

SARS MUSINA - ELECTRICAL ENGINEERING

BILL of QUANTITY - ELECTRICAL COST of WORKS



Item	QTY	Unit	Description	Rate	Cost
			BILL NO.1 – PRELIMINAIRES AND GENERALS		
1.1	1	Item	Training : Allow for training by end user personnel		
1.2	1	Item	General : Allow for complying with the special and general conditions of the contract and labour requirements, for site establishment, for providing site office, ablution facilities, project name boards, adequate and suitable water, temporary electricity, telephone devices, staff accomodation, sanitary and first aid services, and for attending all inspections and meetings.		
1.3	1	Item	Guarantee : Allow for providing all sureties, guaranties and insurance as required in the conditions of contract.		
1.4	1	Item	Drawings : Allow for marking-up a full set of drawings to show the exact routes of cables, positions of cable joints, road-crossings etc. to render a complete as-installed set of drawings.		
1.5	1	Item	Permits and Notices : Allow obtaining permits and giving notices and for co-ordination with other contractors.		
1.6	1	Item	Storage : Provide storage for plant, materials and equipment with proper security.		
1.7	1	Item	Commissioning and Testing : Supply all test equipment and labour for testing, commissioning and adjustment to the final installation as well as attending all inspections and tests required by the Department of Public Works and SARS. To cater for the entire Electrical Infrastructure and Building Service inside the Warehouse Facility.		
1.8	1	Item	Additional Items : Any additional items not included in the schedule of quantities that the Contractor wishes to <u>specify</u> and price separately.		
1.9	1	Item	Design Development : Allow for R 80 000.00 (Eighty Thousand Rands Only)	R 80 000	R 80 000
1.10	1	Item	Allow for Temporary Works and Plants		
1.11	300	m3	Allowance for pavement Re-instatement at Vehicle Parking Area		
1.12	1	Item	Allowance for PPE :		
1.13	1	Item	Full time SHEQ Officer		
1.14	1	Item	Full Safety File Documentation		
Total Cost					Carried to Summary

SARS MUSINA - ELECTRICAL ENGINEERING

BILL of QUANTITY - ELECTRICAL COST of WORKS



Item	Qty	Unit	Description	Rate	Cost
2.			BILL NO. 02: Electrical Power Distribution Network		
2.1			MEDIUM VOLTAGE (MV) CABLE		
			Supply and install MV underground cable to comply with SABS 1339, table 19, with a voltage rating of 6.35/11kV, 185mm ² x 3 core, armoured, individually screened with copper conductors. laid with bedding soil		
2.1.1	150	m	185mm ² PILC, 3 core 11kV underground copper cable		
2.2			MEDIUM VOLTAGE (MV) CABLE TERMINATIONS		
			Supply and Install cable terminations complete including glands, shrouds, lugs and connections for 6.35/11kV, 185mm ² x 3 core, armoured PILC Copper Cable.		
2.2.1	2	No.	185mm ² PILC, 3 core 11kV underground copper cable		
2.3			LOW VOLTAGE (LV) CABLE		
			Supply and Install 600/1000V grade PVC/SWA insulated stranded copper conductors drawn into conduit, laid in ground or cable tray.		
2.3.1	40	m	150mm ² 4 core PVC/SWA copper cable + 120mm ² BCEW (From LV Compartment to Warehouse Main DB via Gen Set AMF)		
2.3.2	70	m	120mm ² 4 core PVC/SWA copper cable + 95mm ² BCEW (From Mini Sub LV Compartment to Main Kiosk at Vehicle Parking Area)		
2.3.3	40	m	16mm ² 4 core PVC/SWA copper cable + 10mm ² BCEW (From Warehouse DB2 to Shredder)		
2.3.4	10	m	25mm ² 4 core PVC/SWA copper cable + 16mm ² BCEW (From Mini Sub LV Compartment to Streetlighting Control Box)		
2.3.5	1	Sum	Cable Ladder and Sandries for the Shredder		
2.4			LOW VOLTAGE (LV) CABLE TERMINATIONS		
			Supply and Install cable terminations complete including glands, shrouds, lugs and connections for 1000V grade PVC/SWA Copper Cables.		
2.4.1	2	No.	150mm ² 4 core PVC/SWA copper cable + 120mm ² BCEW (From LV Compartment to Warehouse Main DB via Gen Set AMF)		
2.4.2	2	No.	50mm ² 4 core PVC/SWA copper cable + 35mm ² BCEW (From Mini Sub LV Compartment to Main Kiosk at Vehicle Parking Area)		
2.4.3	2	No.	16mm ² 4 core PVC/SWA copper cable + 10mm ² BCEW (From Main DB Warehouse to Shredder)		
2.4.4	2	No.	25mm ² 4 core PVC/SWA copper cable + 16mm ² BCEW (From Mini Sub LV Compartment to Streetlighting Control Box)		
2.5			MINIATURE SUBSTATION AND ACCESSORIES		
			Supply Install the Miniature Substation with all necessary internal component and device		
2.5.1	1	No.	315kVA 11kV/6.6kV/420V type b miniature substation		
2.5.2	1	No.	Three Phase 400A, 15kA LV Main Isolator		
2.5.3	1	No.	Three Phase 300A, 15kA LV Feeder Moulded Case Circuit Breaker (From LV Compartment to Warehouse Main DB via Gen Set AMF)		
2.5.4	1	No.	Three Phase 150A, 15kA LV Feeder Moulded Case Circuit Breaker (From Mini Sub LV Compartment to Main Kiosk at Vehicle Parking Area)		

2.5.5	1	No.	Three Phase 70A, 15kA Miniature Circuit Breaker (<i>From Mini Sub LV Compartment to Streetlighting Control Box</i>)		
2.6			BULK METERING KIOSK (At the Tie-in Point)		
			Supply Install the bulk metering kiosk with all necessary internal component and devices		
2.6.1	1	No.	Bulk Metering Kiosk		
2.6.2	1	lot	Metering Device and Accessories		
2.7			CIRCUIT BREAKERS AND ISOLATORS		
			Supply and Install the circuit breaker with all the necessary components inside the distribution kiosk		
2.7.1	1	ea	MCCB type 250A, 10kA Triple Pole + N Circuit Breaker (<i>Incomer Inside Main Kiosk to feed BD -Warehouse</i>)		
2.7.2	1	ea	MCCB type 125A, 10kA Triple Pole + N Circuit Breaker (<i>Incomer Breaker Inside Main Kiosk at Vehicle Parking Area</i>)		
2.7.3	1	ea	MCB Type 60A, 10kA Triple Pole + N Circuit Breaker (<i>Incomer Breaker Inside Streetlight Kiosk</i>)		
2.7.4	1	ea	MCCB type 80A, 10kA Triple Pole + N Circuit Breaker (<i>Circuit Breaker Inside Warehouse DB2 to feed Shredder</i>)		
2.7.4	1	ea	80A Triple Pole (Three Phase) waterproof isolator for Shredder (IP 65)		
2.8			GENERAL DISTRIBUTION KIOSK		
			Supply and Install new steel distribution boards complete with doors, frames, subframes, chassis, fixtures, fittings, terminations, busbars and wiring, danger signs and with spare space and switchgear as per schematic.		
2.8.1	1	No.	Main Distribution Board at Warehouse: Surface Mounted. 20 way complete with cover plates		
2.8.2	1	No.	Floor Standing Kiosk for Vehicle Parking Area		
2.8.3	1	No.	Floor Standing Kiosk for Streetlighting around the Warehouse Building		
2.8.4	3	No.	Electrical Certificate of Compliance (COC)		
2.9			CABLE TRENCHES		
			All cable trenching necessary to lay new cables and plant lighting poles to expose existing cables including back filling - all to specification and with 75mm earth bed for cables in soft and hard rock trenches (450mm wide x 750mm deep)		
2.9.1	120	m	Excavation in soft rock		
2.9.2	80	m	Excavation in hard rock		
2.9.3	200	m	Backfilling		
2.10			CABLE MANHOLES		
2.10.1	1	No.	600 x 600 x 1m		
2.11			SLEEVE PIPE		
2.11.1	340	m	110mm diameter Kabelflex sleeve for Electrical Cable (<i>with inclusion of future upgrade</i>)		
2.12			CABLES MARKERS AND DANGER TAPES		
			Supply and install cable markers and danger tapes		
2.12.1	6	No.	Cable markers		
2.12.2	200	m	Cable Danger Tapes		
2.13			BULK ELECTRICITY SUPPLY CONNECTION		

2.13.1	1	lot	Bulk Electricity Supply Connection Fee		
2.13.2	1	lot	Bulk Contribution Deposit		
2.14			Other Items Not covered above: Specify		
2.14.1					
2.14.2					
2.14.3					
2.14.4					
2.14.5					
2.14.6					
				Total Cost	

Carried to Summary

SARS MUSINA - ELECTRICAL ENGINEERING

BILL of QUANTITY - ELECTRICAL COST of WORKS



Item	Qty	Unit	Description	Rate	Cost
3.			BILL NO. 03: Guard House at Vehicle Parking Area		
3.1			PVC INSULATED CONDUCTORS		
			Supply and install single core PVC insulated conductors drawn into conduit or installed in wiring channel		
3.1.1	300	m	2.5 mm ²		
3.1.2	150	m	4 mm ²		
3.2			PVC INSULATED EARTH CONDUCTORS		
			Single Core Earth conductors drawn into conduit or installed in wiring channel		
3.2.1	100	m	1.5 mm ²		
3.2.2	75	m	2.5 mm ²		
3.3			LOW VOLTAGE CABLE		
			Supply and Install 600/1000V grade PVC/SWA insulated stranded copper conductors drawn into conduit, laid in ground or cable tray.		
3.3.1	70	m	10mm ² 4 core PVC/SWA copper cable + 6mm ² BCEW (Main Kiosk - VPA to DB - Guard House)		
3.4			LOW VOLTAGE CABLE TERMINATIONS		
			Supply and Install cable terminations complete including glands, shrouds, lugs and connections for 1000V grade PVC/SWA Copper Cables.		
3.4.1	2	No.	10mm ² 4 core PVC/SWA copper cable + 6mm ² BCEW (Main Kiosk - VPA to DB - Guard House)		
3.5			GALVANISED STEEL CONDUIT and ACCESSORIES		
			Galvanised steel conduit including bending, short lengths, draw boxes, cutting, bands, jointing, couplings, saddles and wastage		
3.5.1	20	m	2 x 2.5 mm ² conductors in 20mm ø conduit + 1.5mm ² earth wire in 20mm ø conduit		
3.5.2	20	m	2 x 4mm ² conductors in 20mm ø conduit + 2mm ² earth wire		
3.5.3	60	m	2 x 4mm ² conductors in 25mm ø conduit + 2mm ² earth wire for Gate Motors		
3.6			DRAW BOXES		
			Galvanised wall boxes placed and fixed in position in brick walls or chased in brickwork and installed against wiring channels excluding cover plates		
3.6.1	1	No.	100 x 50 x 50 mm		
3.6.2	2	No.	100 x 100 x 50 mm		
3.7			LIGHT SWITCHES		
			Switches are to be 16A, 230V light switches , connected to conductors including cradle and coverplate		
3.7.1	1	No.	16A One lever, one-way switch		
3.7.2	1	No.	16A Daylight Switch		
3.8			LIGHT FITTINGS		
			Supply and installation of the following light fittings, including LED's, wiring connections and earthing		
3.8.1	1	No.	LED Fluorescent Light 65W with enclosed covers. Light Fitting Dimension; H= 1270mm, W= 86mm and L= 90mm		
3.8.2	4	No.	External LED Bulkhead 20W, to be mounted on the wall of the Guard House		

3.9			SOCKET OUTLETS		
			Socket outlets are to be 230V 16A 3-pin socket outlets the Crabtree type, installed in 100 x 100 x 50 mm surface wall boxes (measured elsewhere) including cover plates and connected to conductor ends		
3.9.1	2	No.	16A 3-pin single socket outlet on brick wall		
3.9.2	1	No.	16A 3-pin dedicated single socket outlet		
3.12			ISOLATING SWITCHES FOR SURFACE INSTALLATION (For Future Upgrade)		
			Supply and installation of the surface mounted isolating switches for single and three phase power points, complete with 100 x 100 x 50mm galvanized draw box, complete with coverplate and fixing screws		
3.12.1	1	No.	20A double pole (Single Phase) waterproof isolators for Access Control (IP 65)		
3.12.2	1	No.	30A double pole (Single Phase) waterproof isolators for Air Conditioning Unit (IP 65)		
3.12.3	1	No.	30A Triple Pole (Three Phase) waterproof isolators for Air Conditioning Unit (IP 65)		
3.14			FIREMAN SWITCH		
			Supply and install of the surface mounted fireman switch mounted over an 65mm round drawbox		
3.14.1	1	No.	Four Pole 32A Fireman Safety Switch mounted over an 65mm round drawbox		
3.15			CIRCUIT BREAKERS		
			Supply and Install the circuit breaker with all the necessary components		
3.15.1	1	ea	100A, 10kA Triple Pole + N Circuit Breaker (Incomer Inside Main Kiosk to feed BD -Warehouse 02)		
3.15.2	1	ea	80A 6kA Triple Pole + N Circuit Breaker (Incomer Breaker Inside BD - Warehouse 02)		
3.15.3	1	ea	30A 5kA Double Pole + N Circuit Breaker		
3.15.4	1	ea	20A 5kA Double Pole + N Circuit Breaker		
3.15.5	4	ea	20A 5kA Single Pole		
3.15.6	4	ea	10A 5kA Single Pole		
3.16			EARTH LEAKAGE PROTECTION		
			Supply and Install the earth leakage protection with all the necessary components		
3.16.1	1	ea	30mA 5kA Earth Leakage Protection Device with 1P + N 63 A without overload protection		
3.17			GENERAL DISTRIBUTION BOARDS		
			Supply and Install new steel distribution boards complete with doors, frames, subframes, chassis, fixtures, fittings, terminations, busbars and wiring, danger signs and with spare space and switchgear as per schematic.		
3.17.1	1	No.	DB-MAIN Guard House: Flush Mounted, 12 way steel complete with plastic cover and 1 steel tray (Mini Rail)		
3.17.2	1	No.	Electrical Certificate of Compliance		
3.18			EARTHING and LIGHTNING		
			This section covers the earthing of electrical installations in buildings or other structures. The total earthing system of any electrical installation must comply with SANS 10142 and Department of Public Works specification		
3.18.1			Lightning protection provided for the building or installation must comply with SANS standard		
3.18.1.1	1	Sum	Carry out a soil resistivity survey to SANS Standards		

3.18.1.2	1	Sum	Evaluation of soil resistivity survey, including soil prospection sheet		
3.18.1.3	1	Sum	Design drawings of earthing system including all the assembly details.		
3.18.2			Copper Electrodes into ground		
3.18.2.1			Supply and install the following complete with all equipment to complete the installation.		
3.18.2.2	4	No.	1.8m electrode driven into ground		
3.18.2.3	4	No.	1.8m electrode driven mechanically into ground		
3.18.2.4		Rate	6.0m electrode in pre drilled hole and filed with slury and conductive compound.		
3.18.3			Connection and test terminals on columns		
3.18.3.1	2	No.	Connection/test bracket including termination materials.		
3.18.4			Air terminations		
3.18.4.1	50	m	16mm2 solid round down conductors including conductor terminals		
3.18.4.2	4	No.	Alluminium stand off brackets inc PVC-backing for fixing to structure. (at 1.0m spacing)		
3.18.4.3	4	No.	Bonding of air termination conductor between roof, gutter, etc.		
3.18.4.4	12	No.	Cadweld connection of earth terminals to 70mm2 trench earth copper conductor		
3.18.5			Earth Electrode		
			Supply and install the following complete with all equipment to complete the installation.		
3.18.5.1	1	Item	Earthmat to provide a 1 Ohm Electronic earth.		
3.18.5.2	1	Sum	Allow for commissioning and testing and provide earthing certificate.		
3.19			CABLE TRENCHES		
			All cable trenching necessary to lay new cables and plant lighting poles to expose existing cables including back filling - all to specification and with 75mm earth bed for cables in soft and hard rock trenches (450mm wide x 750mm deep)		
3.19.1	80	m3	Excavation in soft rock		
3.19.2	20	m3	Excavation in hard rock		
3.19.3	100	m3	Backfilling		
3.20			CABLE MANHOLES		
3.20.1	1	No.	600 x 600 x 1m		
3.21			SLEEVE PIPE		
3.21.1	20	m	50mm diameter Kabelflex sleeve		
3.22			CABLES MARKERS AND DANGER TAPES		
			Supply and install cable markers and danger tapes		
3.22.1	2	No.	Cable markers		
3.22.2	100	m	Cable Danger Tapes		
3.23			Other Items Not covered above: Specify		
3.23.1					
3.23.2					
3.23.3					
3.23.4					
3.23.5					
3.23.6					

Total Cost

Carried to Summary

SARS MUSINA - ELECTRICAL ENGINEERING

BILL of QUANTITY - ELECTRICAL COST of WORKS



Item	Qty	Unit	Description	Rate	Cost
4.			BILL NO. 04: High Mast Lighting (External/Security Lighting) Infrastructure		
4.1			HIGH MAST LIGHTING INSTALLATION		
			<i>Supply, install and commission of 20m High Mast Light/s fittings c/w LED 470W fittings, relevant circuit breakers, surge protection, contactors, cables, cable termination, foundation, hoisting, light brackets, earthing and Masts designed to SANS 0225 and hot dip galvanised to SANS 121, ISO 1461</i>		
4.1.1	2	Item	Concrete Foundation including Soil and Concrete cube Tests		
4.1.2	2	Item	Foundation Bolts and Templates - 6 x M36 on PCD 710 mm		
4.1.3	2	No.	20m Poles 3 rope hoisting Highlights mast with ,designed to SANS 0225 and hot dip galvanised to SANS 121, ISO 1461		
4.1.4	2	Item	Standard Earthing System for Poles (2x 1,2m earth Spikes)		
4.1.5	2	No.	Internal fibreglass DB with photo cell ,Splitterbox and 5c x 2,5 mm trailing cable.		
4.1.6	1	Item	Delivery of Mast to Site per full load		
4.1.7	2	Each	Electrical Certificate of Compliance for the High Mast		
4.1.8	16	No.	LED 461 W High Mast Light Fittings		
4.1.9	1	No.	Single Drum winch		
4.1.10	1	No.	Hydraulic Powertool with remote		
4.1.11	1	No.	Test Lead (5Pin, 16A, 8m long)		
4.2			LOW VOLTAGE CABLE CONDUCTOR		
			<i>Supply, install and commission 3 core 600/1000V PVC/SWA copper cables insulated armoured copper conductors for electrical circuits and connected to equipment (All wasted cut-offs must be included in the quote price) and inclusion of all cable termination</i>		
4.2.1	80	m	10mm ² 4 core PVC/SWA copper cable <i>(From Main Kiosk - VPA to Floodlight 1 Junction Boxes/ Floodlight Incomer Circuit Breaker)</i>		
4.2.2	120	m	10mm ² 4 core PVC/SWA copper cable <i>(From Main Kiosk - VPA to Floodlight 2 Junction Boxes/ Floodlight Incomer Circuit Breaker)</i>		
4.2.3	60	m	4 mm ² 4 Core PVC / SWA copper cable (For supplying both high mast/s fittings wiring)		
4.3			LOW VOLTAGE CABLE TERMINATIONS		
			<i>Supply and Install cable terminations complete including glands, shrouds, lugs and connections for 1000V grade PVC/SWA Copper Cables.</i>		
4.3.1	2	No.	10mm ² 4 core PVC/SWA copper cable <i>(From Main Kiosk - VPA to Floodlight 1 Junction Boxes/ Floodlight Incomer Circuit Breaker)</i>		
4.3.2	2	No.	10mm ² 4 core PVC/SWA copper cable <i>(From Main Kiosk - VPA to Floodlight 2 Junction Boxes/ Floodlight Incomer Circuit Breaker)</i>		
4.3.2	2	No.	6mm ² 4 Core PVC / SWA copper cable (For supplying both high mast fittings wiring)		
4.4			LV MINIATURE CIRCUIT BREAKER		
			<i>Supply and install Miniature Circuit Breakers per high mast fittings</i>		

4.4.1	2	No.	MCB SP, 20A, 5kA (for incomer breaker each high mast)		
4.4.2	2	No.	MCB TP, 10A, 5kA (controlling of the grouped light fittings : maximum 3 lights per Phase)		
4.7.3	2	No.	16A Daylight Switch		
4.5			TRENCHING		
			All cable trenching necessary to lay new cables and plant lighting poles to expose existing cables including back filling - all to specification and with 75mm earth bed for cables in soft and hard rock trenches (450mm wide x 750mm deep)		
4.5.1	40	m	Hard Rock 600 x 600		
4.5.2	40	m	Soft Rock 600 x 600		
4.5.3	90	m	Pickable Soil 600 x 600		
4.5.4	170	m	Backfilling Compaction		
4.5.5	170	m	75mm diameter Kabelflex sleeves		
4.6			CABLES MARKERS		
			Supply and install cable markers as per specification		
4.6.1	200	m	Cable danger tape		
4.6.2	4	No.	Cable markers		
4.7			CABLE MANHOLES		
4.7.1	4	No.	600 x 600 x 1m full cable manhole for Flood Lighting		
4.8			Other Items Not Covered Above: Specify Accordingly		
4.8.1					
4.8.2					
4.8.3					
4.8.4					
4.8.5					
4.8.6					
				Total Cost	

Note: All site establishment costs related to high mast installation should be included on Bill 01; Preliminary and General. The Contractor shall submit the fabrication documentation (ie drawings and specification) to the Consultant for approval. All Contractors work shall be certified by relevant registered Professional Engineer or Professional Engineering Technologist

Carried to Summary

SARS MUSINA - ELECTRICAL ENGINEERING

Cost Estimates Summary of Electrical Works



Item	Description	Cost Amount
1.	Preliminaries & Generals	
2.	Electrical Power Distribution Network	
3.	Guard House - Vehicle Parking Area's	
4.	High Mast Lighting Infrastructure	
5.	Sub Total 01	
6.	Contingencies @ 15% of Sub Total 01	
7.	Sub Total 02	
8.	Value Added Tax @14%	
9.	GRAND TOTAL ESTIMATES	