4021	CSIR - SMALL MOLECULE AND BIOPHARM FACILITY				TDI	
	SCIENTIA CAMPUS PRETORIA					DCDN Ig engineers
	Electrical Installation - Biopharm Lab					IG ENGINEERS
	09-Sep	-22	REV 3			
ITEM	DESCRIPTION			MATERIAL	LABOUR	TOTAL
BILL NO	.1 : PRELIMINARY AND GENERAL COSTS					
1.1	SITE ESTABLISHMENT					
	Camp and fencing	sum	1			
	Office	sum	1			
	Office Equipment	sum	1			
	Store	sum	1			
	Workshop	sum	1			
	Other	sum	1			
1.2	ADMINISTRATIVE					
	Site personnel	sum	1			
	Supervisory staff	sum	1			
	Guards	sum	1			
	Transport	sum	1			
	Insurance	sum	1			
	Cost of Guarantee	sum	1			
	Financing of Retention	sum	1			
	Running costs e.g. telephone, electricity, cleaning services, printing,	sum	1			
	stationery, etc	Sum	1			
1.3	GENERAL COSTS					
	Allow an amount if required for expenses incurred					
	to tender.	sum	1			
	Loading and off loading of material and equipment	sum	1			
	Setting out of Works.	sum	1			
	Cleaning of site upon completion of Contract.	sum	1			
	Critical Path/Schedule.	sum	1			
	Marking up "As Built" drawings	sum	1			
	Issuing Cadded "As Built" drawings on completion	sum	1			
	Test and commissioning of complete Works.	sum	1			
	Inspection and handing over.	sum	1			
	Certificate of Compliance	sum	1			
	Maintenance manuals	ea	4			
	TOTAL BILL NO 1					-

Section 5.4 : Electrical Bills Of Quantities Page 1 of 16

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
A	INSTALLATION - GENERAL		<u> </u>			
	The following shall apply to all material and equipment supplied and					
	installed on site and shall conform to specifications contained in the					
	technical specification of this document.					
A.1	WIRING CHANNEL					
7.1	Galvanised metal channel complete with covers fixed at intervals not					
	exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces,					
	ends etc.					
A.2	CONDUITS & DRAW BOXES					
	Conduits cast in concrete, chased into brickwork,fixed in partitioning, roof spaces, surface on concrete or brickwork to be complete with saddles,					
	couplings and terminations to drawboxes. Draw boxes to be galvanised type.					
	All cutting and terminations to be included.					
A.3						
	Take delivery of, store, install and connect all light fittings complete with					
	lamps, gear, etc. as specified and indicated on the drawings. All fluorescent lamps to be Colour 840 unless indicated otherwise.					
A.4	CONDUCTORS					
	SABS approved PVC insulated copper conductors drawn into conduit,					
	installed in wiring trunking or power skirting.					
Λ. F.	SOCKET OUTLETS					
A.5	16A, 3-pin switched socket outlets flush mounted in drawboxes complete with					
	cover plates shall be of the "Crabtree"or "Clipsal" range which fit into					
	standard outlet boxes dedicated outlets shall have a red cover plate.Floor					
	boxes shall be of the "Cabstrut" range. or similar					
A.6	LIGHT SWITCHES 16A light switch flush mounted in draw boxes or power skirting complete with					
	cover plates shall be of the "Crabtree" or "Clipsal" range which fit into					
	standard outlet boxes.					
A.7	DISTRIBUTION BOARDS					
	Supply & Install Distribution Boards complete as in accordance with the					
	specification and drawings					
A.8	ISOLATORS					
	Isolators surface/flush mounted in 100 x 100mm x 50mm draw boxes					
	complete with coverplate as specified and indicated on drawings. All isolators					
	installed externally shall be in weather proof enclosures					
A.9	LOW VOLTAGE CABLES					
А.Э	600/1000V PVC/SWA/PVC Cables with copper conductors to SABS 1507					
	fixed vertically or horizontally on cable trays in accordance with the					
	specification and drawings. All fixings to be included.					
A.10	TERMINATIONS					
	Termination of LV cable to be as specified including connection of					
	conductors, cable lugs, captive cone glands, shrouds, etc. for the relevant cable sizes.					

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
	BILL NO 2:		~			101/12
	Small Power & Lighting - BioPharm Facility					
	NOTE:					
	All clean room penetrations must be sealed with anti-bacterial silicone					
3.1	LV CABLES					
•••						
	Supply and installation of the following PVC armoured SWA copper cables to SANS 1507, installed on cable Trays vertically and horizontally.					
	95mm ² x 4-core	m	20			
	10mm ² x 4-core	m	50			
3.2	TERMINATIONS					
	Termination of LV cable as specified including connection of conductors,					
	cable lugs, captive glands, shrouds, etc. for the following cable sizes					
			0			
	95mm ² x 4-core	ea	2			
	10mm ² x 4-core	ea	2			
0.0						
3.3	EARTHING					
	Supply and install the following bare copper earth conductors					
	50mm2 bare earth conductor	m	20			
	6mm ² bare earth conductor	m	50			
3.4	TERMINATION OF EARTH CONDUCTORS					
	50mm ² bare earth conductor	ea	2			
	10mm ² bare earth conductor	ea	2			
3.5	DISTRIBUTION BOARDS & SWITCH GEAR					
	Provide an infra red scan to check all terminations in the distribution board					
	and replace missing blank circuit breaker covers. Ensure that all labelling is					
	complete and legend cards are provided and updated. Ensure that all					
	warning signs are provided. Test the earthing of DB. Ensure that cover plates					
	are properly secured. Provide a Certificate of compliance for the distribution					
	board in accordance with SANS 10142.					
	LIST OF DISTRIBUTION BOARDS					
	SDB - BPG (New)	ea	1			
	SDB - BPF (New)	ea	1			
3.6						
5.0	STRIP OUT EXISTING ELECTRICAL SERVICES				1	
J.U	Strip out existing electrical services BioPharm facility 327m ²	sum	1			
5.0		sum	1			
3.7		sum	1			
	Strip out existing electrical services BioPharm facility 327m ²					
	Strip out existing electrical services BioPharm facility 327m ² UPS	sum sum	1			
	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min					
	Strip out existing electrical services BioPharm facility 327m ² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up					
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays					
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD)					
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Description Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD) complete with splices, nuts, bolts and washers fixed horizontally on hangers					
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD)					
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3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD) complete with splices, nuts, bolts and washers fixed horizontally on hangers or vertically up walls and risers. 150 mm wide x 50 mm HD cable ladder	sum	1			
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD) complete with splices, nuts, bolts and washers fixed horizontally on hangers or vertically up walls and risers. 150 mm wide x 50 mm HD cable ladder Horizontal bends	sum m ea	1 60 3			
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD) complete with splices, nuts, bolts and washers fixed horizontally on hangers or vertically up walls and risers. 150 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece	sum sum m ea ea	1 60 3 1			
3.7	Strip out existing electrical services BioPharm facility 327m² UPS Suply and install an Eaton 20 kVA UPS and associated batteries for 10 min back-up Cable Trays Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD) complete with splices, nuts, bolts and washers fixed horizontally on hangers or vertically up walls and risers. 150 mm wide x 50 mm HD cable ladder Horizontal bends	sum m ea	1 60 3			

	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
	200mm Wire Mesh tray	m	92			
	Horizontal Bends	ea	5			
	Vertical Bend	ea	2			
	Tee pieces	ea	10			
	Cable Tray Hanger	ea	62			
		00				
	100mm Wire Mesh tray	m	92			
	Horizontal Bends	ea	5			
	Vertical Bend	ea	2			
	Tee pieces	ea	10			
	Cable Tray Hanger	ea	62			
		ea	02			
	100mm Perforated tray	- m	0			
	Horizontal Bends	m	-			
		ea	0			
	Vertical Bend	ea	0			
		ea	0			
	Perforated Tray fixings	ea	0			
0.0					┞────┤	
3.9	Supply and Installation of the Following Circuit Breakers					
	15Amp Circuit Breaker - 5kA	ea	1		┞────┤	
	20Amp Circuit Breaker - 5kA	ea	0		ļļ	
	40Amp Circuit Breaker - 5kA	ea	0			
	63Amp Trip Pole Circuit Breaker - 10kA	ea	0			
	80Amp Trip Pole Circuit Breaker - 10kA	ea	0			
	160Amp Trip Pole Circuit Breaker - 15kA	ea	0			
	250Amp Trip Pole Circuit Breaker - 15kA	ea	0			
	60Amp Earth Leakage Circuit Breaker rate at 30mA	ea	0			
	40 Amp 3 pole AC3 Duty Contactor	ea	0			
3.10	WIRING CHANNEL					
3.10						
3.10	Galvanised steel channel complete with covers fixed at intervals not					
3.10	Galvanised steel channel complete with covers fixed at intervals not exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces,					
5.10						
3.10	exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces, ends etc.					
3.10	exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces, ends etc. (Type OL or similar manufactured channel).					
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SMALL POWER INSTALLATION Image: Small start 3.11 Conduit Image: Small start PVC conduit installed chased in walls and in open roof spaces in the following sizes Image: Small start 20mm PVC m 196 25mm PVC m 0 25mm PVC m 0 30mm PVC m 0 50mm PVC m 0 25mm Bosal m 100 25mm metal Sprague (500mm) m 100 25mm Bosal m 0 25mm Bosal m 0 25mm Rosal Threaded Dome Lid ea 0 312 Outlet Boxes m 100 312 Outlet Boxes m 100 100mm x 50mm Adep ea 10 100 100mm x 50mm Adep ea 12 10 100mm x 50mm x 50mm dep ea 12 10 100mm x	ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTA
3.11 Conduit Image: Conduit Installed chased in walls and in open roof spaces in the following sizes 20mm PVC m 196 25mm PVC m 0 32mm PVC m 0 32mm PVC m 0 Boal conduit, installed chased in walls, surface mounted and in open roof spaces on the following sizes Image: Conduit installed chased in walls, surface mounted and in open roof spaces on the following sizes 25mm Boal m 100 25mm Metal Sprague (500mm) m 0 25mm Boal m 100 26mm metal Sprague (500mm) m 0 100mm x 10sea max and outlet boxes installed surface, in ceiling spaces or chased into bnokwalts, in the following sizes 100mm x 100mm x 50mm deep 100mm x 10mm x 50mm deep ea 10 100mm x 70mm x 50mm deep 100mm x 75mm x 50mm deep ea 11 10 100mm x 75mm x 50mm deep ea 11 10 16A SSO - Flush in draw box <		SMALL POWER INSTALLATION					
PVC conduit installed chased in walls and in open roof spaces in the following sizes in 20mm PVC m 0 32mm PVC m 0 32mm PVC m 0 30mm PVC m 0 Somm PVC m 0 Boal conduit, installed chased in walls, surface mounted and in open roof spaces on the following sizes 1 25mm Boal m 100 25mm Boal m 100 25mm Boal m 100 25mm Boal m 0 25mm Boal m 100 100mm x 10mm x 50mm deep ea 70 100mm x 50mm Xomm deep ea 12 100mm x 10mm x 50mm deep ea 12 100mm x 10mw box ea 12	3.11	Conduit					
20mm PVC m 196 25mm PVC m 0 32mm PVC m 0 Bosal conduit, installed chased in walls, surface mounted and in open roof spaces on the following sizes 2 25mm Bosal m 100 25mm Bosal m 100 25mm Bosal Threaded Dome Lid ea 0 25mm Bosal Threaded Dome Lid ea 0 312 Outlet Boxes		Supply and Install					
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S0mm PVC m 0 Bosal conduit, installed chased in walls, surface mounted and in open roof spaces on the following sizes 25mm Bosal m 100 25mm Bosal m 100 100 100 25mm Bosal Threaded Dome Lid ea 0 100 311 Quttet Boxes 0 100 100 Supply and Install 0 100 100 100 Galvanised steel draw and outlet boxes installed surface, in ceiling spaces or chased into brickwells, in the following sizes 100mm x 10mm x 50mm deep ea 70 100mm x 10mm x 50mm deep ea 12 100mm x 75mm x 50mm deep ea 12 Wonderboxes with cover plate ea 12 100 100 100 100 313 SOCKET OUTLETS 100		25mm PVC	m	0			
Bosal conduit, installed chased in walls, surface mounted and in open roof spaces on the following sizes 100 25mm Bosal m 100 25mm Bosal Threaded Dome Lid ea 0 3.12 Outlet Boxes Supply and Install image: Colspan="2">Image: Colspan="2">Colspan="2" Colspan="2">Colspan="2">Colspan="2" Colspan="2" Colspan="2" <td></td> <td>32mm PVC</td> <td>m</td> <td>0</td> <td></td> <td></td> <td></td>		32mm PVC	m	0			
25mm Bosal m 100 25mm metal Sprague (500mm) m 0 25mm Bosal Threaded Dome Lid ea 0 3.12 Outlet Boxes		50mm PVC	m	0			
25mm Bosal m 100 25mm metal Sprague (500mm) m 0 25mm Bosal Threaded Dome Lid ea 0 3.12 Outlet Boxes							
25mm metal Sprague (500mm) m 0 25mm Bosal Threaded Dome Lid ea 0 3.12 Outlet Boxes Supply and Install Galvanised steel draw and outlet boxes installed surface, in celling spaces or chased into brickwalls, in the following sizes 100mm x 100mm x 50mm deep ea 70 100mm x 50mm x 50mm deep ea 2 100mm x 75mm X 50mm deep ea 2 60mm round , 2-way ea 12 Wonderboxes with cover plate ea 1 Supply and Install 16A SSO - Flush in draw box ea 17 16A SSO + 2 x Switched ZA sockets ea 0 16A SSO - Flush in draw box ea 1 16A SSO - Flush in powerskirling ormal ea 1 16A SSO - Flush in powerskirling dedicated ea 20 16A SSO - Flush in powerskirling dedicated ea 1 16A SSO - Flush in powerskirling dedicated ea 1 16A SSO - Flush in powerskirling dedicated ea 1 16A SSO - Flush in powerskirling dedicated ea		Bosal conduit, installed chased in walls, surface mounted and in open roof spa	ices o	n the fol	lowing sizes		
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				÷	1		
Stainless Steel Power Pole c/w baseplate and ceiling fixings ea 3				-		<u> </u>	

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ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTA
3.14	ISOLATORS				1	
	Isolators mounted complete with backbox on 100x100 outlet boxes or power s	skirting				
	Supply & Install the following sizes:	Ī				
	20A 2-pole	ea	9			
	32A 2-pole	ea	0			
	60A 2-pole	ea	0			
	20A 3-pole	ea	0			
	32A 3-pole	ea	0			
	40A 3-pole	ea	1			
	63A 3-pole	ea	0			
	80A 3-pole	ea	0			
	125A 3-pole	ea	0			
	20A 2-pole IP65	ea	0			
	20A 3-pole IP65 (Welding socket)	ea	2			
	32A 3-pole IP65 (Welding socket)	ea	0			
	63A 3-pole IP65 (Welding socket)	ea	1			
3.15	CONDUCTORS					
	Supply and Install					
	2.5mm ² stranded PVC insulated copper conductors	m	3 750			
	4mm ² stranded PVC insulated with copper conductors	m	25			
	6mm ² stranded PVCinsulated with copper conductors	m	0			
	10mm ² stranded PVC insulated with copper conductors	m	0			
	16mm ² stranded PVC insulated with copper conductors	m	0			
	25mm ² stranded PVC insulated with copper conductors	m	0			
	35mm ² stranded PVC insulated with copper conductors (rate only)	m	0			
3.16	INNOVATIVE WIRING					
3.10						
	Supply and Install					
	2.5mm² Twin & Earth	m	0			
	4.0 mm² Twin & Earth 6mm² x 4 core surfix	m	0			
		m	0			
3.17	POWER SKIRTING					
	Supply and Install					
	2-Compartment, 2-Cover Steel powder coated power skirting	m	54			
	Cover only for power skirting	m	54			
	Corner - 90deg. Internal	ea	16			
	Corner - 90deg. External	ea	7			
	End Caps	ea	10			
	Horizontal bend	ea	0			
		00			╂────┼	

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ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
3.18	LIGHTING INSTALLATION					
	Conduit					
	Supply and Install					
	PVC conduit, installed chased in walls and in open roof spaces in the					
	following sizes					
	20mm	m	140			
	25mm	m	0			
	Bosal conduit, installed chased in walls, surface mounted and in open roof sp	aces o	n the foll	owing sizes		
	20mm Bosal	m	100			
	25mm Bosal	m	0			
	25mm metal Sprague	m	0			
	25mm Bosal Threaded Dome Lid	ea	0			
3.19	Outlet Boxes					
	Supply and Install					
	Galvanised steel draw and outlet boxes installed surface, Brass bushes &					
	locknuts in ceiling spaces or chased into Brickwalls, in the following sizes					
			10			
	100mm x 50mm x 50mm deep	ea	13			
	60mm round , 1,2 or 3-way	ea	2			
	100mm x 100mm x 50mm deep	ea	2			
3.20	Light Switches(Complete with Cover Plates)					
3.20	Supply and Install					
	16A 1 - Lever ; 1 - Way switch - flush in draw box	00	9			
	16A 1 - Way ; dimmer switch - flush in draw box	ea ea	0			
		+	0			
	16A 1- Lever, 2-Way switch - flush in draw box 16A 1- Lever, Intermediate switch - flush in draw box	ea	0			
	16A 2 - Lever ; 1 - Way switch - flush in draw box	ea	2			
	16A 2 - Lever, 2-Way switch - flush in draw box	ea	0			
		ea	0			
	16A 3 - Lever ; 1 - Way switch - flush in draw box	ea	0			
	16A 3 - Lever ; 2 - Way switch - flush in draw box	ea	-			
	5Amp unswitched socket outlets complete with ROUND Box	ea	136			

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ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
3.21	LIGHT FITTINGS					
	Supply,take delivery, store, install the following light fittings with lamps &					
	including the necessary supports etc. As specified and indicated on					
	drawings. All fluorescent lamps to be either Osram or Phillips lamps. Colour					
	840. LED lamps to be neutral white unless otherwise stated. All fluorescent					
	light fittings to have electronic control ballast.					
TYPE	Supply & Install					
	600 x 600 Recessed panel luminiare white 30W LED luminaire with opal					
A	diffuser. Similar and equal to Province/RubiconTHEIA 4000K c/w 3m lead	ea	69			
	and 5A plugtop					
Ae	Same as Type A but with 1 hour emergency control gear and 2x 3m lead with	ea	5			
	5A plugtop					
	600 x 600 Recessed panel luminiare white 40W LED luminaire with opal					
В	diffuser. Similar and equal to Province/Rubicon HELLAS 4000K c/w 3m lead	ea	24			
D	and 5A plugtop	ca	27			
	Same as Type B but with 1 hour emergency control gear c/w 2 x 3m lead and			<u> </u>		
Be	5A plugtop	ea	2			
	Explosion proof luminiare Class 1 Div 1 Similar and equal to					
С	Province/Rubicon CHADD 67W 4000K		0			
	Surface mounted vapour proof luminiare Province/Rubicon Metropolis 47W		12			
D	4000K	ea	12			
De	Same as type D but with emergency 1 hr control gear.	ea	2			
Е	Recessed downlight Province/Rubicon MARIA 80 10W 4000K c/w 3m lead	ea	14			
	and 5 A plugtop.					
F	Recessed downlight Province/Rubicon MARIA 110 15W 4000K c/w 3m lead	ea	0			
	and 5 A plugtop.					
	2 9m LED Strip light LE 45 600 lm/m in 45 dag sluminium shannol s/w LED					
G	2.8m LED Strip light LF 45 600 lm/m in 45 deg aluminium channel. c/w LED 60W Driver	ea	2			
Ge	Same as Type G but with emergency control gear 1Hr.	ea	0			
	Photo cell. Similar and equal to Major Tech DNS6	ea	0			
3.22	CONDUCTORS					
	2.5mm ² stranded insulated PVC with copper conductors	m	1 540			
	4mm ² stranded insulated PVC with copper conductors	m	0			
	2.5mm² Twin & Earth	m	0			
3.23	SENSORS					
ļ	Ceiling mounted 360deg occupancy sensors 1000W Major Tech PIR 45	ea	0			
	TOTAL FOR BILL NO 2					=

CSIR - BIOPHARM FACILITY - Summary							
Bill no. 1 Preliminary & General				-			
Bill no. 2 Small Power & Lighting - BioPharm Facility				-			
Provisional Amount for power supply to HVAC & Ventilation				60 000.00			
			Sub Total				
TOTAL CARRIED FORWARD TO MAIN CONTRACTORS BILL OF	QUANTITIES (ex	cl VAT)					

4021	CSIR - SMALL MOLECULE AND BIOPHARM FACILITY				TDI	DCON		
	SCIENTIA CAMPUS PRETORIA							
	Electrical Installation - Small Molecule Facility							
	09-Sep	-22	2 REV 3					
ITEM	DESCRIPTION			MATERIAL	LABOUR	TOTAL		
ILL NO	.1 : PRELIMINARY AND GENERAL COSTS							
1.1	SITE ESTABLISHMENT							
	Camp and fencing	sum	1					
	Office	sum	1					
	Office Equipment	sum	1					
	Store	sum	1					
	Workshop	sum	1					
	Other	sum	1					
1.2	ADMINISTRATIVE							
	Site personnel	sum	1					
	Supervisory staff	sum	1					
	Guards	sum	1					
	Transport	sum	1					
	Insurance	sum	1					
	Cost of Guarantee	sum	1					
	Financing of Retention	sum	1					
	Running costs e.g. telephone, electricity,cleaning services,printing,		1					
	stationery, etc	sum	I					
1.3								
	GENERAL COSTS							
	Allow an amount if required for expenses incurred		1					
	to tender.	sum	1					
	Loading and off loading of material and equipment	sum	1					
	Setting out of Works. Cleaning of site upon completion of Contract.	sum	1		┨───┤			
	Critical Path/Schedule.	sum	1		┨───┤			
	Marking up "As Built" drawings	sum	1		<u> </u>			
	Issuing Cadded "As Built" drawings on completion	sum sum	1		<u>├</u>			
	Test and commissioning of complete Works.	sum	1		┨────┤			
	Inspection and handing over.	sum	1		┨────┤			
	Certificate of Compliance	sum	1		<u> </u>			
	Maintenance manuals	ea	4		<u>├</u>			
		ea	4		├			
	TOTAL BILL NO 1							

Section 5.4 : Electrical Bills Of Quantities Page 9 of 16

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
A	INSTALLATION - GENERAL		<u> </u>			
	The following shall apply to all material and equipment supplied and					
	installed on site and shall conform to specifications contained in the					
	technical specification of this document.					
A.1	WIRING CHANNEL					
7.1	Galvanised metal channel complete with covers fixed at intervals not					
	exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces,					
	ends etc.					
A.2	CONDUITS & DRAW BOXES					
	Conduits cast in concrete, chased into brickwork,fixed in partitioning, roof spaces, surface on concrete or brickwork to be complete with saddles,					
	couplings and terminations to drawboxes. Draw boxes to be galvanised type.					
	All cutting and terminations to be included.					
A.3						
	Take delivery of, store, install and connect all light fittings complete with					
	lamps, gear, etc. as specified and indicated on the drawings. All fluorescent lamps to be Colour 840 unless indicated otherwise.					
A.4	CONDUCTORS					
	SABS approved PVC insulated copper conductors drawn into conduit,					
	installed in wiring trunking or power skirting.					
Λ. F.	SOCKET OUTLETS					
A.5	16A, 3-pin switched socket outlets flush mounted in drawboxes complete with					
	cover plates shall be of the "Crabtree"or "Clipsal" range which fit into					
	standard outlet boxes dedicated outlets shall have a red cover plate.Floor					
	boxes shall be of the "Cabstrut" range. or similar					
A.6	LIGHT SWITCHES 16A light switch flush mounted in draw boxes or power skirting complete with					
	cover plates shall be of the "Crabtree" or "Clipsal" range which fit into					
	standard outlet boxes.					
A.7	DISTRIBUTION BOARDS					
	Supply & Install Distribution Boards complete as in accordance with the					
	specification and drawings					
A.8	ISOLATORS					
	Isolators surface/flush mounted in 100 x 100mm x 50mm draw boxes					
	complete with coverplate as specified and indicated on drawings. All isolators					
	installed externally shall be in weather proof enclosures					
A.9	LOW VOLTAGE CABLES					
А.Э	600/1000V PVC/SWA/PVC Cables with copper conductors to SABS 1507					
	fixed vertically or horizontally on cable trays in accordance with the					
	specification and drawings. All fixings to be included.					
A.10	TERMINATIONS					
	Termination of LV cable to be as specified including connection of					
	conductors, cable lugs, captive cone glands, shrouds, etc. for the relevant cable sizes.					

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
	BILL NO 2: Small Molecule Facility					
	Small Power & Lighting					
2.1	LV cables					
	Supply and installation of the following PVC armoured SWA copper cables to					
	SANS 1507, installed on cable Trays vertically and horizontally.					
	25mm ² x 4-core	m	74			
			74			
2.2	TERMINATIONS					
L .L	Termination of LV cable as specified including connection of conductors,					
	cable lugs, captive glands, shrouds, etc. for the following cable sizes					
	25mm² x 4-core	ea	2			
		ea	2			
2.3						
2.3	EARTHING					
	Supply and install the following bare copper earth conductors		74			
	16mm ² bare earth conductor	m	74			
0.4						
2.4	TERMINATION OF EARTH CONDUCTORS					
	16mm ² bare earth conductor	ea	2			
		 	ļ			
2.5	DISTRIBUTION BOARDS & SWITCH GEAR					
	Provide an infra red scan to check all terminations in the distribution board					
	and replace missing blank circuit breaker covers. Ensure that all labelling is					
	complete and legend cards are provided and updated. Ensure that all					
	warning signs are provided. Test the earthing of DB. Ensure that cover plates					
	are properly secured. Provide a Certificate of compliance for the distribution					
	board in accordance with SANS 10142.					
	LIST OF DISTRIBUTION BOARDS					
	SDB - 13 (Retrofit as per single line diagram)	ea	1			
	SDB - DB UPS (New)	ea	1			
	SDB on First Floor small molecule (alterations)	ea	1			
2.6	STRIP OUT EXISTING ELECTRICAL SERVICES					
	Strip out existing electrical services small molecule facility 507m ²	sum	1			
2.7	UPS					
	Suply and install an Eaton 40 kVA UPS and associated batteries for 10 min					
	back-up	sum	1			
2.8	Cable Trays					
210	Heavy Duty, hot dipped galvanised Return Flange cable tray (RFHD)					
	complete with splices, nuts, bolts and washers fixed horizontally on hangers					
	or vertically up walls and risers.					
			ļ			
			-			
		m	5			
	100 mm wide x 50 mm HD cable ladder	m	5			
	100 mm wide x 50 mm HD cable ladder Horizontal bends	ea	1			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece	ea ea	5 1 0			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow	ea ea ea	1 0 1			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece	ea ea	1			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings	ea ea ea	1 0 1 5			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings 200mm Wire Mesh tray	ea ea ea m	1 0 1 5 145			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings 200mm Wire Mesh tray Horizontal Bends	ea ea ea m ea	1 0 1 5			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings 200mm Wire Mesh tray Horizontal Bends Vertical Bend	ea ea ea m	1 0 1 5 145 8 1			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings 200mm Wire Mesh tray Horizontal Bends Vertical Bend Cross pieces	ea ea ea m ea ea	1 0 1 5 145 8 1 8			
	100 mm wide x 50 mm HD cable ladder Horizontal bends Tee Piece External Elbow Cable ladder fixings 200mm Wire Mesh tray Horizontal Bends Vertical Bend	ea ea ea m ea	1 0 1 5 145 8 1 8			

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
	100mm Wire Mesh tray	m	145			
	Horizontal Bends	ea	8			
	Vertical Bend	ea	1			
	Cross pieces	ea	8			
	Tee pieces	ea	8			
	Cable Tray Hanger	ea	98			
	200mm Perforated tray	m	10			
	Horizontal Bends	ea	1			
	Vertical Bend	ea	1			
	Tee pieces	ea	0			
	Perforated Tray fixings	ea	10			
	100mm Perforated tray	m	70			
	Horizontal Bends	ea	4			
	Vertical Bend	ea	2			
	Tee pieces	ea	0			
	Perforated Tray fixings	ea	47			
2.9	Supply and Installation of the Following Circuit Breakers					
	15Amp Circuit Breaker - 5kA	ea	0			
	20Amp Circuit Breaker - 5kA	ea	0			
	40Amp Circuit Breaker - 5kA	ea	0			
	63Amp Trip Pole Circuit Breaker - 5kA	ea	1			
	80Amp Trip Pole Circuit Breaker - 10kA	ea	0			
	160Amp Trip Pole Circuit Breaker - 15kA	ea	0			
	60Amp Earth Leakage Circuit Breaker rate at 30mA	ea	0			
	40 Amp 3 pole AC3 Duty Contactor	ea	0			
2.10	WIRING CHANNEL					
	Galvanised steel channel complete with covers fixed at intervals not					
	exceeding 1.5m. Channel to be complete with all splices, bends, T-pieces,					
	ends etc.					
	(Type OL or similar manufactured channel).					
	Supply & Install					
	P9000 + Cover - suspended / in celing void for electrical services	m	145			
			<u>^</u>			
	P9000 - Tee Piece	ea	8			
	P9000 - Tee Piece P9000 Horizontal Bend	1	8 1			
	P9000 Horizontal Bend	ea ea	-			
	P9000 Horizontal Bend P9000 Vertical Bend	ea ea ea	1			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece	ea ea ea ea	1			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps	ea ea ea ea	1 0 8 0			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece	ea ea ea ea	1 0 8			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers	ea ea ea ea ea ea ea ea	1 0 8 0 98			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services	ea ea ea ea ea m	1 0 8 0 98 145			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece	ea ea ea ea ea ea m ea	1 0 8 0 98			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend	ea ea ea ea ea m ea ea ea	1 0 8 0 98 145			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend	ea	1 0 8 0 98 145 8 1 1			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces	ea	1 0 8 0 98 145 8 1 1 8			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces End Caps	ea	1 0 8 0 98 145 8 1 1 8 0			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces	ea	1 0 8 0 98 145 8 1 1 8			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces End Caps Hangers	ea	1 0 8 0 98 145 8 1 1 8 0 98			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces End Caps Hangers P2000 + Cover - suspended / in celing void for electrical services	ea ea	1 0 8 0 98 145 8 1 1 8 0 98 98			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Horizontal Bend P8000 Vertical Bend Cross Pieces End Caps Hangers P2000 + Cover - suspended / in celing void for electrical services P8000 Vertical Bend Proces End Caps Hangers P2000 + Cover - suspended / in celing void for electrical services P2000 + Cover - suspended / in celing void for electrical services P2000 - Tee Piece	ea	1 0 8 0 98 145 8 1 1 8 0 98 98 145 8			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Vertical Bend P8000 Vertical Bend Cross Pieces End Caps Hangers P8000 Vertical Bend P2000 Vertical Bend P2000 + Cover - suspended / in celing void for electrical services P2000 + Cover - suspended / in celing void for electrical services P2000 - Tee Piece P2000 - Tee Piece P2000 Horizontal Bend	ea	1 0 8 0 98 145 8 1 1 8 0 98 145 8 4			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Vertical Bend Cross Pieces End Caps Hangers P8000 Vertical Bend Cross Pieces End Caps Hangers P2000 + Cover - suspended / in celing void for electrical services P2000 + Cover - suspended / in celing void for electrical services P2000 + Cover - suspended / in celing void for electrical services P2000 - Tee Piece P2000 - Tee Piece P2000 Horizontal Bend P2000 Vertical Bend P2000 Vertical Bend	ea	1 0 8 0 98 145 8 1 1 8 0 98 98 145 8 4 1			
	P9000 Horizontal Bend P9000 Vertical Bend P9000 Cross Piece End Caps Hangers P8000 + Cover - suspended / in celing void for electrical services P8000 - Tee Piece P8000 Vertical Bend P8000 Vertical Bend Cross Pieces End Caps Hangers P8000 Vertical Bend P2000 Vertical Bend P2000 + Cover - suspended / in celing void for electrical services P2000 + Cover - suspended / in celing void for electrical services P2000 - Tee Piece P2000 - Tee Piece P2000 Horizontal Bend	ea	1 0 8 0 98 145 8 1 1 8 0 98 145 8 4			

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
	SMALL POWER INSTALLATION	•	<u> </u>			
2.11	Conduit					
	Supply and Install					
	PVC conduit installed chased in walls and in open roof spaces in the following	sizes				
	20mm PVC	m	215			
	25mm PVC	m	10			
	32mm PVC	m	0			
	50mm PVC	m	0			
			, , , , , , , , , , , , , , , , , , ,			
	Bosal conduit, installed chased in walls, surface mounted and in open roof spa	aces o	n the fol	lowing sizes		
	25mm Bosal	m	100	 		
	25mm metal Sprague (500mm)	m	0			
	25mm Bosal Threaded Dome Lid	ea	0			
		•••	-			
2.12	Outlet Boxes					
	Supply and Install					
	Galvanised steel draw and outlet boxes installed surface, in ceiling spaces or					
	chased into brickwalls, in the following sizes					
	100mm x 100mm x 50mm deep	ea	84			
	100mm x 50mm x 50mm deep	ea	04			
	100mm x 75mm x 50mm deep		0			
		ea	12			
	60mm round , 2-way Wonderboxes with cover plate	ea	0			
		ea		<u> </u>		
2.13				<u> </u>		
Z.13	SOCKET OUTLETS					
	Supply and Install					
	16A SSO - Flush in draw box	ea	0			
	16A Double SSO - Flush in draw box	ea	0			
	16A SSO + 2 x Switched ZA sockets	ea	41			
	16A SSO with half-round earth pin and red face plate in draw box	ea	18			
	16A Double SSO with half-round earth pin and red face plate in draw box	ea	0			
	16A SSO - Flush in powerskirting normal	ea	30			
	ZA Socket outlet in power skirting	ea	14			
	16A SSO - Flush in powerskirting dedicated	ea	9			
	RJ45 data outlet in power skirting	ea	1			
	RJ45 data outlet flush in drawbox	ea	1			
	RJ45 data outlet in power pole enclosure	ea	0			
	16A SSO - Normal mounted in power pole enclosure with face plate	ea	0			
	16A SSO - ZA socket mounted in power pole enclosure with face plate	ea	0			
	16A SSO - Dedicated mounted in power pole enclosure with face plate	ea	0			
	Data outlet mounted in power pole enclosure with face plate	ea	0			
	16A SSO - In weatherproof york box built in to the wall (for garden equipment)	ea	0			
	mounted	ea	0			
	RJ11 Telephone outlets in power skirting	ea	0			
	RJ11 Telephone outlets in drawbox with cover plate	ea	0			
	RJ11 Telephone outlets in power pole enclosure	ea	0			
	UK Socket to South African socket adaptor	ea	20			
	· · · · · · · · · · · · · · · · · · ·					
2.14	ISOLATORS					
	Isolators mounted complete with backbox on 100x100 outlet boxes or power s	kirtino	ı I.			
	Supply & Install the following sizes:			1		
	20A 2-pole	ea	15			
	32A 2-pole	ea	0	1		
	60A 2-pole	ea	0	1		
	20A 3-pole	ea	1			
	32A 3-pole	ea	3			
	40A 3-pole	ea	0			
	63A 3-pole	ea ea	0			
			0			
	80A 3-pole	ea	0	<u> </u>		
	125A 3-pole	ea	-			
	20A 2-pole IP65	ea	0			
		-	A			
	20A 3-pole IP65 (Welding socket)	ea	1			
		ea ea ea	1 0			

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
2.15	CONDUCTORS					
	Supply and Install					
	2.5mm ² stranded PVC insulated copper conductors	m	5 560			
	4mm ² stranded PVC insulated with copper conductors	m	20			
	6mm ² stranded PVCinsulated with copper conductors	m	0			
	10mm ² stranded PVC insulated with copper conductors	m	0			
	16mm ² stranded PVC insulated with copper conductors	m	0			
	25mm ² stranded PVC insulated with copper conductors	m	0			
	35mm ² stranded PVC insulated with copper conductors (rate only)	m	0			
2.16	INNOVATIVE WIRING					
2110	Supply and Install				ł – – †	
	2.5mm ² Twin & Earth	m	0			
	4.0 mm² Twin & Earth	m	0			
	6mm ² x 4 core surfix	m	0			
			0			
0.47						
2.17	POWER SKIRTING	_				
	Supply and Install					
	2-Compartment, 2-Cover Steel powder coated power skirting	m	44		┞───┤	
	Cover only for power skirting	m	44	 	├ ──- ├	
	Corner - 90deg. Internal	ea	3			
	Corner - 90deg. External	ea	1			
	End Caps	ea	14			
	Horizontal bend	ea	0			
2.18	LIGHTING INSTALLATION					
	Conduit					
	Supply and Install					
	PVC conduit, installed chased in walls and in open roof spaces in the					
	following sizes					
	20mm	m	65			
	25mm	m	0		ł – – †	
			Ť			
	Bosal conduit, installed chased in walls, surface mounted and in open roof s		n the fol	lowing sizes		
	20mm Bosal	m	100			
	25mm Bosal	m	0			
			0			
	25mm metal Sprague 25mm Bosal Threaded Dome Lid	m	0		+ +	
		ea	0			
2.19	Outlet Devee					
2.19	Outlet Boxes					
	Supply and Install	_				
	Galvanised steel draw and outlet boxes installed surface , Brass bushes &					
	locknuts in ceiling spaces or chased into Brickwalls, in the following sizes					
		_				
		_			↓↓	
	100mm x 50mm x 50mm deep	ea	15			
	60mm round , 1,2 or 3-way	ea	4			
	100mm x 100mm x 50mm deep	ea	0			
2.20	Light Switches(Complete with Cover Plates)					
	Supply and Install					
	16A 1 - Lever ; 1 - Way switch - flush in draw box	ea	13			
	16A 1 - Way ; dimmer switch - flush in draw box	ea	0			
	16A 1- Lever, 2-Way switch - flush in draw box	ea	0		<u> </u>	
	16A 1- Lever, Intermediate switch - flush in draw box	ea	0		† †	
	16A 2 - Lever ; 1 - Way switch - flush in draw box	ea	0			
	16A 2 - Lever, 2-Way switch - flush in draw box	ea	0		┼───┼	
	16A 3 - Lever ; 1 - Way switch - flush in draw box	ea	0		╂───┼	
		i ed				
		-	Λ		1 1	
	16A 3 - Lever ; 2 - Way switch - flush in draw box	ea	0			
		-	0 135			

ITEM	DESCRIPTION	UNIT	QTY	MATERIAL	LABOUR	TOTAL
2.21	LIGHT FITTINGS					
	Supply,take delivery, store, install the following light fittings with lamps & including the necessary supports etc. As specified and indicated on drawings. All luminiares shall be equipped with LED lamps 4000K unless					
	otherwise specified.					
TYPE	Supply & Install					
A	600 x 600 Recessed panel luminiare white 30W LED luminaire with opal diffuser. Similar and equal to Province/RubiconTHEIA 4000K c/w 3m lead and 5A plugtop	ea	83			
Ae	Same as Type A but with 1 hour emergency control gear and 2x 3m lead with 5A plugtop	ea	10			
В	600 x 600 Recessed panel luminiare white 40W LED luminaire with opal diffuser. Similar and equal to Province/Rubicon HELLAS 4000K c/w 3m lead and 5A plugtop	ea	0			
Be	Same as Type B but with 1 hour emergency control gear c/w 2 x 3m lead and 5A plugtop	ea	0			
С	Explosion proof luminiare Class 1 Div 1 Similar and equal to Province/Rubicon CHADD 67W 4000K		6			
D	Surface mounted vapour proof luminiare Province/Rubicon Metropolis 47W 4000K	ea	19			
De	Same as type D but with emergency 1 hr control gear.	ea	3			
E	Recessed downlight Province/Rubicon MARIA 80 10W 4000K c/w 3m lead and 5 A plugtop.	ea	0			
F	Recessed downlight Province/Rubicon MARIA 110 15W 4000K c/w 3m lead and 5 A plugtop.	ea	0			
	Photo cell. Similar and equal to Major Tech DNS6	еа	0			
2.22	CONDUCTORS					
	2.5mm ² stranded insulated PVC with copper conductors	m	1 992			
	4mm ² stranded insulated PVC with copper conductors	m	0			
	2.5mm² Twin & Earth	m	0			
2.23	SENSORS					
2.20	Ceiling mounted 360deg occupancy sensors 1000W Major Tech PIR 45	ea	0			
	TOTAL FOR BILL NO 2					-

CSIR - SMALL MOLECULE AND				
Bill no. 1 Preliminary & General				-
Bill no. 2 Small Power & Lighting - Small Molecule Facility				-
Provisional Amount for Earthing of Reactor Bay				8 000.00
Provisional Amount for power supply to HVAC & Ventilation				180 000.00
			Sub Total	
TOTAL CARRIED FORWARD TO MAIN CONTRACTORS BILL OF	QUANTITIES (e)	ccl VAT)		

			Du Toit Pienaar			
	Electrical Bills of Quantities		G	UANTITY SURVEYC	ORS	
ill Io				Amount		
5.4	Electrical Bills of Quantities		R			
	Main Contractors percentage for all mark-ups, attendance, etc on specialist domestic contractor		R			
	Carried Forward To Section 5.10 : Final Summary		R	-		
	CSIR Future PHARMA Facility					