

CARNARVON 22kV SUBSTATION ELECTRICAL					
Bill E1	Preliminary & General Items	Unit	Qty	Rate	Total Amount
E1.1	<u>Fixed Items</u>				
E1.1.1	<u>Site Camp, Stores and Offices</u>				
a)	Facilities for the Contractor Total cost of a construction camp complete with secure storage facilities, site office with toilet and hand wash basin, air conditioner, table and chairs and administrative offices				
a.i)	Supply	Sum	1	.....	.....
a.ii)	Removal on completion of contract	Sum	1	.....	.....
b)	<u>Facilities for the Engineer</u> Total cost of a site office for the Engineer and Clerk of Works complete with toilet and hand wash basin, air conditioner, 2x desks with chairs, plan table, pin boards, filing cabinets, table and chairs to sit 6x people for meetings.				
b.i)	Supply	Sum	1	.....	.....
b.ii)	Removal on completion of contract	Sum	1	.....	.....
E1.1.2	<u>Construction Machinery & Equipment</u>				
a)	Total cost of all construction machinery required during the project. Supply to site	Sum	1	.....	.....
b)	Removal on completion of contract	Sum	1	.....	.....
E1.1.3	<u>Name Board</u>				
a)	Supply & installation of name board as per detail dwg.	No	2	.....	.....
b)	Removal of name boards at final hand over	No	2	.....	.....
E1.1.4	<u>Clearing of Site</u>				
a)	Allow for clearing of substation site on completion of the Works.	Sum	1	.....	.....
E1.1.5	<u>Occupational Health and Safety</u>				
a)	Allow for Health & Safety Management Plan as per the Employer's specification and requirements by regulations	Sum	1	.....	.....
b)	Other H&S Requirements: Covid 19, etc.	Sum	1	.....	.....
E1.1.6	<u>Allowance for Damage and Repairs to Existing Services</u>				
a)	This sum will only be approved for spending by the engineer on proof of accidental damage.	Sum	1	R 75 000.00	.....
E1.1.7	<u>Allowance for tracing of existing cables</u>				
a)	This sum will only be approved for spending by the engineer on proof of invoices paid, plus attendance fee.	Sum	1	R 15 000.00	.....
b)	Attendance fee on PC amount	%	.....	.....	.....
E1.1.8	<u>Performance Guarantee</u>				
a)	Allow for fixed costs for performance guarantee in accordance with contract	Sum	1	.....	.....
Subtotal carried over					.....

CARNARVON 22kV SUBSTATION ELECTRICAL					
Bill E1	Preliminary & General Items	Unit	Qty	Rate	Total Amount
	Subtotal carried over				.....
E1.2	<u>Time Related Items (Tenderer to fill in contract period in months under Qty)</u>				
E1.2.1	<u>Site Camp, Stores, Accommodation & Senior Personnel</u>				
a)	Cost for the site camp & offices during contract period	Months	....	.....	.....
b)	Accommodation of staff during contract period	Months	....	.....	.....
c)	Costs for contract manager during contract period	Months	....	.....	.....
d)	Costs for contract foreman during contract period	Months	....	.....	.....
e)	Costs for contract administration personnel during contract period	Months	....	.....	.....
E1.2.2	<u>Construction Machinery & Equipment</u>				
a)	Total cost of construction machinery and maintenance of all construction machinery required during the project.	Months	....	.....	.....
E1.2.3	<u>Co-operation & Liaison</u>				
a)	Allow for co-operation & liaison with client, other contractors and engineer	Months	....	.....	.....
E1.2.4	<u>Security</u>				
a)	Total cost for storing, guarding and protection of all material, equipment and construction site during the contract period.	Months	....	.....	.....
E1.2.5	<u>Insurance of the Works</u>				
a)	Total cost of Insurance of the Works in accordance with the Conditions of Contract.	Months	....	.....	.....
E1.2.6	<u>Performance Guarantee</u>				
a)	Allow for time related costs for performance guarantee in accordance with the Conditions of Contract.	Months	....	.....	.....
E1.2.7	<u>Health & Safety</u>				
a)	Allow for all Health & Safety requirements as per the Management Plan and Employer's requirements	Months	....	.....	.....
b)	Health & Safety Personnel	Months	....	.....	.....
E1.2.8	<u>Program</u>				
a)	Allow for the weekly updating of program & progress as per the Employer's format.	Months	....	.....	.....
E1.2.8	<u>Extension of time costs</u>				
	In the event of extension of time granted with cost, the total cost for time related items claimed will be :				
a)	Per calendar day	Day	1	.....	Rate Only
b)	Per Week	Week	1	.....	Rate Only
c)	Per Month	Month	1	.....	Rate Only
Total Bill E1 - Electrical Preliminary & General carried forward to Summary					.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E2	Substation Electrical Work	Unit	Qty	Supply Rate	Install Rate	Total Amount
E2.1	<u>Site Works</u>					
a)	Site preparation for yard, weedkillers, terraced and levelled.	Sum	1	.....	.....	.....
E2.2	<u>Earthing including trenching, compaction & backfill as per Eskom D-DT-5240</u> <u>Rates to provide for 600mm wide x 1100mm deep trench to accommodate 10mm Ø earth bar</u>					
a)	Earth measurements, design, testing and certification by specialist earthing contractor	Sum	1	.....	.....	.....
b)	Pickable soil (10%)	Cubm	33	.....	.....	.....
c)	Soft Rock (10%)	Cubm	33	.....	.....	.....
d)	Hard Rock (80%)	Cubm	264	.....	.....	.....
e)	Bedding with red soil (50%)	Cubm	165	.....	.....	.....
f)	Remove excessive rock (Allow for bulking factor & dumping at approved site)	Cubm	165	.....	.....	.....
g)	Install acceptable spoil from trench excavation and compact <i>Note: Compaction to be done as per detail trench drawing</i>	Cubm	165	.....	.....	.....
h)	Danger tape	m	499	.....	.....	.....
i)	10mm Ø annealed copper conductor	m	463	.....	.....	.....
j)	50 x 3mm HDHC copper strap for connection to fence posts & miniature substation (including connections)	No	24	.....	.....	.....
k)	Brazing of underground connections	No	53	.....	.....	.....
l)	All other preparation, conductor, connections and finishing of all gate and fence section coupling as required	Sum	1	.....	.....	.....
m)	50 x 6.3mm HDHC copper earthbar inside substation building including connections to earthbar	m	20	.....	.....	.....
E2.3	<u>Low Voltage Distribution Board</u>					
a)	Three phase, flush mounted switchboard suitable for expected load, including switchgear, wiring, labelling and battery system for substation alarm.	Sum	1	.....	.....	.....
E2.4	<u>Substation Building</u>					
a)	Attendance on building contractor	%	.....	Included in Building rate		.....
E2.5	<u>Electrical Installation</u>					
a)	Complete LV electrical installation including testing and electrical certificate of compliance	Sum	1	.....	.....	.....
	Including luminaires, switchplugs, AC isolators, cable/wire management, etc. All conduit to be steel conduit. All conduit in walls to be chased into wall before plastering.					
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E2	Substation Electrical Work	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
E2.6	<u>Air Conditioning Installation</u>					
a)	24000 BTU Inverter type Split units	No	2	.....	.....	.....
b)	9000 BTU Inverter type Split units	No	1	.....	.....	.....
	<i>Rate to be for complete installation of either Danhum Bush, Samsung, LG or Carrier.</i>					
E2.7	<u>600V/1000V PVC/SWA/PVC Cables</u> (Confirm cable necessary on site before ordering) Rate to include terminations, glands, shrouds, etc					
a)	16mm ² x 4c (DB Feeder Cable from Minisub)	m	35	.....	.....	.....
b)	6mm ² x 3c (DB - 22kV Panels)	m	20	.....	.....	.....
c)	6mm ² x 3c (DB - Battery Charger)	m	10	.....	.....	.....
d)	4mm ² x 3c (Battery Charger-22kV Panels)	m	15	.....	.....	.....
	600/1000V cables are only measured between miniature substation and low voltage board, low voltage board and battery unit, battery unit and 22kV switchgear. All other (control) cabling shall be included with the relevant items.					
E2.8	<u>Stranded Bare Cu Earth Wire</u> (Confirm cable necessary on site before ordering) Rate to include terminations, glands, shrouds, etc					
a)	10mm ² (with 16mm ² cables) (DB Feeder Cable from Minisub)	m	35	.....	.....	.....
E2.9	<u>Cable Rack Supports, etc</u>					
a)	Unistruts for installation of MV cables and cable racks in cable trench	No	44	.....	.....	.....
b)	Supply and install clamps complete with cushions for cables in cable trenches	Sum	1	.....	.....	.....
c)	Cabstrut heavy duty cable racks for control cabling (610mm wide)	m	21	.....	.....	.....
d)	Unistruts for vertical installation of control cables behind control panel	Sum	1	.....	.....	.....
E2.10	<u>Lightning Protection</u> <i>Preferred Supplier: HHK Bloemfontein 051 430 4807</i>					
a)	Lighting Protection by specialist Contractor	Sum	1	.....	.....	.....
	<i>Proposed installation to be provided to Engineer for approval</i>					
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E2	Substation Electrical Work	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
E2.11	All material and labour not specified but deemed necessary by the Tenderer for the succesful completion of the works Specify:					
a)	.....	.....	.....	.....	.....	.....
b)	.....	.....	.....	.....	.....	.....
c)	.....	.....	.....	.....	.....	.....
d)	.....	.....	.....	.....	.....	.....
e)	.....	.....	.....	.....	.....	.....
Total Bill E2 - Substation Electrical carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E3	22kV Supply	Unit	Qty	Supply Rate	Install Rate	Total Amount
	<i>Cables used to connect substation to overhead lines are contained in this section.</i>					
E3.1	<u>Surveying & Setting out</u>					
a)	MV Routes	No	5	.....	.....	.....
E3.2	<u>Cable Trenches including compaction & backfill as per SANS 10198-8</u>		129			
	<u>Rates to provide for 600mm and 800mm wide x 1200mm deep trench to accommodate MV cables</u>					
	<u>Note: Rates to include barricading in accordance with Part 11 of the Construction Regulations</u>					
a)	Open by hand on existing trenches	Cubm	1	.....	.....	Rate only
b)	Pickable soil (10%)	Cubm	9	.....	.....	.....
c)	Soft Rock (10%)	Cubm	9	.....	.....	.....
d)	Hard Rock (80%)	Cubm	74	.....	.....	.....
e)	Remove excessive rock (Allow for bulking factor & dumping at approved site)	Cubm	62	.....	.....	.....
f)	Soft red soil bedding (800mm)	Cubm	62	.....	.....	.....
g)	Install acceptable spoil from trench excavation and compact <i>Note: Compaction to be done as per detail trench drawing</i>	Cubm	31	.....	.....	.....
h)	Concrete slabs (600x300x40) <i>Note: Cracked or concrete wall panels not accepted</i>	No	392	.....	.....	.....
i)	Danger tape	m	235	.....	.....	.....
j)	PVC Sleeves 160mm dia.	m	8	.....	.....	Rate Only
k)	Concrete cable markers	No	30	.....	.....	.....
l)	Cut & Repair tar (500 wide)	m	1	.....	.....	Rate Only
m)	Remove & Repair Paving	m ²	1	.....	.....	Rate Only
n)	Remove & Repair Walkway (220m) Paving blocks (500x500x40)	No	1	.....	.....	Rate Only
	Note! a) Contractor will liaise with municipal engineering department before any trenching is done, to establish position of existing services. Cross cuts will be done to 1m deep and positions of existing services will be noted on a drawing and both parties will sign to acknowledge these positions. b) All cable trenches will be set out straight with white lime and trenches will be excavated in a straight line. c) Cable trenches will be inspected at the hold point inspections as indicated on the detail dwg d) All open cable trenches will be marked & protected as prescribed in the OSH Act e) Cables will be installed as soon as possible to prevent trenches from laying open. f) Proper care and method to ensure road crossing is securely compacted					
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E3	22kV Supply	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
E3.3	<u>Paper Insulated Lead Covered PVC Bedded & Sheathed Steel Tape Armoured Cables 12,7/22kV to SABS 97/91 Table 20</u> <i>Confirm Cable Quantity on Site Before Ordering</i>					
a)	95mm ² x 3c Cu Table 20	m	202	.....	.....	.....
b)	185mm ² x 3c Cu Table 20	m	33	.....	.....	.....
c)	Indoor Terminations at Substations and Miniature Substation <i>Tank (Raychem) Screened Connectors Only</i>	No	6	.....	.....	.....
d)	Outdoor Terminations at Overhead Lines	No	4	.....	.....	.....
e)	Cable joints	No	1	.....	.....	Rate Only
f)	Note joint GPS coordinates	No	1	.....	.....	Rate Only
g)	Pressure test	Sum	5	.....	.....	.....
E3.4	<u>Stranded bare Cu Earth Conductor</u>					
a)	70mm ² BCEW	m	202	.....	.....	.....
b)	150mm ² BCEW	m	33	.....	.....	.....
c)	BCEW Terminations <i>Note! Strap earth wire neatly to cable every 5 m</i>	No	10	.....	.....	.....
Total Bill E3 - 22 kV Supply carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E4	Overhead Lines	Unit	Qty	Supply Rate	Install Rate	Total Amount
	<p><i>Note: Rates to include any temporary support structures where necessary where old structures are relocated, etc.</i></p> <p>E4.1 <u>Surveying and Setting Out</u></p> <p>a) MV Pole Holes</p> <p>b) Stay Holes</p> <p>E4.2 <u>Medium Voltage Structures:</u> <u>(Mink Conductor)</u> Complete assembly and installation of structures as per DDT standards, all inclusive, unless specifically noted otherwise. Remember to include all sub references structures denoted on the main structure as listed below. ALL STRUCTURES TO BE AS PER ESKOM STANDARDS.</p> <p>a) 3 Phase - Cut-out links 3,5m X arm, As DDT 1852 (Links) + Solid Links + Surge Arrestors at the back of X arm with earthing system</p> <p>b) 3 Phase - H Pole 2 x 3,5m X arm - Strain Terminal As DDT 1769</p> <p>c) 3 Phase - 3.5m X arm for MV Cable termination support</p> <p>E4.3 <u>Medium Voltage (Stranded ACSR) Conductor:</u> Stringing of MV Conductor</p> <p>a) Bare Conductor, MINK</p> <p>E4.4 <u>Pole Holes</u></p> <p>a) 12m Wood Pole, 2m deep</p> <p>b) 11m Wood Pole, 1.8m deep</p> <p>E4.5 <u>Stay Holes</u></p> <p>a) Stay Holes</p> <p>E4.6 <u>Wooden Poles</u> NB: Earthing of Pole must be Included in Price. Contractor to determine length of existing poles which will influence decision on new poles. Handling, planting, labeling and backfilling, compaction of poles complete.</p> <p>a) 12m wood pole 200-220 top</p> <p>b) 11m wood pole 180-200 top</p> <p>E4.7 <u>Medium Voltage Stays/Struts: (Extra over not part of standard structures listed elsewhere) To allow for site constraints</u> Handling, installation and re-tentioning of anchors and struts complete. Excavations measured elsewhere.</p>	No	6	.....	.....	.....
		No	6	.....	.....	.....
		No	3	.....	.....	.....
		No	3	.....	.....	.....
		No	3	.....	.....	.....
		Sum	1	.....	.....	.....
		No	6	.....	.....	.....
		No	1	.....	.....	Rate Only
		No	6	.....	.....	.....
		No	6	.....	.....	.....
		No	1	.....	.....	Rate Only
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E4	Overhead Lines	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
a)	MV Stay, as DDT 0341 + 3144 + 0350	No	6	.....	.....	.....
E4.8	<u>Modifications to Existing MV Structures</u>					
a)	Disconnect MV conductor (Eskom supply) from four pole structure and terminate on new H-pole structure.	Sum	1	.....	.....	.....
b)	Disconnect 22 kV conductor (town supply) from four pole structure and terminate on new H-pole structure	Sum	1	.....	.....	.....
c)	Disconnect 22 kV conductor (industrial supply) from four pole structure and terminate on new H-pole structure	Sum	1	.....	.....	.....
d)	Disconnect 22 kV step-down transformer supply from four pole structure	Sum	1	.....	.....	.....
e)	Remove 2 auto-reclosers from four pole structure and deliver to municipal stores	No.	2	.....	.....	.....
f)	Demolish entire four pole structure once all equipment and terminations have been removed. Material suitable for re-use by municipality to be delivered to stores.	Sum	1	.....	.....	.....
Total Bill E4 - Overhead Lines carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E5	Fire Detection / Suppression	Unit	Qty	Supply Rate	Install Rate	Total Amount
Preferred Supplier - FBS Electronics Contact Francois - 051 460 0506 / 082 800 1448						
<u>Notes</u> 1. Refer to detail specifications before pricing 2. 25mm dia. BOSAL conduit to be used						
E5.1	<u>Infrastructure (By Electrician)</u> The points below shall include all wire ways, draw boxes, fixing and sundries to create a complete continuous infrastructure network, to allow the installation of an efficient, cost effective workable system.					
a)	Allowance for : Fire Alarm Point - Break Glass Unit (Including galv. conduit)	No	5	.....	.....	.....
b)	Allowance for : Fire Alarm Point - Heat/Smoke/Ceiling Void Detector (Including galv. round box & galv. conduit)	No	10	.....	.....	.....
c)	Allowance for : Fire Alarm Sounder/Flashing Sign Point (Including galv. round box & galv. conduit)	No	2	.....	.....	.....
d)	Allowance for : Fire Alarm Control Panel (Including 100x100mm galv. Deep wallbox and galv. conduits)	No	1	.....	.....	.....
e)	Connection between Fire Control Panel's Wall box DB (galv. conduit)	No	1	.....	.....	.....
f)	Allowance for : Gas Discharge Unit (Including galv. round box & galv. conduit)	No	1	.....	.....	.....
E5.2	<u>Fire Detection Alarm System</u> <i>(Inclusive of wiring per point - Use PH30 4-core cable as minimum; Conduit measured above)</i> <i>Complete Conventional 3 Zone Fire/Extinguishant Panel (EN 12094-1, EN54-2 & EN54-4 Approved) , standby power units (minimum 72 hours), etc.</i> <i>The rate provided shall include all necessary relays, I/O units housed in a neat and professional fashion approved by the Engineer AND programming required on the unit for it to function as required.</i>					
E5.2.1	<u>Equipment</u>					
a)	Smoke / Heat detectors including base	No	10	.....	.....	.....
b)	Base for detectors	No	10	.....	.....	.....
c)	Resettable Break Glass Units with necessary mounting bracket - Colour RED with anti-tamper covers	No.	5	.....	.....	.....
d)	Weatherproof Siren & Beacon - 90dB minimum - Colour RED	No.	1	.....	.....	.....
e)	Klaxon Bell (second knock) - Colour RED	No.	1	.....	.....	.....
f)	"GAS EVACUATE" 24Vdc Flashing Sign	No.	1	.....	.....	.....
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E5	Fire Detection / Suppression	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
E5.2.2	<u>Gas</u>					
a)	Complete HFC227 Suppresion gas installation incl cylinder, valve, nozzles, piping, etc	Sum	1	.....	.....	.....
b)	Labelling & warning signs on entraces of gas protected room according to relevant standards	No	3	.....	.....	.....
E5.2.3	<u>Control Equipment</u>					
a)	Extinguishant control panel in weather proof enclosure Technoswitch TEC 047	No	1	.....	.....	.....
b)	Fire Control Panel Technoswitch TEC 204	No	1	.....	.....	.....
c)	Test & Interface unit Technoswitch TEC 057A	No	1	.....	.....	.....
E5.2.4	<u>Electrical Interface with DB</u>					
a)	Shut down interlock to AC's (must include relay)	Sum	1	.....	.....	.....
E5.2.5	<u>Testing & Commisioning</u>					
a)	Certificate of Compliance: Installation & Commissioning + O&M manuals	Sum	1	.....	.....	.....
b)	Room Integrity Test	Sum	1	.....	.....	.....
c)	Block Plan - Laminated in alluminium frame as minimum	No.	1	.....	.....	.....
d)	Provide training to at least two personnel as per specification document.	Sum	1	.....	.....	.....
E5.2.6	<u>Drawings</u>					
a)	Tenderers to provide detail drawings of proposed fire protection system from supplier with tender	Sum	1	.....	.....	.....
E5.2.7	<u>Maintenance</u>					
a)	Allow for 1 year maintenance warranty of the entire fire detection & suppression system - Two visits a year <i>Specify cost per trip</i> <i>SLA must be concluded with service provider</i>	No.	2	.....	.....	.....
b)	Allow for second and third year services of the entire fire detection & suppression system - Two visits a year <i>Specify cost per trip</i> <i>SLA must be concluded with service provider</i>	No.	4	.....	.....	.....
Total Bill E5 - Fire Detection & Suppression carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E6	22 kV Switchgear	Unit	Qty	Supply Rate	Install Rate	Total Amount
	<u>Preferred Supplier - ABB Contact Henk Jacobs - 072 495 5157</u>					
E6.1	<u>22kV 25kA ABB UniGear ZS1 equipped with VD4 Vacuum Breaker</u> Included shall be all specified equipment, labels, earthing, bus wiring, connections and installation. 1250A busbars, 25kA fault level					
a)	Complete Feeder Breakers (630A)	No	5	.....	.....	.....
b)	Complete Incomer (630A)	No	1	.....	.....	.....
c)	Floor Frames	Sum	1	.....	.....	.....
d)	Complete CT Labs VectoIII for Incomer Panel <i>Rate to include GPS Antenna for external mounting</i>	No.	1	.....	.....	.....
e)	VectoIII Subscription (5 Years)	No.	5	.....	.....	.....
E6.2	<u>Alternative: 22kV 25kA ABB LeanGear ZS9 equipped with Vacuum Breaker</u> Included shall be all specified equipment, labels, earthing, bus wiring, connections and installation. 1250A busbars, 25kA fault level					
a)	Complete Feeder Breakers (630A)	No	5	.....	.....	Rate Only
b)	Complete Incomer (630A)	No	1	.....	.....	Rate Only
E6.3	<u>Control Panel (Including all specified equipment, labels, earthing & control cabling)</u>					
a)	22kV Panel Remote Control Panel installed in adjacent room	No.	1	.....	.....	.....
E6.4	<u>Battery System (ABB)</u>					
a)	Complete system including batteries, charger, relays, indication instruments and installation	No.	1	.....	.....	.....
E6.5	<u>Commissioning</u>					
a)	Installation & Commissioning by Supplier <i>This item is to satisfy the full gaurantee requirements of the manufacturer</i>	Sum	1	.....	.....	.....
b)	All material and labour for relay settings, connecting, testing, commissioning and operation of substation, including liaison with Eskom protection staff <i>Rate to include a specialist for the relay settings and protection schemes</i>	Sum	1	.....	.....	.....
c)	Manuals and drawings Hard Copy in file	No	3	.....	.....	.....
	Electronic Copy on CD	No	3	.....	.....	.....
d)	Instruction of Employer how to operate and maintain the substation	Sum	1	.....	.....	.....
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E6	22 kV Switchgear	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
E6.6	<u>Tools, Spares and Auxiliary Equipment</u> <i>As recommended by switchgear supplier</i>					
a)	Set of maintenance tools for breakers	No	1	.....	.....	.....
c)	Pad lockable steel box to store loose equipment	No	1	.....	.....	.....
d)	Wallmounted frame to house all handles, remote control, etc.	No	1	.....	.....	.....
e)	Spare fuses of each rating for secondary circuits	No	6	.....	.....	.....
f)	Spare Closing Coil	No.	2	.....	.....	.....
g)	Spare Trip Coil	No.	2	.....	.....	.....
h)	Spare Spring Charge Motor	No.	2	.....	.....	.....
i)	Spare VT Primary Fuses	No.	6	.....	.....	.....
j)	Unigear Single End Cover	No.	2	.....	.....	.....
k)	Circuit Breaker Racking Lever for Truck	No	2	.....	.....	.....
l)	Lever for VD4 Circuit Breaker Spring Charging	No.	2	.....	.....	.....
m)	Operating Lever for Earthing Switch	No.	2	.....	.....	.....
n)	All plates and labels to be included in equipment pricing	Sum	1	N/A	N/A	N/A
o)	Correction pen for paint touch up	No.	1	.....	.....	.....
p)	Tin of 400g grease	No.	1	.....	.....	.....
q)	Apparatus Service Trolley 17.5kV 650mm	No.	1	.....	.....	.....
r)	Circuit Breaker Remote Control Box + 10m cord	No.	1	.....	.....	.....
s)	Galvanized Metal Elbow Bracket for VectoIII GPS Antenna	No.	1	.....	.....	.....
Total Bill E6 - 22 kV Switchgear carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E7	Miniature Substation & Low Voltage	Unit	Qty	Supply Rate	Install Rate	Total Amount
E7.1	<u>Surveying & Setting out</u>					
a)	MV Routes & Miniature Substation	No	1	.....	.....	.....
E7.2	<u>Miniature Substations (Reticulation Miniature Substation)</u>					
a)	630 kVA 22kV/420V Minisub <i>Final LV compartment configuration determined by LV cables to be transferred</i>	No	1	.....	.....	.....
b)	Concrete foundation as per detail drawing <i>Note: Sleeves not used to be capped and wet cement bags or alternative means used to fill used sleeves. Rate to include excavation, removal of waste, compaction, etc.</i>	No	1	.....	.....	.....
c)	Assa Abloy Colour Coded Municipal Locks (A-B-C System) - Colours to be confirmed	No	4	.....	.....	.....
E7.3	<u>Miniature Substations Earthing</u>					
a)	Connect miniature substation to substation earth mat	Sum	1	.....	.....	.....
E7.4	<u>Cable Trenches including compaction & backfill as per SANS 10198-8</u> <u>Rates to provide for 600mm x 800mm deep trench to accommodate LV cables</u> <u>Note: Rates to include barricading in accordance with Part 11 of the Construction Regulations</u>		95			
a)	Pickable soil (10%)	Cubm	5	.....	.....	.....
b)	Soft Rock (10%)	Cubm	5	.....	.....	.....
c)	Hard Rock (80%)	Cubm	36	.....	.....	.....
d)	Remove excessive rock (Allow for bulking factor & dumping at approved site)	Cubm	26	.....	.....	.....
e)	Soft red soil bedding (450mm)	Cubm	26	.....	.....	.....
f)	Install acceptable spoil from trench excavation and compact <i>Note: Compaction to be done as per detail trench drawing</i>	Cubm	20	.....	.....	.....
g)	Danger tape	m	95	.....	.....	.....
E7.5	600V/1000V PVC/SWA/PVC Cables (Confirm cable necessary on site before ordering)					
a)	16mm ² x 4core Cu	m	229	.....	.....	.....
a)	25mm ² x 4core Cu	m	42	.....	.....	.....
b)	35mm ² x 4core Cu	m	1	.....	.....	Rate Only
c)	50mm ² x 4core Cu	m	42	.....	.....	.....
d)	70mm ² x 4core Cu	m	1	.....	.....	Rate Only
e)	95mm ² x 4core Cu	m	121	.....	.....	.....
f)	120mm ² x 4core Cu	m	1	.....	.....	Rate Only
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E7	Miniature Substation & Low Voltage	Unit	Qty	Supply Rate	Install Rate	Total Amount
	Subtotal carried over					.....
g)	150mm ² x 4core Cu	m	1	.....	.....	Rate Only
h)	240mm ² x 4core Cu	m	42	.....	.....	.....
i)	Indoor Terminations (25-70mm)	No	5	.....	.....	.....
j)	Outdoor Terminations (25-70mm)	No	5	.....	.....	.....
k)	Indoor Terminations (95-240mm)	No	2	.....	.....	.....
l)	Outdoor Terminations (95-240mm)	No	2	.....	.....	.....
m)	Cable Joints	No	1	.....	.....	Rate Only
n)	Seal end-cap on cable and mark	No	1	.....	.....	Rate Only
E7.6	Stranded Bare Cu Earth Wire (Confirm cable necessary on site before ordering)					
a)	10mm ² (with 16mm ² cables)	m	229	.....	.....	.....
b)	16mm ² (with 25mm ² cables)	m	42	.....	.....	.....
c)	25mm ² (with 35-50mm ² cables)	m	42	.....	.....	.....
d)	35mm ² (with 70mm ² cables)	m	1	.....	.....	Rate Only
e)	50mm ² (with 95mm ² cables)	m	121	.....	.....	.....
f)	70mm ² (with 120mm ² cables)	m	1	.....	.....	Rate Only
g)	95mm ² (with 150-185mm ² cables)	m	1	.....	.....	Rate Only
h)	120mm ² (with 240mm ² cables)	m	42	.....	.....	.....
i)	Terminations	No	14	.....	.....	.....
j)	Joints	No	1	.....	.....	Rate Only
E7.7	<u>Modification of Existing LV Connections</u>					
a)	Identify and trace existing LV cables (including street lights) currently being supplied by the LV panel within the old substation building & kiosk on the outside <i>The contractor must compile a list of cables, sizes, lenghts and what is fed. This is to be presented to the Engineer for final approval. This shall also influence the final miniature substation configuration.</i>	Sum	1	.....	.....	.....
b)	Allowance for changeover of existing LV cables from Old Substation building to new Miniature Substation (over and above that measured under E7.5 & E7.6)	Sum	1	.....	.....	.....
c)	Marking of all old equipment as redundant after changeover	Sum	1	.....	.....	.....
Total Bill E7 - Maniature Substation & Low Voltage carried forward to Summary						.....

CARNARVON 22kV SUBSTATION ELECTRICAL						
Bill E8	Intruder Alarm System	Unit	Qty	Supply Rate	Install Rate	Total Amount
	<u>Preferred Supplier - FBS Electronics Contact Francois - 051 460 0506 / 082 800 1448</u> <u>Notes</u> 1. Refer to detail specifications before pricing 2. 25mm dia. BOSAL conduit to be used					
E8.1	<u>Infrastructure (By Electrician)</u> The points below shall include all wire ways, draw boxes, fixing and sundries to create a complete continuous infrastructure network, to allow the installation of an efficient, cost effective workable system					
a)	Galv. Round box - IR Detector - Connected with Control Unit wall box via 25mm conduit	No	4	.....	.....	.....
b)	100 x 100 Galvanized Deep Wall box - Security Alarm Control Unit, c/w 3x25mm dia conduit into roof space (two connected with containment and one connected with keypad provision below)	No	1	.....	.....	.....
c)	Galv. Round box - Keypad - Connected with Control Unit wall box via 25mm conduit	No	1	.....	.....	.....
d)	Galv. Round box - Beacon/Sounder - Connected with Control Unit wall box via 25mm conduit	No	1	.....	.....	.....
E8.2	<u>Alarm System</u> a) Alarm Control Panel <i>Rate to include battery backup system, antenna system, keypad below and 3x remotes</i> b) IR Detector <i>Rate to include wiring back to control panel</i> c) Sounder/Beacon	No	1	.....	.....	.....
		No.	4	.....	.....	.....
		No.	1	.....	.....	.....
E8.3	<u>Subscriptions & Maintenance</u> a) Armed Response Subscriptions <i>SLA must be concluded with service provider</i> b) 6 Monthly Inspections, Battery and System Testing <i>SLA must be concluded with service provider</i>	Mths	36	.....	.....	.....
		No.	6	.....	.....	.....
Total Bill E8 - Intruder Alarm System carried forward to Summary						.....

CARNARVON 22kV SUBSTATION BUILDING WORKS						
Bill B1	Payment SANS 1200	Builder's Preliminary & General Items	Unit	Qty	Rate	Total Amount
B1.1	A 8.3	FIXED CHARGE ITEMS				
B1.1.1	A 8.3.1	Contractual requirements	Sum	1	.....	.....
	A 8.3.2.2	Establish facilities on site for the contractor				
B1.1.2	A 8.3.2.2.a	Offices and storage sheds	Sum	1	.....	.....
B1.1.3	A 8.3.2.2.d	Living accommodation	Sum	1	.....	.....
B1.1.4	A 8.3.2.2.e	Ablution and latrine facilities	Sum	1	.....	.....
B1.1.5	A 8.3.2.2.f	Tools and equipment	Sum	1	.....	.....
B1.1.6	A 8.3.2.2.g	Water supply,electric power,communications,dealing with water and access	Sum	1	.....	.....
B1.1.7	A 8.3.2.2.i	Plant	Sum	1	.....	.....
B1.1.8	A 8.3.4	Remove site establishment on completion	Sum	1	.....	.....
B1.1.9	A 8.3.3	Other fixed charge obligations (Specify and price each item individually)	Sum	1	.....	.....
					
					
					
					
B1.2	A8.4	TIME RELATED ITEMS				
B1.2.1	A8.4.1	Contractual requirements	Sum	1	.....	.....
B1.2.2	A8.4.2	Operation and Maintenance of Facilities on Site for the Duration of Construction for the contractor				
B1.2.2.1	A8.4.2.2.a	Offices and storage sheds	Sum	1	.....	.....
B1.2.2.2	A8.4.2.2.d	Living accommodation	Sum	1	.....	.....
B1.2.2.3	A8.4.2.2.e	Ablution and latrine facilities	Sum	1	.....	.....
B1.2.2.4	A8.4.2.2.f	Tools and equipment	Sum	1	.....	.....
B1.2.2.5	A8.4.2.2.g	Water supplies,electric power,communications,dealing with water and access	Sum	1	.....	.....
B1.2.2.6	A8.4.2.2.j	Plant	Sum	1	.....	.....
B1.2.2.7	A8.4.3	Supervision for duration of construction	Sum	1	.....	.....
Subtotal carried over						.....

CARNARVON 22kV SUBSTATION BUILDING WORKS						
Bill	Payment	Description	Unit	Qty	Rate	Total Amount
		Subtotal carried over				.....
B1.2.2.8	A8.4.4	Company and head office overhead costs for duration of the contract	Sum	1	.....	.....
B1.2.2.9	A8.4.5	Other time related obligations (Specify and price each item individually)	Sum	1	.....	.....
					
					
					
					
B1.2.3		QCP				
B1.2.3.1		Provision of Quality control plan	Sum	1	.....	.....
B1.2.4		Program				
B1.2.4.1		Provision of MS Project programme	Sum	1	.....	.....
Total Bill B1 - Building Works Preliminary & General carried forward to Summary						.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
B2.1	C	SITE CLEARANCE					
B2.1.1	C 8.2.1	Clear construction site of all vegetation etc.	m ²	836	.....	.....	.....
	C 8.2.8	Demolish and remove structures / buildings and dismantle steelwork, etc.					
B2.1.2	C 8.2.8	Remove existing security fence and gates complete with all posts, stays, wire etc and store in designated area	m	329	.....	.....	.....
B2.2	D 8.3.2 (a)	BULK EXCAVATION					
B2.2.1	D 8.3.2 (a)	Excavate in all materials not exceeding 1.5m deep and stockpile on site and use for filling behind kerbs and walls etc.	m ³	79	.....	.....	.....
B2.2.2	D 8.3.3 (a)	Excavate in all materials not exceeding 1.5m deep and dispose surplus material within 2km radius	m ³	300	.....	.....	.....
		Extra Over for:					
B2.2.3	D 8.3.3 (b)1	Intermediate excavation	m ³	100	.....	.....	.....
B2.2.4	D 8.3.3 (b)2	Hard rock excavation	m ³	200	.....	.....	.....
B2.3	D 8.3.3	RESTRICTED EXCAVATION					
	D 8.3.3 (a)	Excavate not exceeding 1.5m deep for restricted foundations and footings in hard rock and dispose surplus material within 2km radius					
B2.3.1	D 8.3.3 (a)	Walls, Platforms & stair strip footings	m ³	80	.....	.....	.....
B2.3.2	D 8.3.3 (a)	Cable trench strip footings	m ³	28	.....	.....	.....
B2.4	DM 8.3.3	PREPARATION OF IN - SITU MATERIAL					
	DM 8.3.3 (a) 2	Preparation of in-situ material by scarifying, watering well and compacting to 93% MOD AASHTO maximum density for a depth of 150 mm					
B2.4.1	DM 8.3.3 (a)	Earth mat	m ³	40	.....	.....	.....
B2.4.2	DM 8.3.3 (a)	Walls, Platforms & stair strip footings	m ³	12	.....	.....	.....
B2.4.3	DM 8.3.3 (a)	Cable trench strip footings	m ³	8	.....	.....	.....
B2.4.4	DM 8.3.3 (a)	Aprons	m ³	9	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.5	D 8.3.4	IMPORTING OF MATERIAL					
	D 8.3.4 (a)	Extra over for importation of materials from stockpiles on site.					
B2.5.1	D 8.3.4 (a)	Construct layers from selected material (from stockpiles on Site) not exceeding 150 mm thick, compacted to 90% MOD AASHTO, hand compacted behind Kerbs and Walls etc.	m ³	79	.....	.....	.....
B2.5.2		Fill area with 120 mm thick layer of 19mm crushed stone, from commercial sources, as shown on drawing SK 3841 / 21	m ³	98	.....	.....	.....
	ME 8.3.3	Fill					
B2.5.3	ME 8.3.3	Construct fill layer of sand from commercial sources, not exceeding 150 mm thick, compacted to 93% MOD AASHTO over Earth mat.	m ³	40	.....	.....	.....
B2.5.4	ME 8.3.3	Construct fill layer of G6 or better material from commercial sources, not exceeding 150 mm thick, compacted to 93% MOD AASHTO over sand layer up to level of top of strip footings	m ³	298	.....	.....	.....
B2.5.5	ME 8.3.3	Construct hand compacted fill layers of G6 or better material from commercial sources, not exceeding 150 mm thick, compacted to 93% MOD AASHTO underside of Substation floors, Platforms surface beds, stairs and aprons	m ³	99			
B2.6	G	CONCRETE (STRUCTURAL)					
	G 8.2	Formwork					
	G 8.2.2	Smooth					
B2.6.1	G 8.2.1	Vertical to sides of Apron	m ²	4	.....	.....	.....
B2.6.2	G 8.2.1	Vertical to sides of Platform slabs & stairs	m ²	4	.....	.....	.....
	G 8.3	Scheduled Reinforcement Items					
		Steel Bars					
B2.6.3	G 8.3.1	Mild steel bars 8 mm diameter	t	0.2	.....	.....	.....
B2.6.4	G 8.3.1	Mild steel bars 10 mm diameter	t	0.03	.....	.....	.....
B2.6.5	G 8.3.1	High tensile steel bars 12 mm diameter	t	0.62	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.6.6	G 8.3.2	Ref 245 Mesh	m ²	108	.....	.....	.....
B2.6.7	G 8.3.2	Ref 193 Mesh	m ²	41	.....	.....	.....
	G 8.4	Scheduled Concrete Items					
		Strength Concrete Grade 25/19					
B2.6.8	G 8.4.3	Strip footings	m ³	23	.....	.....	.....
B2.6.9	G 8.4.3	Cable trench strip footings	m ³	3	.....	.....	.....
B2.6.10	G 8.4.3	Switchgear room Surface bed (constructed to Accuracy 1)	m ³	8	.....	.....	.....
B2.6.11	G 8.4.3	Control room and Store room Surface bed	m ³	7	.....	.....	.....
B2.6.12	G 8.4.3	Apron	m ³	4	.....	.....	.....
B2.6.13	G 8.4.3	Platform slabs and stairs	m ³	22	.....	.....	.....
	G 8.4.4	Unformed Finish Surfaces					
B2.6.14	G 8.4.4(a)	Wood float finish to MCC Apron	m ²	42	.....	.....	.....
B2.6.15	G 8.4.4(a)	Wood float finish to Surface beds	m ²	91	.....	.....	.....
B2.6.16	G 8.4.4(a)	Wood float finish to Platforms and stairs	m ²	23	.....	.....	.....
	G 8.5	Joints					
B2.6.17	G 8.5	Construction joint J1 including bondbreaker, formwork and sealant as detailed on drawing no SK 3841 / 15	m	17	.....	.....	.....
B2.6.18	G 8.5	Construction joint J2 including bondbreaker, filler and sealant as detailed on drawing no SK 3841 / 15	m	56	.....	.....	.....
B2.6.19	G 8.5	Construction joint J3 including bondbreaker, formwork and sealant as detailed on drawing no SK 3841 / 15	m	17	.....	.....	.....
	G 8.7 and 8.8	HD Bolts and Miscellaneous Metal Work					
B2.6.20	G 8.8	Install 80 x 80 x 8 angle iron rails with lugs cast in top of cable trenches as detailed on drawing no SK 3841 / 5, / 15 & / 16 (Supply measured elsewhere)	Sum	1	.....	.....	.....
B2.6.21	G 8.8	Install 50 x 50 x 4 angle iron platform protection rail with lugs cast in top of platform as detailed on drawing no SK 3841 / 3 & / 5 (Supply measured elsewhere)	Sum	1	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.6.22	G 8.8	Install 25 x 25 x 3 angle iron Door protection rail with lugs cast in top of surface bed as detailed on drawing no SK 3841 / 5 (Supply measured elsewhere)	Sum	1	.....	.....	.....
B2.6.23	G 8.8	Supply and install 1 mm thick BOND - LOK panels in platform as shown on drawing SK 3841 / 11 and / 12	m ²	1.5	.....	.....	.....
B2.7		GRANO					
B2.7.1		30mm thick Grano on stairs complete with reeding	m ²	6	.....	.....	.....
B2.8	H	STEELWORK					
	H 8.3.1	Supply and Fabrication					
		Cable Trench Steelwork					
B2.8.1	H 8.3.1.2	80 x 80 x 8 RSA	t	0.35	.....	.....	.....
B2.8.2	H 8.3.1.2	60 x 60 x 6 RSA	t	0.03	.....	.....	.....
B2.8.3	H 8.3.1.2	50 x 3 Flat	t	0.02	.....	.....	.....
B2.8.4	H 8.3.1.2	50 x 10 Flat	t	0.21	.....	.....	.....
B2.8.5	H 8.3.1.2	60 x 8 Flat	t	0.01	.....	.....	.....
B2.8.6	H 8.3.1.2	30 x 5 Flat	t	0.05	.....	.....	.....
B2.8.7	H 8.3.1.2	12mm Round	t	0.02	.....	.....	.....
B2.8.8	H 8.3.1.2	6mm Vastrap plate	t	0.52	.....	.....	.....
B2.8.9	H 8.3.1.2	20mm Pipe	t	0.01	.....	.....	.....
		Door Protection Rails & Platform Protection					
B2.8.10	H 8.3.1.2	25 x 25 x 3 RSA	t	0.01	.....	.....	.....
B2.8.11	H 8.3.1.2	50 x 50 x 4 RSA	t	0.03	.....	.....	.....
B2.8.12	H 8.3.1.2	50 x 3 Flat	t	0.01	.....	.....	.....
	H 8.3.7	Handrails					
	H 8.3.7	Supply and Install					
		Diameter 34 runner measured in running meters. Pricing must allow for both the Hand and Knee rail					
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.8.13	H 8.3.7 (c)1	Runner	m	30	.....	.....	.....
B2.8.14	H 8.3.7 (c)2	MT 90 Stanchions	No.	17	.....	.....	.....
B2.8.15	H 8.3.7 (c)2	MTA Stanchions	No.	9	.....	.....	.....
B2.8.16	H 8.3.7 (c)2	Angle closure bends	No.	9	.....	.....	.....
B2.8.17	H 8.3.7 (c)3	Radius Bend	No.	18	.....	.....	.....
B2.8.18	H 8.3.7 (c)3	90° Bend	No.	4	.....	.....	.....
B2.8.19	H 8.3.7 (c)3	90° Straight closure Bend	No.	4	.....	.....	.....
	H 8.3.4	Erection Bolts					
B2.8.20	H 8.3.4	Supply, drill holes and install M16 Chemical anchors x 150mm long complete with suitable epoxy grout.	No.	20	.....	.....	.....
B2.8.21	H 8.3.4	Supply, drill holes and install M12 Chemical anchors x 120mm long complete with suitable epoxy grout.	No.	64	.....	.....	.....
B2.8.22	H 8.3.4	Grade 8,8 bolts and nuts including through hardened washers	t	0.01	.....	.....	.....
	H 8.3.13	Corrosion Protection					
B2.8.23	H 8.3.13	Painting of steelwork and handrailing to specification	t	1.47	.....	.....	.....
	H 8.3.2.	Delivery to Site					
B2.8.24	H 8.3.2.1	Delivery to site, off load and store in a secure area	t	1.47	.....	.....	.....
B2.9	LC	CABLE DUCTS					
	LC 8.2.2	Excavation					
B2.9.1	LC 8.2.2 (a)	Excavate in all materials, not more than 1m deep, for trenches, backfill, hand compact and dispose of surplus material in Sleeve trenches shown on drawing no SK 3841 / 11	m³	1	.....	.....	.....
	LC 8.2.5	Supply, lay, bed and prove duct					
B2.9.2	LC 8.2.5	Supply, lay, bed and prove 75 mm PVC pipe sleeve complete with pull wire as detailed on drawing no SK 3841 / 11 Pull wires to extend 1 metre beyond ends of sleeves	m	7	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.10	MK MK 8.2.1	KERBING AND CHANNELLING Concrete Kerbing All precast kerbing must be supplied from a SANS approved manufacturer. Samples of kerbing to be provided for approval by client. See detail on drawing no SK 3841 / 21 Prefabricated fig. 3 (Kerb type 1) placed in accordance to detail including haunching behind kerbs complete.					
B2.10.1	MK 8.2.1 (b)	Straight on plan	m	70	.....	.....	.....
	MK 8.2.6	Ancillaries					
B2.10.2	MK 8.2.6.1	Transition kerb, 1 metre length of standard Prefabricated Concrete kerb to form transition kerb t Prefabricated (Kerb type 8A) placed in accordance to detail	No.	2	.....	.....	.....
B2.10.3	MK 8.2.1(b)	Straight on plan	m	48	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.11		SUBSTATION BUILDING					
		Soil Insecticide					
B2.11.1		Soil insecticide under Substation building	Sum	1	.....	.....	.....
		Brickwork					
		Refer drawings SK 3841 / 3, / 4, / 10, / 11, / 12, / 13 and /14					
		230mm Full Brick Walls					
B2.11.2		Corobrick NFX bricks with flush joints in Substation internal Walls, Cable trenches, and all other brickwork below ground level including cable openings, building in of observation window, control panel, DB, conduit, plug boxes, light switches etc. (allow for closing up cable entry openings after the installation of cables)	m²	256	.....	.....	.....
B2.11.3		Corobrick Semi face FLAMINGO TRAVERTINE with raked joints and NFX bricks with flush joints in Substation building, Platforms and Stairs including building in of door frames , windows, conduit, plug boxes, light switches etc..	m²	240	.....	.....	.....
		Doors & Door Jambs					
B2.11.4		Supply and install Type D transformer door and Jamb complete with outside barrel bolt and padlock etc as detailed on drawing SK 3841 / 7	No.	2	.....	.....	.....
B2.11.5		Supply and install Type D transformer door and Jamb complete with Union 802 DMG Panic bolt etc as detailed on drawing SK 3841 / 7	No.	1	.....	.....	.....
B2.11.6		Supply and install Type F transformer door and Jamb complete with outside barrel bolt and padlock etc.as detailed on drawing SK 3841 / 7	No.	1	.....	.....	.....
B2.11.7		Supply and install Type H transformer door and Jamb complete with Union 802 DMG Panic bolt etc as detailed on drawing SK 3841 / 7	No.	1	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					
B2.11.8		Windows Supply and install Window Type NE 22 complete with 4mm thick glazing and burglar proofing as detailed on drawing SK 3841 / 7	No.	4	.....	.....	.....
B2.11.9		Roof Substation roof as shown on drawing no SK 3841 / 3, & /4 complete with timber trusses, wallplates, wall anchors, purlins, bracing, roof insulation, ceilings, cornices, fascia boards, gutters, down pipes & sheeting etc.	Sum	1	.....	.....	.....
B2.11.10		Floor Finish Supply and apply 2 x coats of Plascothane Purecoat floor coating(PUC range) paint on floor strictly to manufacturer's specification.	m²	82	.....	.....	.....
B2.11.11		Plaster 12 mm thick plaster on all internal walls of Substation	m²	220	.....	.....	.....
B2.11.12		Paint Supply and paint interior plastered walls with one coat plaster primer undercoat and 2 x final coats of Acrylic PVA paint (Colour White).	m²	220	.....	.....	.....
B2.11.13		Supply and paint gypsum plaster board ceiling and cornices of Substation building with one coat plaster primer undercoat and 2 x final coats of White ceiling paint	m²	96	.....	.....	.....
B2.11.14		Supply and paint doors and door jambs with 1 coat undercoat and 2 x final coats of gloss enamel paint (colour to clients specification)	No.	5	.....	.....	.....
B2.11.15		Supply and paint doors window frames and burglar proofing with 1 coat undercoat and 2 x final coats of gloss enamel paint (colour to client's specification)	No.	4	.....	.....	.....
B2.11.16		Waterproofing Supply and apply SIKALASTIC 152 (or similar approved) waterproofing compound to the bottom and sides of the cable trenches strictly to the manufacturer's specification.	m²	84	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.11.17		Fire Fighting Supply and install 9 kg DPC fire extinguisher complete with backing board and bracket as shown on drawing SK 3841 / 18	No.	6	.....	.....	.....
B2.11.18		Signs Refer drawing SK 3841 / 18 & / 19 Supply and install Sign 1 as shown on drawing	No.	11	.....	.....	.....
B2.11.19		Supply and install Sign 3 as shown on drawing	No.	9	.....	.....	.....
B2.11.20		Supply and install Sign 4 as shown on drawing	No.	6	.....	.....	.....
B2.11.21		Supply and install Sign 5 as shown on drawing	No.	6	.....	.....	.....
B2.11.22		Supply and install Sign 6 as shown on drawing	No.	6	.....	.....	.....
B2.11.23		Supply and install Sign 7 as shown on drawing	No.	1	.....	.....	.....
B2.11.24		Supply and install Sign 8 as shown on drawing	No.	1	.....	.....	.....
B2.11.25		Worktop and Pin - Up Board Supply and install a Pin - up board as detailed on drawing SK 3841 / 7	No.	1	.....	.....	.....
B2.11.26		Supply and install a Worktop as detailed on drawing SK 3841 / 6 (dimensions to be verified on site before manufacture)	No.	1	.....	.....	.....
B2.11.27		Purpose Made Observation Window Supply and install a purpose made window with 22mm thick safety glass approx size 1450 x 340mm as detailed on drawing SK 3841 / 6 (dimensions to be verified on site before manufacture)	No.	1	.....	.....	.....
Subtotal carried over							.....

CARNARVON 22kV SUBSTATION BUILDING WORKS							
Bill B2	Payment SANS 1200	Substation Building	Unit	Qty	Supply Rate	Install Rate	Total Amount
		Subtotal carried over					.....
B2.12		NEW SECURITY FENCE					
B2.12.1		Supply material and labour to construct 1,8 meter high security fence with diamond mesh and razor wire on top, complete with all straining posts stays excavations, compaction, concrete bases around posts etc, shown on drawing no SK 3841 / 20	m	317	.....	.....	.....
B2.12.2		Supply and install 2 x 2880mm swing gates covered with diamond mesh with razor wire on top, complete as detailed on drawing no 3841 / 22	set	2	.....	.....	.....
Total Bill B2 - Building Works Substation Building carried forward to Summary							.....

**KAREEBERG LOCAL MUNICIPALITY
CARNARVON**

NEW 22kV SUBSTATION

SUMMARY OF PRICES

ITEMS		AMOUNTS
<u>Bill</u>	<u>Description</u>	
Bill E1	Preliminary & General Items	.....
Bill E2	New Substation (Electrical)	.....
Bill E3	Supply Cables	.....
Bill E4	Overhead Lines	.....
Bill E5	Fire Detection & Suppresion	.....
Bill E6	22 kV Switchgear	.....
Bill E7	Miniature Substation & Low Voltage	.....
Bill E8	Intruder Alarm System	.....
<u>Builders Work</u>		
Bill B1	Preliminary & General Items	.....
Bill B2	Substation Building	.....
Subtotal		.....
Unforeseen Expenses (10%)		.....
Subtotal		.....
Plus VAT 15%		.....
Subtotal		.....

Name	
Date	
Signature	