

C2.2 Activity Schedule

Quail (unit A and B) 3 kV DC Traction Substation					
Item no	Description	Unit	Quantity	Rate	Price
A	INDOOR WORK				
A1	Supply and install AC primary circuit breaker control panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	2.00		
A2	Supply and install AC/DC distribution panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	1.00		
A3	Supply and install 3kV DC Rectifier with its associated control equipment. Specification: BBB0496 ver 16: 6MW	ea.	2.00		
A4	Supply and install a complete mechanical interlocking system with a set of its mechanical keys in accordance with Transnet Freight rail specification BBB5452 ver 7.	set	2.00		
A5	Supply and install a 1.8 mH 3kV DC Reactor coil .	ea.	2.00		
A6	Supply and Install battery room windows .	ea	2.00		
A7	Supply and install Wave filter equipment for 6th,12th,18,24th harmonics with its cables and busbars. It must be in accordance with Transnet Freight Rail specification BBB 3139 ver 2 for capacitor, and Specification BBB 3162 ver 2 for inductor coil. Additionally: Steel breather doors, lights, and interlocking steel bar system.	set	2.00		
A8	Supply and install 3kV DC Positive isolator with its cables and busbars with potential divider. Specification: BBB4724 ver 5 including 3kV DC undervoltage relay in accordance with Transnet Freight Rail specification BBB 3005 ver 2.	set	2.00		

A9	Battery Room: Supply and install 110V Gel type battery bank with its cables. The capacity of the battery should be 100 amperes minimum. Also include Flame proof light, extractor fan, steel safe door to the High-tension yard; standard lockable wooden door to panel room with no smoke-naked flame-hand protection signs on both sides of wooden door, Battery base for battery and supply and install sink. BBH3236Ver2	sum	1.00		
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A10	Supply and install 110V Battery charger in accordance with Transnet Freight Rail specification BBB 2502 ver 6.	ea.	1.00		
A11	Supply and install 3kV DC high Speed circuit breaker (ECR) with earth switches,including cells in accordance with Transnet Freight Rail specification BBB 5452 ver 7-CEE-0099&0227.	ea.	6.00		
A12	Supply and install Telecontrol system with its associated control cables and cards. Specification: BBB5452 ver 7.	sum	1.00		
A13	Supply and install 3kV DC earth leakage relay in accordance with Transnet Freight Rail specification BBB 2721 Ver 12 and drawing CEE-TBD-0007.	ea.	1.00		
A14	Supply and install indoor earthing with all its cables in accordance with Transnet Fright rail drawing CEE-TBD-0007.	sum	1.00		
A15	Supply and install safety and burglar doors. Double opening steel door 2.4m by 3m (Garage door)	Sum	1.00		
A16	Supply and install 220V indoor lights; 110V emergency lightning conduits and plugs BBB 5452 version 7.	Sum	1.00		
A17	Supply and install two [Unit A&B] extractor fans including cables and two outward opening lockable steel extraction/ventilation doors. BBB5452 Ver 7	Sum	1.00		
A18	Remove roof flakes, repaint roof, floor and wall	Sum	1.00		
A19	Supply Metal Chequer plates in accordance with Transnet Freight Rail specification BBB 5452 version 7.	Sum	1.00		
A20	Supply and Install 2 x steel standard doors for office and battery room, 1 x steel double door and two standard wooden doors and 1 window.	Sum	1.00		
SUB TOTAL FOR QUAIL SUBSTATION INDOOR WORK:					

	Quail (Unit A and B) 3 kV DC Traction Substation				
Item no	Description	Unit	Quantity	Rate	Price
B	OUTDOOR WORK				
B1	Supply and install 88kV Metal Oxide surge arrester in accordance with Transnet Freight Rail specification BBB 0845. [One primary set at				
	Eskom yard and one set each for Unit A & B secondary], (Each set consist of 3 x LA's)	set	4.00		
B2	Supply and install control cables for Main Current transformer . [Unit A&B] BBB0937 Ver 5.	set	2.00		
B3	Supply and install complete High voltage AC primary circuit breaker in accordance with Transnet specification BBB 0938 ver 9 or BBB 1267 ver 10. Including: including tripping mechanism, control box and all associated cabling.	set	2.00		
B4	Supply and install Main Current transformer in accordance with Transnet freight rail specification BBB 0937 ver 5.	ea	6.00		
B5	Main 88KV Transformer : - Supply and install traction transformer with all associated equipment in accordance with Transnet freight rail specification BBB 5019 ver 6. - Install and construct bund wall and oil dam (include drainage system).	sum	2.00		
B6	Supply and install a three phase 50kVA Auxiliary Transformer with its protection system in accordance with Transnet Freight rail specification BBB 2721 ver 12. Including fencing of Auxiliary transformer.	ea.	2.00		
B7	Supply and fill the Main and Auxiliary transformers with Transformer Oil (Virgin) .	sum	2.00		
B8	Supply and install the AC-Earth leakage system complete in the HT outdoor yard as per Specification no. BBB 3059 ver 2 and drawing no. BBB 3620 Ver 8. [Unit A&B]	ea.	2.00		
B9	Supply and install outdoor earthing . All material to complying with Transnet Fright rail specification BBB 3059 ver 2 and drawing no. BBB 3620 Ver 8. [Unit A&B],	set	2.00		

B10	Supply and install Anti-Climb Clear-Vu Electric Security Lockable with Razer Fence . BBH 4465 Diameters: 84x38 and 2 x sliding gates.	sum	1.00		
B11	Supply and install new all outdoor busbars in accordance with Specification BBB5452 version 7. [Unit A&B]	set	2.00		

B12	Supply and install all wall bushings in accordance with Transnet Freight Rail specification BBB 5452.	set	2.00		
B13	Supply yard stones (25mm), layer 1mm thick, as per specification	sum	1.00		
B14	Supply and install outdoor LED lights . Complete with cabling and daylight switch.	ea	8.00		
B15	Supply and install the following for back up supply : - Supply and install a (11kV/380V, 150kVA) transformer and mount it on the universal mast pole outside the substation. - Dig a trench and install 90m- 3 core alu XLPE 380-400Vac cable to AC/DC panel - Supply and install a 40 KVA 400Vac to 400Vac Isolation transformer BBC330 (including all associated cabling and MCBs)	Sum	1.00		
B16	Supply and Install Positive Cable from HSCB to track switch structure	m	150		
B17	Supply and install AC disconnects (Complete set)	set	2.00		
B18	Supply and install whirly birds	ea	3.00		
B19	Remove and transport all scrap to Ladysmith depot.	Sum	1.00		
B20	Soil rehabilitation approximately 35m x 35m = 1225sqm (Estimation only), 1m deep	Sum	1.00		
B21	Testing and commissioning.	Sum	1.00		
B22	Catalogues, manuals, and drawings.	sum	1.00		
B23	P's & G's	sum	1.00		

SUB TOTAL FOR QUAIL SUBSTATION OUTDOOR WORK:	
SUB TOTAL FOR QUAIL SUBSTATION A and B (Excl. vat)	
VAT(At 15%):	
SUB TOTAL FOR QUAIL SUBSTATION A and B (incl. VAT)	

	Pepworth 3 kV DC Traction Substation				
Item no	Description	Unit	Quantity	Rate	Price
A	INDOOR WORK				
A1	Supply and install AC primary circuit breaker control panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	1.00		
A2	Supply and install AC/DC distribution panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	1.00		
A3	Supply and install 3kV DC Rectifier with its associated control equipment. Specification: BBB0496 ver 16: 6MW	ea.	1.00		
A4	Supply and install a complete mechanical interlocking system with a set of its mechanical keys in accordance with Transnet Freight rail specification BBB5452 ver 7.	set	1.00		
A5	Supply and install a 1.8 mH 3kV DC air Reactor coil .	ea.	1.00		
A6	Supply and install Wave filter equipment for 6th,12th,18,24th harmonics with its cables and busbars. It must be in accordance with Transnet Freight Rail specification BBB 3139 ver 2 for capacitor, and Specification BBB 3162 ver 2 for inductor coil. Additionally: Steel breather doors, lights, and interlocking steel bar system.	sum	1.00		
A7	Supply and install 3kV DC Positive isolator with its cables and busbars with potential divider. Specification: BBB4724 ver 5 including 3kV DC undervoltage relay in accordance with Transnet Freight Rail specification BBB 3005 ver 2.	sum	1.00		
A8	Battery Room: Supply and install a 110V Gel type battery bank with its cables . The capacity of the battery should be 100 amperes minimum. Also include Flame proof light, extractor fan, steel safe door to the High-tension yard; standard lockable wooden door to panel room with no smoke-naked flame-hand protection signs on both sides of wooden door, Battery base for battery and supply and install sink. BBH3236 ver 2 Including Extractor fan	sum	1.00		
A9	Supply and install 110V Battery charger in accordance with Transnet Freight Rail specification BBB 2502 ver 6.	ea.	1.00		

A10	Supply and install 3kV DC high Speed circuit breaker (ECR) with earth switches in accordance with Transnet Freight Rail specification BBB 5452 ver 7-CEE-0099&0227. Break existing breaker cells.	ea.	6.00		
A11	Supply and install Telecontrol system with its associated control cables and cards. Specification: BBB5452 ver 7.	sum	1.00		
A12	Supply and install 3kV DC earth leakage relay in accordance with Transnet Freight Rail specification BBB 2721 Ver 12 and drawing CEE-TBD-0007.	ea.	1.00		
A13	Supply and install indoor earthing with all its cables in accordance with Transnet Fright rail drawing CEE-TBD-0007.	sum	1.00		
A14	Supply and install safety and burglar doors -Double opening steel door 2.4m by 3m	sum	1.00		
A15	Supply and install 220V indoor lights; 110V emergency lightning conduits and plugs BBB 5452 version 7.	sum	1.00		
A16	Supply and install two extractor fans including cables and two outward opening lockable steel extraction/ventilation doors. BBB5452 Ver 7	sum	1.00		
A17	Supply and install 1m by 1.2m non-see-through window with steel burglar guards.	sum	1.00		
A19	Remove flakes and repaint the walls, roof and floor	sum	1.00		
A20	Supply Metal Chequer plates in accordance with Transnet Freight Rail specification BBB 5452 version 7.	sum	1.00		
A21	Supply and Install steel standard doors for office and battery room, and two standard wooden doors and 1 window.	sum	1.00		
SUB TOTAL FOR PEPWORTH SUBSTATION INDOOR WORK:					

PEPWORTH 3 kV DC Traction Substation					
Item no	Description	Unit	Quantity	Rate	Price
B	OUTDOOR WORK				
B1	Supply and install 88kV Metal Oxide surge arrester in accordance with Transnet Freight	set	3.00		
	Rail specification BBB 0845. [One primary set at Eskom yard and one set each secondary]				

B2	Supply and install control cables for Main Current transformer . BBB0937 Ver 5.	sum	1.00		
B3	Supply and install complete High voltage AC primary circuit breaker in accordance with Transnet specification BBB 0938 ver 9 or BBB 1267 ver 10. Including: including tripping mechanism, control box and all associated cabling.	set	2.00		
B4	Supply and install Main Current transformer in accordance with Transnet freight rail specification BBB 0937 ver 5. These must be inside the main transformer.	ea	3.00		
B5	Main 88KV Transformer : - Supply and install traction transformer (tap changer interlocked) with all associated equipment in accordance with Transnet freight rail specification BBB 5019 ver 6. - CTs included. - Install and construct bund wall and oil dam (include drainage system)	ea	1.00		
B6	Supply and install a three phase 50kVA Auxiliary Transformer including oil with its protection system in accordance with Transnet Freight rail specification BBB 2721 ver 12. Including fencing of Auxiliary transformer.	ea.	1.00		
B7	Supply and fill the Main and Auxiliary transformers with Transformer Oil (Virgin) .	sum	1.00		
B8	Supply and install outdoor earthing . All material to complying with Transnet Fright rail specification BBB 3059 ver 2 and drawing no. BBB 3620 Ver 8.	sum	2.00		
B9	Repair Anti-Climb Clear-Vu Electric Security Lockable with Razer Fence Diameters: 42x19 and sliding gate: 6m x2.	sum	1.00		
B10	Supply and install all wall bushings in accordance with Transnet Freight Rail specification BBB 5452. Including jumper cables.	sum	1.00		
B11	Supply and Install Positive Cable from HSCB to track switch structure	m	80.00		
B12	Supply yard stones (25mm), layer 1mm thick, as per specification	sum	1.00		
B13	Supply and install outdoor LED lights . Complete with cabling and daylight switch.	ea	5.00		

B14	Soil rehabilitation approximately 35m x 35m = 1225sqm (Estimation only), 1m deep	Sum	1.00		
B15	Supply and install AC disconnects (Complete set)	ea	1.00		
B16	Remove all scrap and transport to Ladysmith	Sum	1.00		
B17	Testing and commissioning.	Sum	1.00		
B18	Catalogues, manuals, and drawings.	sum	1.00		
B19	P's & G's	sum	1.00		
SUB TOTAL FOR PEPWORTH SUBSTATION OUTDOOR WORK:					
SUB TOTAL PEPWORTH A and B (Excl. Vat)					
VAT(At 15%):					
SUB TOTAL PEPWORTH (Unit A and B) SUBSTATION (incl. VAT)					

Pieters 3 kV DC Traction Substation					
Item no	Description	Unit	Quantity	Rate	Price
A	INDOOR WORK				
A1	Supply and install AC primary circuit breaker control panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	1.00		
A2	Supply and install AC/DC distribution panel with all protection relays in accordance with Transnet Freight Rail specification BBB 2721 ver 12.	ea.	1.00		
A3	Supply and install 3kV DC Rectifier with its associated control equipment. Specification: BBB0496 ver 16: 6MW	ea.	1.00		

A4	Supply and install a complete mechanical interlocking system with a set of its mechanical keys in accordance with Transnet Freight rail specification BBB5452 ver 7.	sum	1.00		
A5	Supply and install 3kV DC Positive isolator with its cables and busbars with potential divider. Specification: BBB4724 ver 5 including 3kV DC undervoltage relay in accordance with Transnet Freight Rail specification BBB 3005 ver 2.	sum	1.00		
A6	Battery Room: Supply and install a 110V Gel Type battery bank with its cables . The capacity of the battery should be 100 amperes minimum. Also include Flame proof light, extractor fan, steel safe door to the High-tension yard; standard lockable wooden door to panel room with no smoke-naked flame-hand protection signs on both sides of wooden door, Battery base for battery and supply and install sink. BBH3236Ver2	sum	1.00		
A7	Supply and install 110V Battery charger in accordance with Transnet Freight Rail specification BBB 2502 ver 6.	ea.	1.00		
A8	Supply and install 3kV DC high Speed circuit breaker (ECR) with earth switches in accordance with Transnet Freight Rail specification BBB 5452 ver 7-CEE-0099&0227. Demolish old breaker cells	ea.	6.00		
A9	Supply and install Telecontrol system with its associated control cables and cards. Specification: BBB5452 ver 7.	sum	1.00		
A10	Supply and install Wave filter equipment for 6th,12th,18,24th harmonics with its cables and busbars. It must be in accordance with Transnet Freight Rail specification BBB 3139 ver 2 for capacitor, and Specification BBB 3162 ver 2 for inductor coil. Additionally: Steel breather doors, lights, and interlocking steel bar system.	sum	1.00		
A11	Supply and install 3kV DC earth leakage relay in accordance with Transnet Freight Rail specification BBB 2721 Ver 12 and drawing CEE-TBD-0007.	ea.	1.00		
A12	Supply and install indoor earthing with all its cables in accordance with Transnet Fright rail drawing CEE-TBD-0007.	sum	1.00		
A13	Supply and install 220V indoor lights; 110V emergency lightning conduits and plugs BBB 5452 version 7.	Sum	1.00		
A14	Remove roof flakes and repaint roof	Sum	1.00		
SUB TOTAL FOR PIETERS SUBSTATION INDOOR WORK:					

Pieters 3 kV DC Traction Substation

Item no	Description	Unit	Quantity	Rate	Price
B	OUTDOOR WORK				
B1	Main 88KV Transformer: - Supply and install complete transformer bushings for both HV and LV side in accordance with Transnet freight rail specification BBB 5019 ver 6. - Supply and install silica gel. - Refill transformer oil and circulate (1 full cycle)13000 litres. - Re-Gasket transformer. - Re-paint transformer and conservator tank. - Replace busbars to wall bushings. - Re-place wall bushings. - Replace negative bursars and negative cables. - Replace Temperature, winding and oil gauge including cabling. - Oil sampling and DGA - Install and construct bund wall and oil dam (include drainage system)	sum	1.00		
B2	Supply and install a three phase 50kVA Auxiliary Transformer incl oil outside the substation with its protection system in accordance with Transnet Freight rail specification BBB 5452 ver 7. Including fencing of Auxiliary transformer.	ea.	1.00		
B3	Supply and install Main Current transformers in accordance with Transnet freight rail specification BBB 0937 ver 5.	ea.	3.00		
B4	Supply and install secondary 88kV Metal Oxide surge arrester in accordance with Transnet Freight	set	3.00		
B5	Supply and install the AC-Earth leakage system complete in the HT outdoor yard as per Specification no. BBB 3059 ver 2 and drawing no. BBB 3620 Ver 8.	ea.	1.00		
B6	Reconnect Electric Security Lockable Fence on the existing Anti-climbing fence. BBH 4465	m	180.00		

B7	Supply and install outdoor LED lights. Complete with cabling and daylight switch.	ea	8.00		
B8	Supply and install back up transformer (11kV/380V, 150kVA) for 380V and trench and install 90m- 3 core alu XLPE 380-400Vac cable to AC/DC panel; 40 KVA 400Vac to 400Vac Isolation transformer BBC330.	Sum	1.00		

B9	Supply and install PCB no volt coil and motor then refill SF6 gas. (Areva PCB)	Sum	1.00		
B10	Soil rehabilitation around the transformer (6m x 6m)	Sum	1.00		
B11	Remove and transport all scrap material to Ladysmith	Sum	1.00		
B12	Testing and commissioning.	Sum	1.00		
B13	Catalogues, manuals, and drawings.	sum	1.00		
B14	P's & G's	sum	1.00		
SUB TOTAL FOR PIETERS SUBSTATION OUTDOOR WORK:					
SUB TOTAL PIETERS A and B (Excl. Vat)					
VAT (At 15%):					
SUB TOTAL PIETERS (Unit A and B) SUBSTATION (incl. VAT)					