 3, 4, and 5 above shall be obtained from an insurer(s) in terms of an insurance policy approved by the *Employer*. The *Contractor* shall arrange with the insurer to submit to the *Project Manager* the original and the duplicate original of the policy or policies of insurance and the receipts for payment of current premiums, together with a certificate from the insurer or insurance broker concerned, confirming that the policy or policies provide the full coverage as required. The original policy will be returned to the *Contractor*.**
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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 *Contractor*) caused by activity in connection with this contract for any one event is

Whatever the *Contractor* requires in addition to the amount of insurance taken out by the *Employer* 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: If no <i>Adjudicator nominating body</i> is entered, it is:	The Chairman of the Association of Arbitrators (Southern Africa) 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	Durban, South Africa

	The person or organisation who will choose an arbitrator - if the Parties cannot agree a choice or - if the arbitration procedure does not state who selects an arbitrator, is	The Chairman of the Association of Arbitrators (Southern Africa)
12	Data for secondary Option clauses	
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
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
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	2 years after Completion of the whole of the works
Z	Additional conditions of contract are:	

**Z1 Additional clauses relating to
Joint Venture****Z1.1****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.**

Z1.2

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*.

Z2 Additional obligations in respect of Termination

Z2.1

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)**

Z2.2	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"
Z2.3		Amend "R1 – R15 or R18" to "R1 – R15, R18, R22 or R23."
Z3	Right Reserved by the <i>Employer</i> to Conduct Vetting through SSA	
Z3.1		The <i>Employer</i> reserves the right to conduct vetting through State Security Agency (SSA) for security clearances of any <i>Contractor</i> 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. 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.
Z4	Additional Clause Relating to Collusion in the Construction Industry	
Z4.1		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.

**Z5 Protection of Personal
 Information Act**

Z5.1

The *Employer* and the *Contractor* 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.

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			
31.1	The programme identified in the Contract Data is			
B	Priced contract with bill of quantities			
11.2(21)	The <i>bill of quantities</i> is in			
11.2(31)	The tendered total of the Prices is	(in figures)		
		(in words), excluding VAT		
	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	%	
63 in SSCC	The categories of design employees whose travelling expenses to and from the Working Areas are included in Defined Cost are:		

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	(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. (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. (28) The Price for Work Done to Date is the total of - 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. Completed work is work without Defects which would either delay or be covered by immediately following work. (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.

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
ha	hectare
kg	kilogram
kl	kilolitre
km	kilometre
km-pass	kilometre-pass
kPa	kilopascal
kW	kilowatt
l	litre
m	metre
mm	millimetre
m ²	square metre
m ² -pass	square metre pass
m ³	cubic metre
m ³ -km	cubic metre-kilometre
MN	meganewton
MN.m	meganewton-metre

MPa	megapascal
No.	number
Prov sum ¹	provisional sum
PC-sum	prime cost sum
R/only	Rate only
sum	Lump sum
t	ton (1000kg)
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.

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

- 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.

2.3. Departures from the *method of measurement*

2.4. Amplification of or assumptions about measurement items

For the avoidance of doubt the following is provided to assist in the interpretation of descriptions given in the *method of measurement*. In the event of any ambiguity or inconsistency between the statements in the *method of measurement* and this section, the interpretation given in this section shall be used.

C2.2 The *bill of quantities*

Summary:		
Item No.	Description	Sub-Total
1	Devon FDU	
2	Kendal East FDU	
3	Kendal West TRU	
4	Kendal West FDU	
5	Secunda TRU	
Total		
VAT		
Total Carried To The Form Of Offer		

BILL OF QUANTITIES FOR THE DEVON FDU

ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
1	PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:					
1.1		Insurances and contractual obligations	Sum	1		-
1.2		Clinent induction and requisite site medicals	Sum	1		-
1.3		Preparation of safety file as per TPL SHE specification	Sum	1		-
1.4		Preparation of quality pack	Sum	1		-
1.5		Preparation of works program	Sum	1		-
1.6		Offices, storage sheds, fencing, workshops, laboratories, etc.	Sum	1		-
1.7		Tools and equipment	Sum	1		-
1.8		Other fixed charge obligations	Sum	1		-
1.9		Remove all site establishment upon completion	Sum	1		-
Total: P&G Fixed Cost Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
2	PRELIMINARY & GENERAL - TIME RELATED CHARGES:					
2.1		Operation and maintenance of facilities on Site	Week	4		-
2.2		Living out accomodation	Week	4		-
2.3		Construction manager	Week	4		-
2.4		Construction supervisor	Week	4		-
2.5		Safety administration	Week	4		-
2.6		Quality administration	Week	4		-
2.7		Transport and plant	Week	4		-
2.8		Security for duration of project armed (night) and unarmed (day)	Week	4		-
2.9		Ablution or sanitation facilities & dining facilities	Week	4		-
2.10		Company and head office overhead costs for the duration of contract	Week	4		-
Total: Time Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
3	CONSTRUCTION ACTIVITY					
3.1		Removal of Vandelised Structures				
3.2		Proofing				
3.2.1		Detection and marking of buried foreign services	Sum	1		-
3.2.2		Check for cable sleeve and that the sleeve is not toucing the pipe and report	Sum	1		-
3.3		Forced Drainage Unit (FDU) System				
		Supply & Installation Activities				-
3.3.1		Supply & install phase 100A/100V FDU as per TPL specification	Each	1		-
3.3.2		Supply & install & install heavy duty concrete enclosure	Each	1		-
3.3.3		Supply & install rail cable cable - 4 core 35mm2 armoured cable PVC/PVC (red)	m	20		-
3.3.4		Supply & install kwena cable 70mm2 and rail attachment accessories	m	20		-
3.3.5		Supply & install negative cable - 16mm2 4 core armoured cable PVC/PVC (black)	m	20		-
3.3.6		Supply & install 1 X 16mm² X 20m monitor cable (black)	m	20		-
3.3.7		Supply & install AC Supply & install cable shall be of 4-core 16mm2 ECC cable	m	30		-
3.3.8		Supply & install 3m X 3m zinc earth-mat covered in a layer of low resistance backfill, situtated directly below the heavy duty enclosure	sum	1		-
3.3.9		Supply & install low resistance backfill	Ton	1		-
3.3.10		Supply & install copper earth rods, 1.5m long installed at each corner of the earth mat, attached to the earth mat with a copper lug	Each	8		-
3.3.11		Supply & install earth cable, 70mm2 green/yellow cable	m	20		-
3.3.12		Supply & install concrete for cable encasement from the rail to the depot	m³	3		-
3.3.13		Supply & install concrete for ROCLA enclosure surround	m³	1		-
3.3.14		Supply & install concrete for ROCLA enclosure base	m³	3.6		-
3.3.15		Supply & install splicing kits with epoxy	Each	2		-
3.3.16		Supply & install coating make good kit (Denso wrap)	Sum	1		-

3.3.17		Supply & install thermite welding kit and accessories	Sum	1		-
3.3.18		Supply & install stencil and paint for the labelling of the heavy duty ROCLA enclosure	Sum	1		-
3.3.19		Terminate cables to FDU and supply COC certificate				-
Total: Construction Activity						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
4		PROJECT HANDOVER				
4.1		Project Commissioning				
4.1.1		Factory acceptance testing (FAT)	Sum	1		-
4.1.2		On-site commissioning and testing (SAT)	Sum	1		-
4.1.3		Commissioning report and handover report	Sum	1		-
Total: Project Handover						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	TOTAL AMOUNT			
1		PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:				
2		PRELIMINARY & GENERAL - TIME RELATED CHARGES:				
3		CONSTRUCTION ACTIVITY				
4		PROJECT HANDOVER				
5		TOTAL PROJECT COST				
6		VAT				
7		TOTAL PROJECT COST INCLUDING VAT				

BILL OF QUANTITIES FOR THE KENDAL EAST FDU

ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
1	PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:					
1.1		Insurances and contractual obligations	Sum	1		-
1.2		Clinent induction and requisite site medicals	Sum	1		-
1.3		Preparation of safety file as per TPL SHE specification	Sum	1		-
1.4		Preparation of quality pack	Sum	1		-
1.5		Preparation of works program	Sum	1		-
1.6		Offices, storage sheds, fencing, workshops, laboratories, etc.	Sum	1		-
1.7		Tools and equipment	Sum	1		-
1.8		Other fixed charge obligations	Sum	1		-
1.9		Remove all site establishment upon completion	Sum	1		-
Total: P&G Fixed Cost Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
2	PRELIMINARY & GENERAL - TIME RELATED CHARGES:					
2.1		Operation and maintenance of facilities on Site	Week	4		-
2.2		Living out accomodation	Week	4		-
2.3		Construction manager	Week	4		-
2.4		Construction supervisor	Week	4		-
2.5		Safety administration	Week	4		-
2.6		Quality administration	Week	4		-
2.7		Transport and plant	Week	4		-
2.8		Security for duration of project armed (night) and unarmed (day)	Week	4		-
2.9		Ablution or sanitation facilities & dining facilities	Week	4		-
2.10		Company and head office overhead costs for the duration of contract	Week	4		-
Total: Time Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
3	CONSTRUCTION ACTIVITY					
3.1		Removal of Vandelised Structures				
3.1.1		Removal of outdated FDU and housing unit, cap seal and bury unused cables	Sum	1		-
3.2		Proofing				
3.2.1		Detection and marking of buried foreign services	Sum	1		-
3.2.2		Check for cable sleeve and that the sleeve is not toucing the pipe and report	Sum	1		-
3.3		Forced Drainage Unit (FDU) System				
		Supply & Installation Activities				
3.3.1		Supply & install phase 100A/100V FDU as per TPL specification	Each	1		-
3.3.2		Supply & install & install heavy duty ROCLA concrete enclosure	Each	1		-
3.3.3		Supply & install rail cable cable - 4 core 35mm2 armoured cable PVC/PVC (red)	m	50		-
3.3.4		Supply & install kwena cable 70mm2 and rail attachment accessories	m	20		-
3.3.5		Supply & install negative cable - 16mm2 4 core armoured cable PVC/PVC (black)	m	20		-
3.3.6		Supply & install 1 X 16mm ² X 20m monitor cable (black)	m	20		-
3.3.7		Supply & install AC Supply & install cable shall be of 4-core 16mm2 ECC cable	m	160		-
3.3.8		Supply & install 3m X 3m zinc earth-mat covered in a layer of low resistance backfill, situated directly below the heavy duty enclosure	sum	1		-
3.3.9		Supply & install low resistance backfill	Ton	1		-
3.3.10		Supply & install copper earth rods, 1.5m long installed at each corner of the earth mat, attached to the earth mat with a copper lug	Each	8		-
3.3.11		Supply & install earth cable, 70mm2 green/yellow cable	m	20		-
3.3.12		Supply & install concrete for cable encasement from the rail to the depot	m ³	3		-
3.3.13		Supply & install concrete for ROCLA enclosure surround	m ³	1		-
3.3.14		Supply & install concrete for ROCLA enclosure base	m ³	3.6		-

3.3.15		Supply & install splicing kits with epoxy	Each	2		-
3.3.16		Supply & install coating make good kit (Denso wrap)	Sum	1		-
3.3.17		Supply & install thermite welding kit and accessories	Sum	1		-
3.3.18		Supply & install stencil and paint for the labelling of the heavy duty ROCLA enclosure	Sum	1		-
3.3.19		Terminate cables to FDU and supply COC certificate				-
Total: Construction Activity						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
4		PROJECT HANDOVER				
4.1		Project Commissioning				
4.1.1		Factory acceptance testing (FAT)	Sum	1		-
4.1.2		On-site commissioning and testing (SAT)	Sum	1		-
4.1.3		Commissioning report and handover report	Sum	1		-
Total: Project Handover						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	TOTAL AMOUNT			
1		PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:				
2		PRELIMINARY & GENERAL - TIME RELATED CHARGES:				
3		CONSTRUCTION ACTIVITY				
4		PROJECT HANDOVER				
5		TOTAL PROJECT COST				
6		VAT				
7		TOTAL PROJECT COST INCLUDING VAT				

BILL OF QUANTITIES (BOQ) FOR THE CONSTRUCTION OF THE JAMESON PARK TO KENDAL GROUND BED AND TRU INSTALLATION

ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
1	PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:					
1.1		Insurances and contractual obligations	Sum	1		-
1.2		Clinent induction and requisite site medicals	Sum	1		-
1.3		Preparation of safety file as per TPL SHE specification	Sum	1		-
1.4		Preparation of quality pack	Sum	1		-
1.5		Preparation of works program	Sum	1		-
1.6		Offices, storage sheds, fencing, workshops, laboratories, etc.	Sum	1		-
1.7		Tools and equipment	Sum	1		-
1.8		Other fixed charge obligations	Sum	1		-
1.9		Remove all site establishment upon completion	Sum	1		-
Total: P&G Fixed Cost Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
2	PRELIMINARY & GENERAL - TIME RELATED CHARGES:					
2.1		Operation and maintenance of facilities on Site	Week	6		-
2.2		Living out accomodation	Week	6		-
2.3		Construction manager	Week	6		-
2.4		Construction supervisor	Week	6		-
2.5		Safety administration	Week	6		-
2.6		Quality administration	Week	6		-
2.7		Transport and plant	Week	6		-
2.8		Security for duration of project armed (night) and unarmed (day)	Week	6		-
2.9		Ablution or sanitation facilities & dining facilities	Week	6		-
2.10		Company and head office overhead costs for the duration of contract	Week	6		-
Total: Time Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
3	CONSTRUCTION ACTIVITY					
3.1		Removal of Vandelised Structures				
3.1.1		Removal and appropriate disposal of vandalised concrete structures	Sum	1		-
3.1.2		Cap, seal and bury vandalised cables	Sum	1		-
3.1.3		Reinstate ground to natural condition	Sum	1		-
3.2		Proofing				
3.2.1		Pipeline proofing - excavate by hand to pipe depth every 10m	m ³	1		-
3.2.2		Detection and marking of buried foreign services	m	1		-
3.3		Transformer Rectifier Unit (TRU) System				
		Supply & Installation Activities				-
3.3.1		Supply and install 2m long by 200mm diameter coke filled anode canisters containing 1m long by 25mm diameter 160A.y MMO anode with 5m long 16mm ² red PVC/PVC insulated copper cable tails	Each	30		-
3.3.2		Supply and install 2m long by 200mm diameter coke filled spacer canisters	Each	31		-
3.3.3		Supply and install positive ring main cable - 35mm ² red PVC/PVC insulated copper cable	m	210		-
3.3.4		Supply and install anode tail to ring-main connections comprising of line taps and epoxy filled splicing kits	Each	31		-
3.3.5		Excavate anode groundbed trench 2.5m deep by 300mm wide	m	100		-
3.3.6		Excavate positive cable trench 1.5m deep by 300mm wide	m	150		-
3.3.7		Backfill and compact anode groundbed trench	m	100		-
3.3.8		Backfill and compact positive cable trench	sum	150		-
3.3.9		Supply and install 35mm ² black PVC/PVC insulated copper negative cable	m	20		-
3.3.10		Supply and Install 10mm ² black PVC/PVC insulated copper monitor cable	m	10		-

3.3.11		Supply and install stationary reference electrode c/w 10m tail	Each	1		-
3.3.12		Supply and install 4 core 16mm ² armoured cable for power supply	m	30		-
3.3.13		Supply & install concrete for all cable encasement	m ³			-
3.3.14		Supply & install concrete for heavy duty concrete enclosure with steel lane inside	Sum	1		-
3.3.15		Supply & install concrete for ROCLA enclosure base	m ³	3.6		-
3.3.16		Supply & install coating make good kit (Denso wrap)	Sum	1		-
3.3.17		Supply & install thermite welding kit and accessories	Sum	1		-
3.3.18		Supply & install stencil and paint for the labelling of the heavy duty ROCLA enclosure	Sum	1		-
3.3.19		Terminate cables to TRU and supply COC certificate	Sum	1		-
Total: Construction Activity						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
4		PROJECT HANDOVER				
4.1		Project Commissioning				
4.1.1		Factory acceptance testing (FAT)	Sum	1		-
4.1.2		On-site commissioning and testing (SAT)	Sum	1		-
4.1.3		Commissioning report and handover report	Sum	1		-
Total: Project Handover						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	TOTAL AMOUNT			
1		PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:				
2		PRELIMINARY & GENERAL - TIME RELATED CHARGES:				
3		CONSTRUCTION ACTIVITY				
4		PROJECT HANDOVER				
5		TOTAL PROJECT COST				
6		VAT				
7		TOTAL PROJECT COST INCLUDING VAT				

BILL OF QUANTITIES FOR THE KENDAL WEST FDU

ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
1	PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:					
1.1		Insurances and contractual obligations	Sum	1		-
1.2		Clinent induction and requisite site medicals	Sum	1		-
1.3		Preparation of safety file as per TPL SHE specification	Sum	1		-
1.4		Preparation of quality pack	Sum	1		-
1.5		Preparation of works program	Sum	1		-
1.6		Offices, storage sheds, fencing, workshops, laboratories, etc.	Sum	1		-
1.7		Tools and equipment	Sum	1		-
1.8		Other fixed charge obligations	Sum	1		-
1.9		Remove all site establishment upon completion	Sum	1		-
Total: P&G Fixed Cost Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
2	PRELIMINARY & GENERAL - TIME RELATED CHARGES:					
2.1		Operation and maintenance of facilities on Site	Week	4		-
2.2		Living out accomodation	Week	4		-
2.3		Construction manager	Week	4		-
2.4		Construction supervisor	Week	4		-
2.5		Safety administration	Week	4		-
2.6		Quality administration	Week	4		-
2.7		Transport and plant	Week	4		-
2.8		Security for duration of project armed (night) and unarmed (day)	Week	4		-
2.9		Ablution or sanitation facilities & dining facilities	Week	4		-
2.10		Company and head office overhead costs for the duration of contract	Week	4		-
Total: Time Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
3	CONSTRUCTION ACTIVITY					
3.1		Removal of Vandelised Structures				
3.1.1		Removal of outdated FDU and housing unit, cap seal and bury unused cables	Sum	1		-
3.2		Proofing				
3.2.1		Detection and marking of buried foreign services	Sum	1		-
3.2.2		Check for cable sleeve and that the sleeve is not toucing the pipe and report	Sum	1		-
3.3		Forced Drainage Unit (FDU) System				
		Supply & Installation Activities				
3.3.1		Supply & install Single phase 100A/100V FDU as per TPL specification	Each	1		-
3.3.2		Supply & install & install heavy duty ROCLA concrete enclosure	Each	1		-
3.3.3		Supply & install rail cable cable - 4 core 35mm2 armoured cable PVC/PVC (red)	m	50		-
3.3.4		Supply & install kwena cable 70mm2 and rail attachment accessories	m	20		-
3.3.5		Supply & install negative cable - 16mm2 4 core armoured cable PVC/PVC (black)	m	20		-
3.3.6		Supply & install 1 X 16mm ² X 20m monitor cable (black)	m	20		-
3.3.7		Supply & install AC Supply & install cable shall be of 4-core 16mm2 ECC cable	m	70		-
3.3.8		Supply & install 3m X 3m zinc earth-mat covered in a layer of low resistance backfill, situated directly below the heavy duty enclosure	sum	1		-
3.3.9		Supply & install low resistance backfill	Ton	1		-
3.3.10		Supply & install copper earth rods, 1.5m long installed at each corner of the earth mat, attached to the earth mat with a copper lug	Each	8		-
3.3.11		Supply & install earth cable, 70mm2 green/yellow cable	m	20		-
3.3.12		Supply & install concrete for cable encasement from the rail to the depot	m ³	3		-
3.3.13		Supply & install concrete for ROCLA enclosure surround	m ³	1		-
3.3.14		Supply & install concrete for ROCLA enclosure base	m ³	3.6		-

3.3.15		Supply & install splicing kits with epoxy	Each	2		-
3.3.16		Supply & install coating make good kit (Denso wrap)	Sum	1		-
3.3.17		Supply & install thermite welding kit and accessories	Sum	1		-
3.3.18		Supply & install stencil and paint for the labelling of the heavy duty ROCLA enclosure	Sum	1		-
3.3.19		Terminate cables to FDU and supply COC certificate				-
Total: Construction Activity						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
4		PROJECT HANDOVER				
4.1		Project Commissioning				
4.1.1		Factory acceptance testing (FAT)	Sum	1		-
4.1.2		On-site commissioning and testing (SAT)	Sum	1		-
4.1.3		Commissioning report and handover report	Sum	1		-
Total: Project Handover						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	TOTAL AMOUNT			
1		PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:				
2		PRELIMINARY & GENERAL - TIME RELATED CHARGES:				
3		CONSTRUCTION ACTIVITY				
4		PROJECT HANDOVER				
5		TOTAL PROJECT COST				
6		VAT				
7		TOTAL PROJECT COST INCLUDING VAT				

BILL OF QUANTITIES FOR THE SECUNDA TRU

ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
1	PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:					
1.1		Insurances and contractual obligations	Sum	1		-
1.2		Clinent induction and requisite site medicals	Sum	1		-
1.3		Preparation of safety file as per TPL SHE specification	Sum	1		-
1.4		Preparation of quality pack	Sum	1		-
1.5		Preparation of works program	Sum	1		-
1.6		Offices, storage sheds, fencing, workshops, laboratories, etc.	Sum	1		-
1.7		Tools and equipment	Sum	1		-
1.8		Other fixed charge obligations	Sum	1		-
1.9		Remove all site establishment upon completion	Sum	1		-
Total: P&G Fixed Cost Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
2	PRELIMINARY & GENERAL - TIME RELATED CHARGES:					
2.1		Operation and maintenance of facilities on Site	Week	4		-
2.2		Living out accomodation	Week	4		-
2.3		Construction manager	Week	4		-
2.4		Construction supervisor	Week	4		-
2.5		Safety administration	Week	4		-
2.6		Quality administration	Week	4		-
2.7		Transport and plant	Week	4		-
2.8		Security for duration of project armed (night) and unarmed (day)	Week	4		-
2.9		Ablution or sanitation facilities & dining facilities	Week	4		-
2.10		Company and head office overhead costs for the duration of contract	Week	4		-
Total: Time Related Charges						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
3	CONSTRUCTION ACTIVITY					
3.1		Removal of Vandelised Structures				
3.1.1		N/A				-
3.2		Proofing				
3.2.1		Detection and marking of buried foreign services	m			-
3.3		Impressed Current Cathodic Protection (ICCP) System				
		Supply & Install				-
3.3.1		Supply & install three Phase 100A/100V TRU as per TPL specification	Each	1		-
3.3.2		Supply & install heavy duty concrete enclosure	Each	1		-
3.3.4		Supply & install Positive (ringmain) cable - 35mm ² single core PVC/PVC (red)	m	200		-
3.3.5		Supply & install negative cable - 35mm ² single core PVC/PVC (black)	m	20		-
3.3.6		Supply & install 1 X 16mm ² X 20m monitor cable (black)	m	20		-
		Supply & install positive feeder cable shall be of 4-core 35mm ² PVC/SWA/PVC	m	610		-
		Supply & install AC Supply cable shall be of 4-core 16mm ² ECC cable	m	305		-
3.3.7		Supply & install 3m X 3m zinc earth-mat covered in a layer of low resistance backfill, situtated directly below the heavy duty enclosure	sum	1		-
3.3.8		Supply & install copper earth rods, 1.5m long installed at each corner of the earth mat, attached to the earth mat with a copper lug	Each	8		-
3.3.9		Supply & install earth cable, 70mm ² green/yellow cable	m	20		-
3.3.10		Supply & install irrigation system for the construction of the ground-bed	Sum	1		-
3.3.11		Supply & install of tubular anode spacer cannisters. Each cannister shall be galvanised and of the following dimensions 1000mm length X 200mm wide X 1mm thick and filled with calcined petroleum coke.	each	31		-

3.3.12		Supply & install of tubular MMO anodes, the MMO anodes shall be 25.4 mm dia x 1000 mm long/active. The anodes shall be encased in galvenised cannisters of the following dimensions 2000mm length X 200mm wide X 1mm thick and filled with calcined petroleum coke. The anode tails shall be 16mm ² PVC/PVC	each	30		-
3.3.14		Supply & install petroleum coke breeze	m ³	9		-
3.3.15		Supply & install concrete for cable encasement	m ³	79		-
3.3.16		Supply & install concrete for enclosure surround	m ³	1		-
3.3.17		Supply & install concrete for enclosure base	m ³	3.6		-
3.3.18		Supply & install splicing kits with epoxy	Each	31		-
3.3.19		Supply & install coating make good kit (Denso wrap)	Sum	1		-
3.3.20		Supply & install thermite welding kit and accessories	Sum	1		-
3.3.21		Supply & install stencil and paint for the labelling of the hevy duty enclosure	Sum	1		-
Total: Construction Activity						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	UoM	QTY	RATE	AMOUNT
4		PROJECT HANDOVER				
4.1		Project Commissioning				
4.1.1		Factory acceptance testing (FAT)	Sum	1		-
4.1.2		On-site commissioning and testing (SAT)	Sum	1		-
4.1.3		Commissioning report & handover report	Sum	1		-
Total: Project Handover						-
<i>Carried Forward to Summary:</i>						-
ITEM NO.	REFERENCE	DESCRIPTION	TOTAL AMOUNT			
1		PRELIMINARY & GENERAL - FIXED COST RELATED CHARGES:				
2		PRELIMINARY & GENERAL - TIME RELATED CHARGES:				
3		CONSTRUCTION ACTIVITY				
4		PROJECT HANDOVER				
5		TOTAL PROJECT COST				
6		VAT				
7		TOTAL PROJECT COST INCLUDING VAT				

SCOPE OF WORKS
FOR THE SUPPLY AND INSTALLATION OF A TRU, FDU, NDU, TEST
POINTS AND ANODE GROUND-BED FOR TRANSNET PIPELINES

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1. GENERAL

1.1. Introduction

- 1.1.1. *Transnet Pipelines* (TPL) a petroleum pipeline operator intends to initialise a project to upgrade the cathodic protection system at various sites in need of an upgrade. The objective is to ensure compliance with our strategic outlook on pipeline maintenance and integrity management aligned with international NACE standards for cathodic protection.
- 1.1.2. This enquiry is for the appointment of a cathodic protection *Contractor* to supply required materials and install such materials for a functional cathodic protection system and to ensure that the NACE and SANS criterion for pipeline protection which stipulates the measurement of "true", "OFF" or polarized potential of more negative than -0.85V_{cse} as is achieved.
- 1.1.3. This scope of work covers the supply, ascertainment, manufacture, erection, application, delivery, handling, transportation, unloading / receiving, installation, construction, assembly, system testing, quality assurance and commissioning of the works at the sites tendered for. Depending on the site, the work may include the construction of platforms to secure CP & ACM enclosures, the construction of horizontal or vertical ground-beds. Furthermore, the works may require liaison with foreign pipeline owners for the cross-bonding purposes and working in remote areas.
- 1.1.4. TPL shall include with this scope of works a "Bill of Quantities (BOQ)" to assist *Contractors* with costing the various items and/or tasks.
- 1.1.5. The *Contractor* shall also note that in certain instances, TPL may provide certain materials for free, however the contractor is obliged to install such material. The material will be shown on the BOQ but will be explicitly shown as "Free issue" material and the *Contractor* must only price the installation cost.
- 1.1.6. The *Contractor* shall be paid for work done to date as per the BOQ items and rates and a proportion of each lump sum which is the proportion of the work covered by the item which the *Contractor* has completed. TPL has included with this scope of works "drawings" to further assist the *Contractors* with the BOQ pricing.

1.2. Abbreviations & Definitions

To understanding this scope of works, the following abbreviations apply in addition to the NEC.

Abbreviation	Meaning given to the abbreviation
AIA	Approved Inspection Authority
BOQ	Bill of Quantities
CAD	Computer Aided Design
COC	Certificate of Compliance
COVID-19	Corona Virus Disease 2019
DB Box	Electrical Distribution Box
FAT	Factory Acceptance Test
FIC	Field Inspection Checklist
GA	General Arrangement
LV	Low Voltage
NEC	New Engineering Contract

OHS Act	Occupational Health and Safety Act, 85 of 1993
PDF	Portable Document Format
PPE	Personal Protective Equipment
SAT	Site Acceptance Test
SHE	Safety, Health and Environment
TPL	Transnet Pipelines
PQP	Project Quality Plan
QCPs	Quality Control Plans
QCP	Quality Control Plan
FICs	Field Inspection Checklists
WPS	Welding Procedure Specifications
NCR	Non-Conformance Report
QA	Quality Assurance
QC	Quality Control
AC	Alternating Current
CH:	Valve Chamber
CIPS	Close Interval Potential Survey
CP	Cathodic Protection
CSE	Copper Sulphate Electrode
Cu/CuSO ₄	Copper/Copper Sulphate
DC	Direct Current
DCVG	Direct Current Voltage Gradient Survey
DSR	Deep Soil Resistivity
ECDA	External Corrosion Direct Assessment
HDG	Hot Dip Galvanized
HIRA	Hazard Identification & Risk Assessment
HV	High Voltage
IF	Insulating Flange
IJ	Insulation Joint
ISO	International organization of standard
ICCP	Impressed Current Cathodic Protection
MMO	Mixed Metal Oxide
NACE	National Association of Corrosion Engineers

NDU	Natural Drainage Unit
PCM	Pipeline Current Mapping
PRE	Permanent Reference Electrode
PSP	Pipe to Soil Potential
ROCLA	Heavy duty concrete bathroom-like unit use to house a TRU/FDU/NDU
SRB	Sulphate Reducing Bacteria
SWA	Steel Wire Armoured Cable
TRU	Transformer Rectifier Unit

Bill of quantities	(BOQ) – Pricing instructions that are contained in the tender document and indicate the quantities to be supplied or installed
Cathodic protection	The process to reduce or prevent corrosion of metal structures in contact with an electrolyte by the flow of direct current from the electrolyte onto the surface of the structure
Impressed current cathodic protection	(ICCP) – Cathodic protection system utilising anodes which are energized by an external DC power source. The ICCP system is designed to deliver relatively large currents from a limited number of anodes
Sacrificial anode cathodic Protection	(SACP) - Cathodic protection system utilising sacrificial anodes which have a higher energy level or potential with respect to the structure to be protected. The SACP system is designed to deliver relatively small currents from many anodes
Cathodic protection system	A combination of equipment installed to provide cathodic protection to the pipeline
Drain point	The point on the pipeline where the connection of the negative terminal of the cathodic protection voltage source is made to conduct (drain) the returning current from the pipeline to the voltage source
Electrolyte	Conductive material such as soil or water in which an electric current can flow
Earth spike	A threaded metal spike, typically 1,5 m long an electroplated as per SANS 1063
Foreign structures / pipelines	Metal structures or pipelines other than the pipeline under consideration, in contact with the same electrolyte as the pipeline and which are or may become under the influence of the pipeline's cathodic protection system. Foreign structures / pipelines may be owned by the principal or other companies and may or may not be equipped with cathodic protection
Ground-bed	A system of buried or submerged electrodes used to conduct the required current into and through the electrolyte to the steel surface to be protected
Lightning arrestor	A device used on cathodic protection systems to protect the insulation and conductors of the system from the damaging effects of lightning

Midpoint	The point on a pipeline between two cathodic protection stations where the influence of the two cathodic protection stations is expected to be equal and the protection levels are usually lowest
Natural potential	The pipe to soil potential measured when no cathodic protection is applied, and polarisation caused by cathodic protection is absent
“OFF” potential	The pipe to soil potential measured immediately after the cathodic protection system is switched off and the applied electrical current stops flowing to the pipeline surface but before polarisation of the pipeline has decreased
“ON” potential	The pipe to soil potential measured while the cathodic protection system is continuously operating
Pipe-to-soil potential	The difference in electrochemical potential between a pipeline or foreign structure/pipeline and a specified reference electrode in contact with the electrolyte. Similar terms such as structure to soil potential, pipe to electrolyte potential is sometimes used
Polarisation	The change of the pipe to soil potential caused by the flow of DC current between an electrolyte and a steel surface
Reference electrode	An electrode which the electro chemical potential is accurately reproducible and serves as a reference for pipe to soil potential measurements
Stray currents	Electrical currents running through the electrolyte, originating from a foreign DC/AC source which causes interaction with the and cathodic protection system and adversely acts upon foreign structures/pipelines

1.3. General Notes

- 1.3.1 **Most of the work as described in this specification represents works on existing facilities that will or may be in operation during the Contract, for this reason all necessary precautions are to be taken to ensure that normal pipeline and work operation is not disrupted in any way. Contractors are thus required to note that access to the site will be limited and dependent on operational constraints. Contractors will therefore be required to co-operate responsibly with operational staff and to schedule their work programmes to achieve completion of the project. Contractors are to note that work shutdown periods shall be scheduled according to TPL operational constraints and may fall over weekends/public holidays. TPL will not be held responsible, in terms of cost, for any site delay that may arise from petroleum line operations enforced by TPL.**
- 1.3.2 **The Contractor shall supply adequate and competent labour, supervision, tools, equipment, services, testing devices for each item necessary to complete the work. TPL reserves the right to terminate the contract at any point if it is found that the Contractor's performance, supervision, tools, equipment, services, testing devices and material do not comply with specified requirements. The Contractor will only be allowed to claim for work completed to the specified acceptable standard.**
- 1.3.3 *Contractors* are to note that the responsibility for the installation and commissioning of all elements of equipment as specified in the design document shall remain with the Contractor. In this regard, the Contractor is required to satisfy himself that all applicable elements of the Equipment offered can comply with all specifications and reports as included or mentioned in the Tender Documents. Failure to meet specification shall render the successful Contractor liable to rectify the problem at no cost to TPL.

- 1.3.4 The successful Contractor is to note that TPL reserves the right to free-issue certain items of equipment as listed on the BOQ. Free issuing of these items, once accepted by the Contractor, in no way diminishes the Contractor responsibilities as detailed in the contract documentation. The Contractor shall conduct quality checks as to familiarise himself with the working condition and cosmetic appearance of the free issue items. Acceptance of free-issued equipment by the Contractor shall include the following:
- 1.3.5 Acceptance of responsibility in terms of any damages or losses from date/time of handover until end of project handover phase.
- 1.3.6 Acceptance to be indicated in writing.
- 1.3.7 The Contractor is to note with regards to works onsite, that responsibility for the protection of all existing equipment and services shall rest solely with the Contractor. The Contractor shall be required to bear all cost which may arise as result of damage which may have been caused to equipment or services or which may arise because of his operation on the respective sites.
- 1.3.8 The Contractor shall only utilise testing devices and measuring equipment that are certified and carry a valid calibration certificate as issued by an approved calibration authority. Documentation reflecting the type, name and calibration certificate of the test equipment that will be utilised to complete the work and shall be available at the request of the Project Manager.
- 1.3.9 Where control equipment, peripherals or instrumentation from various suppliers or manufacturers are offered for controlling the various sub-systems or portions of a sub-system, it shall be the responsibility of the Contractor to ensure the various portions are fully integrated into a single coherent system. Where specific project development is required, TPL shall first approve these.
- 1.3.10 Contractors are to note that no system or sub-systems shall be designed especially for this project, as it is a requirement that only proven systems and sub-systems be installed.
- 1.3.11 The Contractor shall submit the required Safety, Health and Environment (SHE) Compliance File for approval by TPL, before any works can commence. The content of the SHE Compliance File is dictated by the work undertaken and shall ensure full compliance to the requirements of applicable legislation and best practice standards. The Contractor is also to refer to the attached SHE Compliance file review-guidelines for the SHE Compliance file to fulfil the requirements of applicable legislation and best practice standards.
- 1.3.12 The Contractor and his personnel/sub-contractors shall attend the compulsory TPL induction training before commencement of the work. Standing time approximately 2 hours. The induction training can either be conducted at TPL Pinetown/Alrode workshop or at an alternative TPL facility as arranged by the Project Manager.

1.4. Notes to Contractors

- 1.4.1 The Contractor shall submit a LUMP SUM price for completion of all elements of the works. Contractors are to note that TPL will entertain no additional claims of any nature.
- 1.4.2 The Contractor shall supply a detailed breakdown of all costs to complete all the work as specified for the specific site(s). With reference to the attached BOQ pricing schedule, cost shall include all travel, accommodation, labour, supervision, tools, equipment, services, testing devices and specified equipment as outlined in the BOQ. Contractor to note, TPL will not entertain any additional claims for labour cost over weekends, public holidays or after-hours labour. Any work not complying with specifications as contained herein and elsewhere in the contract document shall be redone at the Contractor's own expense. Contractors are required to return together with their tenders fully completed BOQ. The tender document will be deemed incomplete if either one of the above documents are not fully completed and contains as a minimum the items as per the respective documents supplied with the tender documents.

- 1.4.3 The Contractor is to note that for materials and parts not included in this document the Contractor shall provide an installed price for these parts at cost plus a predetermined mark-up. This predetermined mark-up is to be supplied by the Contractor with a supplier's invoice before payment will be approved. If the Contractor is an agent of a particular range of products their price lists are to be included in the tender documentation. The Contractor must note this is an installed price and must include travelling, accommodation, site installation, labour, materials and all equipment involved. Please note no further claims of any nature will be allowed and cost prices of items will be verified with suppliers before payment is approved.
- 1.4.4 The *Contractor* shall supply day and hourly work rates for the various grade of staff required.
- 1.4.5 The *Contractor* shall furnish proof of actual experience in the class of work for which they have tendered and must submit with the tender on the relevant form attached to the tender documents, a statement of works recently carried out. The list shall include the value of previous contracts, completion dates, contact names and telephone numbers.
- 1.4.6 The *Contractor* to note that incomplete tender documents will not be considered.
- 1.4.7 The Contractor shall ensure that they have the requisite insurances in place prior to commencement of the project.

1.5. Project Time Schedule

- 1.5.1 Programme to Be Furnished After Contract Award
 - 1.5.1.1 The order in which the works are to be carried out shall be as directed by the Project Manager. Within fourteen (14) days after the acceptance of his Tender, the Contractor shall submit to the Project Manager for his approval a detailed work programme conforming to the Project Manager's requirements, showing the order of procedure and method in which he proposes to carry out the works, and shall, whenever required by the Project Manager, furnish for his information, particulars of the Contractor's arrangement for carrying out the works, of the construction plant and temporary works which the Contractor intends to supply, use or construct as the case may be. The programme shall cater for duration(s) by which information is to be supplied by the Project Manager. This programme shall be referred to as the Programme, be issued as a Gantt chart based on a detailed activity linked programme and be subdivided into operations of day(s) or week(s) duration. The programme shall be man loaded by crafts and craft mix ratio of skilled and unskilled. The submission to and approval by the Project Manager of such programme or the furnishing of such particulars, shall not relieve the Contractor of any of his duties or responsibilities under the Contract.
 - 1.5.1.2 This programme, when accepted by the Project Manager will be binding on the Contractor. Amendment to the programme can only be effected by the Project Manager's acceptance of the Contractor's revised programme.
 - 1.5.1.3 The programme shall be used to monitor progress. The programme shall remain in force but the resources to achieve the programme shall be updated at each site meeting and the Contractor shall report progress to date and what steps shall be taken to ensure adherence to programme.
 - 1.5.1.4 Should the successful Contractor at any time during the contract fall behind the approved programme, then the Project Manager may require the Contractor to adjust his manner of working and/or employ additional staff, at NO additional cost to TPL, in order that the approved programme can be achieved.
- 1.5.2 Programme to Be Furnished with Tender
 - 1.5.2.1 The tender programme shall be in Gantt chart format programme. Contract award shall be designated week 0. The tender programme shall not be less than the kick-off meeting, access to site, design, procurement, manufacture, delivery to site, installation, site acceptance testing, defect correction, commissioning, and handover periods for each site at a time. This programme shall also be cost loaded to indicate expected cash flow.

1.5.3 Programme on Which Tenders Are to Be Based

1.5.3.1 Various key elements of the entire project are indicated below: -

- Contract award
- Kick-off meeting
- Access to site (only after TPL Induction and Site-Specific Induction)
- Meetings
- Design
- Procurement
- Manufacture
- Delivery to site
- Installation
- Inspections and testing
- Site acceptance testing
- Defect correction
- Commissioning & Handover

1.6. Reference Documentation

- 1.6.1 The requirements of the materials, design, installation, commissioning, examination, inspection and testing of equipment and facilities onsite shall be in accordance with the relevant sections of the below mentioned codes.
- 1.6.2 Where Government, Local authorities and other statutory body's regulations, laws and requirements are more stringent than those specified hereunder, the regulations, laws and requirements shall take precedence.
- 1.6.3 Where no specific rules, regulations, codes, or requirements are contained in this specification nor covered by the below mentioned codes, the *Contractor* shall, in consultation with TPL, adhere to internationally accepted engineering practices or original manufacturers specification.
- 1.6.4 The TPL issued drawings will be for information, ascertainment and/or construction and does not relieve the *Contractor* of any responsibility to submit to TPL, prior to construction, all corrected and accepted drawings for TPL acceptance and obtaining a TPL signature of acceptance prior to any construction.
- 1.6.5 To understanding these Standards, the following abbreviations apply.
- SANS - South African National Standards
 - SABS - South African Bureau of Standards
 - BS - British Standards
 - IEC - International Electro technical Commission
 - NEC - New Engineering Contract

General:

TITLE	SANS	IEC	BS	OTHER
Code of Practice for Wiring of Premises and incorporated standards	SANS 10142			
The installation and Maintenance of Electrical Equipment used in explosive atmospheres.	SANS 10086-1			
Explosive Atmospheres	SANS 60079			
Protection against lighting: Physical damage to structures and life hazard	SANS 10313			
Protection against lighting	SANS 62305			
Protection against lighting (EMI)	SANS 61312			
Hot dipped galvanised coatings on fabricated iron and steel articles.	SANS 121:2011			
Occupational Health and Safety Act and Regulations. 85 of 1993				
Conditions of Contract				NEC
NACE international standard practice – Control of external corrosion on underground or submerged metallic piping systems				NACE SP0169 – 2013
Petroleum and natural gas industries - cathodic protection of pipeline transportation systems. part 1 on-land pipelines				ISO15589-1
Protection against corrosion by stray current from direct current systems				EN50162
Cathodic protection measurement techniques				EN13509
Measurement techniques related to criteria for cathodic protection on underground or submerged metallic piping systems				TM0497
The use of coupons for cathodic protection monitoring applications				NACE SP0104-2014
The use of coupons for cathodic protection monitoring applications. NACE international task group 210 - coupon technology - technical report on the application and interpretation of data from external coupons used in the evaluation of Cathodically protected metallic structures				NACE RP0104-2004

The wiring of premises part 1: Low voltage installations	SANS 10142-1			
The design and installation of an earth electrode specifications	SANS 10199			
Materials of insulated electric cables and flexible cord's part 1: Conductors	SANS 1411-1			
Materials of insulated electric cables and flexible cord's part 2: Poly-vinyl-chloride (PVC)	SANS 1411-2			
Materials of insulated electric cables and flexible cord's part 3: Elastomers	SANS 1411-3			
Materials of insulated electric cables and flexible cord's part 5: Cross – linked polyethylene (XLPE)	SANS 1411-4			
Electric cables with extruded solid for fixed installations (300/500v to 1900/3300v) part 1: General	SANS 1507-1			
Electric cables with extruded solid dielectric insulation for fixed installations (300/3300v) part 2: Wiring cables	SANS 1507-2			
Cathodic protection measurement techniques	SANS 53509:2009			

1.6.6 The latest revision of the following TPL standard specifications, where applicable, shall apply. It is a requirement that *Contractors* comply with all applicable clauses of the specifications in the execution of the work they undertake.

- PL652 Rectifier Specification
- PL121418 Resistance Panel A4
- PL400H Holiday Detector Specification
- PL415G Steel Insulation Flange Specification
- PL727 Specification for Cable, Racking, Trenching & Earthing Reticulation
- PL711 Specification for Equipment Cabinets to House Electronic Equipment
- PL804 General welding specification
- EA08729A01 Rev A Transnet Equipment Shelter GA (Rocla enclosure Specification)
- EA08768A01 Rev A Transnet Equipment Shelter Inner Grid (Rocla Specification)
- EA08768A03 Rev A Transnet Equipment Shelter Outer Grid (Rocla Specification)
- Drawing number 2684358-C-PL1-CP-DD-181.
- Drawing number 2684358-C-CP-DD-180.

Note: Copies are available on request.

2. General Works Execution and Site Requirements

2.1 Site Meetings

2.1.1 The *Contractor* shall attend site meetings when convened by the *Project Manager*. Such meetings will be for the purpose of discussing progress, delays, materials, conditions, and specifications, as well as the co-ordination of site activities. The meetings will be chaired by the *Project Manager*, or his Deputy and the proceedings shall be noted and circulated by the *Project Manager*.

2.2 House Keeping

2.2.1 The *Contractor* shall maintain the work sites always clean and tidy.

- 2.2.2 The *Contractor* shall take all reasonable precautions to protect existing equipment while work is in progress. Protection of existing equipment shall include protection against dust or any other harmful matter.

2.3 Materials

- 2.3.1 The *Contractor* shall ensure that all metal items other than stainless steel or other non-ferrous metals are hot dipped galvanised.
- 2.3.2 The *Contractor* shall ensure that precaution is taken against electrolytic corrosion where different metals are used on items of equipment.

3. General Operating Conditions

3.1 Hazardous Area

- 3.1.1 All areas demarcated as “Exd” areas are to be treated as hazardous and *Contractors* shall ensure that the necessary care is taken to prevent damage and fire.

3.2 Climatic Conditions

- 3.2.1 Unless otherwise specified, all control equipment, peripherals and ancillary equipment shall be capable of operating in an uncontrolled environment, and at ambient temperatures, which vary between -5 degrees Celsius and 50 degrees Celsius.
- 3.2.2 *Contractors* must state the heat, power and environment requirements for all equipment offered in the tender.
- 3.2.3 The equipment must operate satisfactorily between sea level and 2000 metres above sea level.
- 3.2.4 The equipment must be capable of operating in a relative humidity range from 5% RH to 95% RH.
- 3.2.5 Dust and vapours accumulate rapidly, and selection of equipment and installation thereof shall be given careful consideration to minimise the detrimental effects of this.
- 3.2.6 Severe lightning occurs in certain of the areas in which the equipment will operate. TPL will not regard damage to equipment resulting from a lightning strike or a power surge as unavoidable except where such a strike is a "direct strike".

4. Scope of Works

4.1 Design

- 4.1.1 TPL shall issue the *Contractor* the proposed cathodic protection schematic drawings, proposed cathodic protection layout with proposed cable routing and the relevant BOQ as per respective TPL site.
- 4.1.2 The TPL issued drawings will be for information, ascertainment and/or construction and does not relieve the *Contractor* of any responsibility to submit to TPL, prior to construction, all corrected or accepted and approved drawings for TPL acceptance and must obtain a TPL signature of acceptance prior to procurement and construction.
- 4.1.3 The *Contractor* shall also ascertain if the proposed cathodic protection drawing outlined in clause 4.1.1 meet the NACE or SANS requirements for an installed CP system which are determined as per the attached CP design report.

4.2 Cathodic protection and Civil Work

- 4.2.1 The Contractor shall supply and install new equipment and fittings as per the BOQ submitted during the respective tender, the approved design and scope of works as per specific site and associated drawings.

- 4.2.2 Transnet shall determine all cable routes prior to the Contractor commencing with the works.
- 4.2.3 The *Contractor* shall provide security for high-risk areas for personnel and materials for the duration of the project works.
- 4.2.4 The *Contractor* shall be required to excavate the rail/anode header cable trench as per site design specification.
- 4.2.5 The *Contractor* shall supply and install a single phase or three phase TRU FDU in accordance with the TPL manufacturing specification. These units shall be installed on site once they have been factory tested and have passed the FAT.
- 4.2.6 The TRU or FDU shall be installed inside a steel lined ROCLA enclosure and the door hinges shall be inside the ROCLA enclosure. The enclosure shall comprise a suitable DB box and KW/h meter. The TRU or FDU shall be earthed using a 6m X 6m zinc earth-mat covered in a 100mm layer of low resistance backfill such as a 50/50 mix of gypsum and bentonite.
- 4.2.7 *Contractor* shall be required to excavate to pipe depth and expose the pipeline circumferentially to allow for the negative cable attachment of 16mm² 4 core SWA, black cable and a monitoring cable of 16mm² single core black cable. The cables shall be looped around the bottom of the pipe and attached to the pipeline at the 12 o'clock position, attachment shall be done by thermite welding procedure.
- 4.2.8 Supply and install a permanent reference electrode (Cu/CuSO₄ PRE) and a DC / AC monitoring coupon approximately 300mm away from the pipeline. The PRE and coupon shall face the pipeline and installed in a bed of selective backfill or low resistance backfill such as 50/50 mix of gypsum and bentonite prior to backfilling of the excavation. The PRE and coupon tails shall be as per the design specification.
- 4.2.9 All vandalised or broken-down concrete enclosures within the installation site shall be removed and discarded appropriately and any exposed cable shall be cap, sealed and buried to prevent the loss of any protective CP current.
- 4.2.10 In the case of a TRU installation, the contractor shall supply and install a positive header cable, typically 35mm² 4 core SWA, red cable or red sleeve, the length of which shall be determined as per the CP design specification and terminated at the positive terminal of the TRU.
- 4.2.11 The contractor shall supply and install a power cable, typically 16mm² 4 core aluminium or steel cable, the length of which shall be determined as per the CP design specification.
- 4.2.12 In the case of an FDU installation, the contractor shall supply and install 2 of 5m X 35mm² steel wire cable (Kwena cable), attached to the railway line as per the blue bond procedure. This cable will be buried at a depth of 1.5m from the railway line and then joined by using a suitable splicing kit to the predetermined length (as per CP design) of 35mm² 4 core SWA, red cable/ red sleeve to be terminated at the positive terminal of the FDU. All cable crimping shall be done using a hydraulic crimping tool.
- 4.2.13 The *Contractor* shall also note that other items on the BOQ will be issued "free of charge" by TPL as indicated under the column "material supplied by" of the BOQ, the *Contractor* will have to insert both the material and the labour rate for such items.
- 4.2.14 The *Contractor* shall ensure that the cable routing follows the TPL proposed or accepted cable routing as it makes use of agreed servitudes. The Contractor shall ensure that the trenching routes are pegged by TPL surveyors and appropriate wayleaves signed by those taking responsibility.
- 4.2.15 Where no clear servitudes exist, TPL shall deploy land liaison officers and land surveyors to negotiate appropriate cable trenching routes with foreign landowners.
- 4.2.16 The Contractor shall ensure that all excavations across road crossings/hardened surfaces are re-instated such that the previous finish and all layer works are matched.
- 4.2.17 All agreed cable routes shall be pegged using wooden pegs, sprayed with luminous paint in order to guide the contractor during the trenching phase of the works.
- 4.2.18 Cable trenches shall typically be ±1.5m deep and 300mm wide and encased in 20MPa ready-mix concrete to prevent the theft and vandalism of the cable.

- 4.2.19 Horizontal ground-bed trenches shall typically be $\pm 2.5\text{m}$ deep and 600mm wide
- 4.2.20 The shallow vertical ground-bed shall consist of shallow vertical holes drilled or indicated to a depth as specified in the attached design report at a diameter of 210mm installed to the specified depth of cover and spaced according to the design specification. Typically, each hole will comprise a maximum of 3 anodes spaced 1.5m from centre to centre with individual tails being terminated inside the anode junction box. A PVC casing of suitable length shall then be installed at the mouth of the bore hole to prevent the bore-hole from collapsing. The casing shall extend beyond at least 300mm above natural ground level.
- 4.2.21 For the construction of the deep-well vertical ground-bed, the contractor shall Supply Mixed Metal Oxide (MMO) Anodes in canisters as per design specification. At least the 2m bottom portion of the Ground-bed is to be filled with calcined petroleum coke of particle size **95%** $< 1.5\text{mm}$ and 5% $< 0.5\text{mm}$ before start of active zone. **Anodes** shall be installed centrally in the active zone inside the calcined petroleum coke bed. Anodes shall be spaced 1.5m from centre to centre with individual tails being terminated inside the anode junction box. The coke shall be mixed with soapy water (liquid soap) to form slurry prior to pumping or pouring inside the bore hole. No dry coke shall be allowed. The top anode shall be covered with at least 1m coke bed. The remainder of the Ground-bed or inactive zone is to be backfilled with graded washed silica sand of particle size 5-7mm with quantities indicated in the design specification.
- 4.2.22 Where the contractor is required to supply and install a standard concrete bunker enclosure, TPL shall provide a drawing of such bunker which shall at least have the following dimensions:
- Outer Dimensions:
 - Front view dimensions: 1442mm X 796mm
 - Side view dimensions: 1442mm X 695mm (base) X 502mm (top)
 - Bunker Inner Dimensions:
 - Front view dimensions: 796mm X 430mm
 - Side view dimensions: 415mm X 325mm
 - The concrete strength of the bunker shall not be less than 45MPa. Each unit shall have a testing certificate and test block available upon request.
 - The bunker shall have at a minimum, Y12 HDG rebar cast into the concrete and provision for an M24 eye bolt for lifting the bunker.
 - The door shall be at least 5mm thick, grade S355 case hardened steel for added strength and corrosion prevention.
 - The locking mechanism of the bunker shall consist of 2 X shrouded bolt locks. The bolts shall attach to a built-in case-hardened striker plate, the configuration of which mitigates against vandalism.
 - The bunker shall be provided complete with chaises and suitable gland plate.
- 4.2.23 Where the contractor is required to supply and install a mega concrete bunker enclosure, TPL shall provide a drawing of such bunker which shall at least have the following dimensions:
- Bunker Outer Dimensions:
 - Front view dimensions: 1435mm X 1420mm
 - Top view dimensions: 1420mm X 1050mm
 - Bunker Inner Dimensions
 - Front view dimensions: 770mm X 875mm
 - The concrete strength of the bunker shall not be less than 45MPa. Each unit shall have a testing certificate and test block available upon request.
 - The bunker shall have at a minimum, Y12 HDG rebar cast into the concrete and provision for an M24 eye bolt for lifting the bunker.
 - The door shall be at least 5mm thick, grade S355 case hardened steel for added strength and corrosion prevention.
 - The locking mechanism of the mega bunker shall consist of 3 X shrouded bolt locks. The bolts shall attach to a built-in case-hardened striker plate, the configuration of which mitigates against vandalism.
 - The mega bunker shall be provided complete with chaises and suitable gland plates

4.2.24 Where the contractor is required to supply and install a Underground chamber test post, TPL shall provide a drawing of such underground test post which shall at least have the following dimensions:

Underground test post Dimensions

- The inner dimensions of the underground test post frame shall be suitable for the installation of a standard bunker chassis (dimension 500mm x 300mm) and TPL type link panels, with noncorrosive material, and the inner depth should be 1000mm plus.
 - All underground cable attached to moving components must be flexible with less copper and terminated to the termination box that allows for four core cables and single core to be terminated.
 - Due to the nature of installation of underground test post that is in level with the ground level, the design of the test post must be of the underground type with IP rating of 68, for water and dust not to slip through
 - The installation of the underground test post shall have reinforced concrete surround that is 300mm out, and the concrete strength of have reinforced concrete surround shall not be less than 45MPa.
 - Access of the underground test post shall be opened with the app, and any unauthorised entry and temper (vibration and light sensor) shall be reported on the central platform, for any theft of vandalism control measure (Optional).
 - Underground test post should be able to monitor DC, AC, and instant off CP potentials remotely (Optional).
 - The **Contractor** shall ensure that a suitable IP65 rated enclosure is used for cable terminations inside of chambers or as per the CP design requirement.
- 4.2.25 The **Contractor** shall ensure that a suitable IP66 rated enclosure is used for cable terminations inside of enclosures in areas vulnerable to explosions, such as petroleum and gas plants.
- 4.2.26 The **Contractor** shall ensure that all fittings, conduits, saddles, and housings are corrosion resistant, dust and moisture resistant and where applicable explosion proof.
- 4.2.27 The **Contractor** shall ensure that key personnel have the requisite training in the tasks that they are employed to do. The minimum requirements being the following:
- NACE 1 certification
 - Legal liability
 - Supervisory training
 - Introduction to project management
 - HIRA
 - First aid training
 - Excavation training
 - Permit issuer and receiver training
- 4.2.28 The **Contractor** shall ensure that cable attachments are conducted in compliance with NACE specifications and as per TPL cable attachment specification.
- 4.2.29 The **Contractor** shall ensure that all site work is conducted with a permit in place, the permit shall be issued to the contractor's site supervisor daily.
- 4.2.30 Where required and accepted by the TPL **Project Manager**, the **Contractor** shall ensure that all excavations are done and completed by hand (machines not permitted before the pipeline is partially exposed). Allowance is to be included to detect services along a route prior to trenching. Any existing services damaged during excavation will be repaired at the **Contractor's** cost.
- 4.2.31 The contractor shall carry out commissioning of the TRU or FDU, ensure that all installations, including cabling are labelled as per TPL requirements. Where required, data logging and coating integrity testing (PCM or CIPS survey) and CIPS to determine the effectiveness of the CP system. The commissioning of the CP system and associated reports including quality control documents and as-built drawings will form a part of the hand-over package.
- 4.2.32 The Contractor shall ensure that all circuits are labelled according to TPL specification.
- 4.2.33 The **Contractor** shall ensure that all cables are labelled at both ends according to TPL specification (Laser engraved 316 stainless steel tags, tied with stainless steel cable ties).

- 4.2.34 The *Contractor* shall be responsible for issuing COC's on completion of the work. (Classification certificates are required for all equipment installed in hazardous areas).

4.3 Hold Points

- 4.3.1 Prior to commencement of procurement and manufacture, design acceptance shall be obtained from the *Project Manager*. Hold points for acceptance to proceed shall entail as a minimum submission of the following documentation: -
- Detailed design report
 - Rectifier schematic drawings showing the new rectifier design layout
 - Installation and equipment drawings
 - GPS co-ordinates of proposed cable routes and key installations
 - Equipment and material lists.
 - Construction drawings of any equipment that will be manufactured.
- 4.3.2 The *Contractor* should take note that acceptance by the *Project Manager* of submitted drawings does not relieve the *Contractor* of responsibility for errors in design documents or drawings issued.
- 4.3.3 The *Contractor* shall note that all documentation and drawings issued by TPL are supplied in good faith and may not be complete in every detail. The *Contractor* shall be responsible for ascertaining the validity and correctness of all drawings issued.

4.4 Quality Requirements

- 4.4.1 This section outlines the minimum requirements to ensure that products and services supplied to TPL are manufactured, provided, constructed, or installed in accordance with all specified requirements as defined in this scope of works.
- 4.4.2 The *Contractor* is responsible for all quality activities necessary to ensure the work meets the requirements specified in this scope of works and shall manage and coordinate all quality aspects of the work in accordance with the requirements of this scope of works, together with the *Contractor's* PQP and QCPs once reviewed and accepted by TPL.

4.4.3 Project Quality Plan

The PQP shall entail the following:

- Overview and understanding of scope of works and key requirements
- Organogram with positions, roles and responsibilities
- Procedures:
 - Document control – the *Contractor* shall provide a description of how documents provided by TPL will be managed e.g., management tools and databases, internal and external distribution of documents to TPL, third parties, internal review and approval routes and authorities, receipts, registrations, codes, standards, and specifications.
 - Design control – where the *Contractor* is responsible for any aspects of design related to the scope of works, they must provide procedures for the control of these design activities. This must also factor in the roles and responsibilities
- Project Schedule - As per this scope of works requirements
- Commissioning and training plan.

4.4.4 Quality Control Plans

The QCPs shall be submitted before the commencement of the project.

QCPs must clearly identify all inspection, test, and verification requirements to meet this scope of works including destructive and non-destructive testing where applicable, witness and hold

points. The *Contractor* prepares and submits QCPs to TPL for review in accordance with the requirements of this scope of works and PQP. The QCP shall include:

QCPs shall include reference to all tests specified in the scope of works.

Inspection and Testing

The *Contractor* is responsible for the conduct of all *Contractor* inspections and tests. This responsibility includes:

- Documenting inspection and test results in the QCPs and relevant FIC.
- Progressively inspecting the quality of the scope of works performed, including that of all Sub-Contractors.
- Inspecting to meet all scope of works requirements, in number, type and form
- Inspecting day to day activities, material receipts, issue of material for installation, in-process inspections, and final inspections.

Schedule of Inspection - The *Contractor* shall submit a schedule showing the proposed dates for inspections and tests nominated in the QCP where witness and hold points are required. The schedule shall be regularly updated with progress and issued to TPL to show the current inspection and test status.

Field Inspection Checklists - For site installation and construction activities, the *Contractor* prepares FICs to permit inspection and testing of installed equipment and constructed facilities in accordance with the respective QCPs.

Inspection Points - The QCP identifies points in the fabrication, manufacturing and/or installation process that are selected for inspection. Hold Point (H), Witness Point (W) Review Point (R), Surveillance (S).

Welding Procedures - Where the *Contractor's* scope of works includes fabricated weldments, WPS defining the method, preparation, and sequences to be adopted to achieve a satisfactory welded joint shall be provided for all weld types required in the execution of this scope of works.

Material Traceability - Where, and to the extent that material traceability is required, the *Contractor* shall provide its procedures for the maintenance of material identification throughout all phases of manufacture.

Material Certification - Where specified in this scope of works the following certificates shall also be provided to TPL: A certificates of compliance, A certificates issued by a laboratory or test facility independent of the *Contractor's* work, any other form of certification affecting the scope of works.

Non-Conforming Products

The *Contractor* shall establish and maintain procedures to control material or products that do not meet the specified requirements.

All *Contractor* product and/or materials identified as not conforming to requirements shall be dealt with promptly as follows:

- If the Contractor discovers material or product which is not in accordance with the requirements of the scope of works e.g., a non-conformance, the *Contractor* shall immediately initiate the non-conformance procedure. If TRANSNET or its agent identifies a non-conformance, a TRANSNET NCR may be raised.

Corrective and Preventative Action

- If the Contractor proposes a disposition of any non-conforming materials or product which varies from the requirements of this scope of works, such a proposal shall be

submitted in writing to TPL whose decision on the proposal shall be obtained in writing before the non-conforming material or product is covered up or incorporated into the works or is the subject of any other disposition.

- The disposition of non-conformances which do not vary the requirements of the *Contract*, specification or drawings may be approved by the *Contractor* following discussion and agreement with TPL.

Inspection, Measuring and Test Equipment

Calibration - The *Contractor* shall ensure the calibration of test and measuring equipment is performed and maintained in accordance with the relevant *Contractor* procedures and/or the equipment manufacturer's specifications.

Use of Inspection, Measuring and Test Equipment - The *Contractor* shall ensure that authorized equipment users:

- Use the equipment in accordance with manufacturer's instructions, and accepted industry practices
- Ensure the equipment is covered by a current calibration certificate
- Conduct the measurements or tests in accordance with the equipment manufacturer's specifications or other relevant specification
- Prior to commencement of each inspection or test activities:
 - Identify the measurements to be made
 - Determine the accuracy required
 - Select the appropriate inspection, measuring or test equipment for this scope of works.

4.4.5 Quality Records

Contractors shall maintain Quality Records necessary to provide objective evidence that demonstrates and verifies achievement of the Quality Assurance (QA) / Quality Control (QC) requirements associated with this scope of works. All Quality Records including original source material test certificates and non-destructive test reports, shall be retained by the *Contractor* during the project, and be provided to TPL at the times, and in the quantities specified in this scope of works.

4.5 Documentation

The *Contractor* shall supply the documentation listed below: -

- Two (2) complete sets of the following (in files) and one soft copy on a separate memory stick for each TPL site (Documents must be printable, drawings must also include PDF and CAD versions): -
 - Detailed as built drawings (all drawing types that are outlined on clause 4.1.1 and/or 4.1.5) the as built drawing simply details all cables and equipment installed, it does not change the approved drawings
 - Detailed as design report
 - Required spreadsheet with data logging readings
 - Comprehensive maintenance manuals
 - Detailed spares catalogues
 - Electrical Certificate of Compliance (Original and a copy of the COC) (including equipment certificates).
 - Factory inspection and testing documents
 - Site testing, certification, commissioning, and completion documents
 - Equipment warranty certificates.
- A formal completion certificate signed and dated by both the *Contractor* and the *Project Manager* shall be provided.

4.6 Installation and Site Works

- 4.6.1 The *Contractor* shall prior to making any design changes to the existing equipment and proposed drawings submit drawings and detailed design report to the *Project Manager* for prior acceptance. Drawings shall include equipment schedules detailing all major components as per clause 4.1 requirements.
- 4.6.2 The *Contractor* shall ensure that all equipment arrive timeously onsite. The *Contractor* shall be responsible for any damages to equipment prior to completion and hand over. Should such a delay occur, the *Contractor* shall immediately inform the *Project Manager* in writing such that action can be taken to mitigate the delay.
- 4.6.3 The *Contractor* shall ensure that all onsite and work specific safety protocols and precautions are always followed. The *Contractor* shall also ensure that the relevant PPE is always worn. The *Contractor* is also to ensure compliance to COVID-19 related regulations and mitigations where applicable. The *Contractor* will need to provide their COVID-19 management and risk plan. The COVID-19 risk are also outlined on the attached cathodic protection Upgrade Project Baseline Assessment with COVID-19 Risks (IMS risk assessment register) (Optional).
- 4.6.4 The *Contractor* shall always ensure compliance with SHE requirements prescribed by applicable legislation and best practice standards. The *Contractor* will be responsible for the SHE requirements that TPL may require to be implemented. The *Contractor* shall ensure that no person or employees are allowed to enter any of the work sites on their behalf, unless that employee or person has under-gone, SHE induction pertaining to the hazards prevalent to the site at the time of entry.
- 4.6.5 The *Contractor* shall, in the presence of the *Project Manager* and any other Transnet staff deemed necessary test and commission the upgraded installation and all associated equipment.

4.7 Factory Inspection and Testing

- 4.7.1 It shall be the responsibility of the *Contractor* to compile a complete Factory Acceptance Test Schedule prior to scheduling a Factory Acceptance Testing (FAT). This schedule shall be used for FAT of the equipment supplied by the *Contractor*.
- 4.7.2 Factory Acceptance Test schedule/s shall be comprehensive and must cover all aspects of the equipment to be tested and shall be submitted to the *Project Manager* for acceptance at least two weeks prior to commencement of FAT.
- 4.7.3 The *Project Manager* reserves the right to add or delete any item or test on the Factory Acceptance Test schedule to verify that the supplied equipment complies with specification.
- 4.7.4 The *Contractor* shall perform the FAT at the supplier's manufacturing facility under their supervision, in accordance with standard specifications.
- 4.7.5 The *Contractor* shall be responsible for providing all test equipment and facilities required for the period of the FAT such as the *Project Manager* may deem necessary, and to produce a report of the tests completed.
- 4.7.6 Should the Factory Acceptance Tests be suspended due to the failure of any test or because of equipment failure, re-scheduling of the Factory Acceptance Tests shall be at the discretion of the *Project Manager*. Failure of Factory Acceptance Tests may result in the *Contractor* being back charged for the man hours expended by the TPL representatives witnessing the tests.
- 4.7.7 The Factory Acceptance Test schedule will include as a minimum, the following checks, and tests:

Inspections

- A physical check of all equipment shall be made against the applicable drawings.
- Non-compliance will be marked in red on drawings for correction before acceptance.

4.8 Site Testing, Certification and Commissioning

- 4.8.1 It shall be the responsibility of the *Contractor* to compile a complete Site Acceptance Test and Commissioning Schedule to be used for site acceptance testing, certification, and commissioning of the equipment to be installed by the *Contractor*.
- 4.8.2 The Site Acceptance Test and Commissioning schedule shall be comprehensive and shall cover all aspects of the equipment to be tested and commissioned and shall be submitted to the *Project Manager* for acceptance, prior to commencement of Site Acceptance Testing (SAT).
- 4.8.3 The *Contractor* shall be responsible for providing all test equipment and facilities required for the period of the SAT such as the *Project Manager* may deem necessary, and to produce a report of the tests completed.
- 4.8.4 The *Project Manager* reserves the right to add or delete any item or test on the Site Acceptance Test and Commissioning schedule to verify that the installed equipment complies with the applicable specification.
- 4.8.5 The *Contractor* shall perform the SAT, electrical compliance certification and commissioning of the supplied/installed equipment. The *Contractor* shall at his own expense rectify all defects. Should a defect result in time delays and additional material/labour cost, such additional cost incurred shall be for the *Contractor's* account.
- 4.8.6 The *Contractor* shall perform 24-hour data logging and demonstrate pipeline polarisation for the client. IF is specified in BOQ.
- 4.8.7 Site Acceptance and Handover of all items of the equipment shall be concluded once SAT, certification and commissioning of all supplied/installed equipment has been completed, all fault lists have been completed to compliance and the following documentation has been submitted to and accepted by the *Project Manager*:
- Complete FAT and SAT documentation, comprising of test schedules and commissioning report (as applicable)
 - Completed Electrical Certificates of Compliance (Original and a copy of the COC) (including equipment certificates)
 - Final Contract Documentation as outlined on clause 4.4
 - A formal completion certificate signed and dated by both the *Contractor* and the *Project Manager* shall be provided

Documentation format and number of copies shall be in accordance with TPL specifications.

5. APPENDICES

The following TPL documentation shall be read in conjunction with this scope of works.

- Bill of Quantities
- Technical evaluation
- Design details scope of works requirements include rectifier's installation layout for each specific site
- CP Upgrade Project Baseline Assessment with COVID-19 Risks(IMS risk assessment register)
- SHE Compliance file review-guidelines
- Transnet Contractor Management Procedure TRN-IMS-GRP-PROC-014
- TPL Sample QCP
- Rectifier Specification or Test Point Specification

6. MAINTENANCE

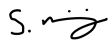
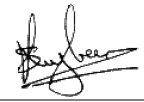
- Not Applicable(N/A)

7. GUARANTEE

Guarantee initiation shall be from the date recorded on the *Contractor's* completion certificate. The completion certificate shall for validity purposes contain the signature of both the *Contractor* and the *Project Manager*.

All electrical components supplied under this specification shall be warranted for a minimum of 12 months from the date of completion. All TRUs and FDUs shall be warranted for a minimum of 12 months from the date of completion. Mechanical equipment shall be warranted for a minimum of 12 months from the date of completion. The defect period (including workmanship) shall be guaranteed for a period of 52 weeks. Upon receiving a notice from TPL, the *Contractor* shall at its own cost and expense and without reimbursement by TPL promptly correct, repair or replace the items, which are not in conformance with this specification. *Contractor's* warranty shall cover all costs (including, without limitation, those costs associated with parts, labour, technical support, travel, transportation, and shipping and handling). The *Contractor* is also to issue TPL all the respective equipment warranty certificates.

8. SIGNATURES

	Name	Title	Signature	Date
Compiled by	L. Molemi	CP Manage		07/12/2022
Reviewed by	M. Du Sart	Risk Operation Manager		09.12.2022
Reviewed by	P. Selwane	Environmental Specialist		09/12/2022
Reviewed by	L. Majozi	Quality Control Auditor	S. 	09.12.2022
Approved by	S. Rugbeer	Acting Electrical Manager		12/12/2022