

BILLS OF QUANTITIES

FOR

THE PROPOSED NEW OFFICE DEVELOPMENT

ON ERF 8681, WINDHOEK

FOR

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY

(BIPA)

MARCH 2026



+264 81 122 3224



+264 61 244701



dawidnel@dnqs.com.na



+264 61 244779



4 Heinitzburg street, Luxury Hill, Windhoek



PO Box 40113, Ausspannplatz, Windhoek

BILLS OF QUANTITIES
FOR
THE PROPOSED NEW OFFICE DEVELOPMENT
ON ERF 8681, WINDHOEK
FOR
BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY
(BIPA)

ARCHITECT

Marley Tjitjo Architects
PO Box 96088
Windhoek

Tel: 061 – 220 604
Fax: 061 – 220 605

QUANTITY SURVEYOR

Dawid Nel Quantity Surveyors Inc.
PO Box 40113
Ausspannplatz, Windhoek

Tel: 061 – 244 701
Fax: 061 – 244 779

CIVIL & STRUCTURAL ENGINEERS

Denchi Consulting Engineers
PO Box 80352
Windhoek

Tel: 061 – 228 183
Fax: 061 – 231 703

ELECTRICAL & MECHANICAL ENGINEERS

Denchi Consulting Engineers
PO Box 80352
Windhoek

Tel: 061 – 228 183
Fax: 061 – 231 703



+264 81 122 3224



+264 61 244701



dawidnel@dnqs.com.na



+264 61 244779



4 Heinitzburg street, Luxury Hill, Windhoek



PO Box 40113, Ausspannplatz, Windhoek

INDEX

ANNEXURE 'A' – MAIN BILLS OF QUANTITIES

SECTION 1 - PRELIMINARIES AND GENERAL

SECTION 2 - BUILDINGS

SECTION 3 - EXTERNAL WORKS

SECTION 4 - OTHER CONTRACTS AND SUNDRY ITEMS

ANNEXURE 'B' – ELECTRICAL INSTALLATION BILLS OF QUANTITIES

SECTION 1 - TECHNICAL SPECIFICATIONS

SECTION 2 - BILLS OF QUANTITIES PRELIMINARIES

ANNEXURE 'C' – ELECTRONIC INSTALLATIONS BILLS OF QUANTITIES

SECTION 1 - TECHNICAL SPECIFICATIONS

SECTION 2 - BILLS OF QUANTITIES PRELIMINARIES

ANNEXURE 'D' – HVAC INSTALLATIONS BILLS OF QUANTITIES

SECTION 1 - TECHNICAL SPECIFICATIONS

SECTION 2 - BILLS OF QUANTITIES PRELIMINARIES

NOTE:

TOTALS OF ANNEXURES 'B' TO 'D' ARE TO BE TRANSFERRED TO

SECTION 4 – OTHER CONTRACTS OF ANNEXURE 'A'



+264 81 122 3224



+264 61 244701



dawidnel@dnqs.com.na



+264 61 244779



4 Heinitzburg street, Luxury Hill, Windhoek



PO Box 40113, Ausspannplatz, Windhoek

Item	Description	Unit	Qty	Amount
	PRELIMINARIES AND GENERAL			
	PRELIMINARIES			
	NOTES			
	1) The "General Conditions of Contract" as included in the "Standard Bidding Documents for Open Advertised Bidding (Works)" shall be the form approved.			
	2) Bidders are referred to the above-mentioned documents for the full intent and meaning of each clause thereof (hereinafter referred to by heading and clause number only) for which such allowance must be made as may be considered necessary.			
	3) Bidders are referred to page 1/6 item F regarding the adjustment of preliminaries in any/all compensation events when pricing these preliminaries items in respect to "Fixed, Time or Value" relation.			

	GENERAL CONDITIONS OF CONTRACT			
	GENERAL			
A	Clause 1: Definitions Fixed:..... Time:..... Value:.....	Item	1	-
B	Clause 2: Interpretations Fixed:..... Time:..... Value:.....	Item	0	-
C	Clause 3: Language and Law Fixed:..... Time:..... Value:.....	Item	0	-
D	Clause 4: Project manager's decisions Fixed:..... Time:..... Value:.....	Item	0	-
				-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	GENERAL (Continued)				
A	Clause 5: Delegation Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 6: Communications Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 7: Sub-contracting Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 8: Other contractors Fixed:..... Time:..... Value:.....	Item	0		-
E	Clause 9: Personnel and Equipment Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 10: Employer?s and Contractor?s Risks Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 11: Employer?s Risks Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 12: Contractor?s Risks Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	GENERAL (Continued)				
A	Clause 13: Insurance Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 14: Site Data Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 15: Contractor to Construct the Works Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 16: The Works to Be Completed by the Intended Completion Date Fixed:..... Time:..... Value:.....	Item	0		-
E	Clause 17: Approval by the Project Manager Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 18: Safety Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 19: Discoveries Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 20: Possession of the Site Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	GENERAL (Continued)				
A	Clause 21: Access to the Site Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 22: Instructions Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 23: Appointment of the Adjudicator Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 24: Procedure for Disputes Fixed:..... Time:..... Value:.....	Item	0		-
E	TIME CONTROL Clause 25: Program Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 26: Extension of the Intended Completion Date Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 27: Acceleration Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 28: Delays Ordered by the Project Manager Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	TIME CONTROL (Continued)				
A	<i>Clause 29: Management Meetings</i> Fixed:..... Time:..... Value:.....	Item	0		-
B	<i>Clause 30: Early Warning</i> Fixed:..... Time:..... Value:.....	Item	0		-
	QUALITY CONTROL				
C	<i>Clause 31: Identifying Defects</i> Fixed:..... Time:..... Value:.....	Item	0		-
D	<i>Clause 32: Tests</i> Fixed:..... Time:..... Value:.....	Item	0		-
E	<i>Clause 33: Correction of Defects</i> Fixed:..... Time:..... Value:.....	Item	0		-
F	<i>Clause 34: Uncorrected Defects</i> Fixed:..... Time:..... Value:.....	Item	0		-
	COST CONTROL				
G	<i>Clause 35: Contract Price</i> Fixed:..... Time:..... Value:.....	Item	0		-
H	<i>Clause 36: Changes in the Contract Price</i> Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	COST CONTROL (Continued)				
A	Clause 37: Variations Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 38: Cash Flow Forecasts Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 39: Payment Certificates Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 40: Payments Fixed:..... Time:..... Value:.....	Item	0		-
E	Clause 41: Compensation Events Notwithstanding the provisions of this clause, the preliminaries shall be adjusted on the basis of fixed, time and value related items. Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 42: Tax Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 43: Currencies Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 44: Price Adjustment Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	GENERAL CONDITIONS OF CONTRACT				
	COST CONTROL (Continued)				
A	Clause 45: Retention Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 46: Liquidated Damages Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 47: Bonus Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 48: Advance Payment Fixed:..... Time:..... Value:.....	Item	0		-
E	Clause 49: Securities Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 50: Dayworks Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 51: Cost of Repairs Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 52: Labour Clause Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES				
	GENERAL CONDITIONS OF CONTRACT				
	FINISHING THE CONTRACT				
A	Clause 53: Completion Fixed:..... Time:..... Value:.....	Item	0		-
B	Clause 54: Taking Over Fixed:..... Time:..... Value:.....	Item	0		-
C	Clause 55: Final Account Fixed:..... Time:..... Value:.....	Item	0		-
D	Clause 56: Operating and Maintenance Manuals Fixed:..... Time:..... Value:.....	Item	0		-
E	Clause 57: Termination Fixed:..... Time:..... Value:.....	Item	0		-
F	Clause 58: Fraud and Corruption Fixed:..... Time:..... Value:.....	Item	0		-
G	Clause 59: Payment upon Termination Fixed:..... Time:..... Value:.....	Item	0		-
H	Clause 60: Property Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty	Amount
PRELIMINARIES AND GENERAL				
FINISHING THE CONTRACT (Continued)				
A	<i>Clause 61: Release from Performance</i> Fixed:..... Time:..... Value:.....	Item	0	-
SPECIFIC PRELIMINARIES				
B	<i>Samples of materials The contractor shall furnish at his own cost such samples of materials and specimens of colours as may be called for by the Project Manager for his approval.</i> Fixed:..... Time:..... Value:.....	Item	0	-
C	<i>Samples of workmanship and mock-ups The contractor shall furnish such samples of workmanship as may be called for by the Project Manager for his approval. Where an assembly of various elements of the buildings is required, which is not incorporated in the works, this shall be arranged by the contractor. Any cost involved shall be borne by the employer.</i> Fixed:..... Time:..... Value:.....	Item	0	-
D	<i>Ordering of materials Should the Bills of Quantities be used for ordering materials, this shall be entirely at the contractor's risk.</i> Fixed:..... Time:..... Value:.....	Item	0	-
E	<i>Enclosure of works The contractor shall provide, erect, alter as necessary, maintain and remove and make good at completion suitable hoardings complete with gantries, fans, safety screens, barriers, access gates, covered gangways, steel sections at crane lifts, splayed corners, returned ends, etc. all as necessary for the enclosure of the works and the protection of the general public and others. The contractor shall pay and recover all deposits and pay all fees and charges in connection with the hoarding and the use of the pavements throughout the whole course of the contract, all in accordance with any Act of Parliament, regulation or by-law of any local authority.</i> Fixed:..... Time:..... Value:.....	Item	0	-
				-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	SPECIFIC PRELIMINARIES (Continued)				
A	<i>Pavement crossings and parking meters The contractor shall pay and recover all deposits and pay all fees and charges in connections with and/or obtain permission for the suspension of parking facilities and for pavement or street encroachment and or crossings and the removal and eventual reinstatement of any local authority's parking meters Fixed:..... Time:..... Value:.....</i>	Item	0		-
B	<i>Special scaffolding No special scaffolding is measured as these Bills of Quantities are based on the sixth edition of the Standard System for Measuring Building Work. The Contractor shall provide, maintain and remove on completion special scaffolding for areas exceeding 5m above floor level, for use of all trades, as defined under the "Description of the Works". Fixed:..... Time:..... Value:.....</i>	Item	0		-
C	<i>Contractor's offices and sheds The contractor shall provide and maintain temporary sheds and offices for the proper storage of materials and for the use of the workmen and shall remove such temporary sheds and offices on completion. Fixed:..... Time:..... Value:.....</i>	Item	0		-
D	<i>Offices The contractor shall provide, maintain and remove on completion office accommodation for meetings held on site. The office shall be provided with tables and chairs sufficient for the maximum number of persons attending meetings and shall be kept clean. Fixed:..... Time:..... Value:.....</i>	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	SPECIFIC PRELIMINARIES (Continued)				
A	<i>Main notice board</i> The contractor shall provide, erect where directed, maintain and remove on completion the main noticeboard complying with the requirements of the Institute of Namibian Architects, with the title of the project and the names of the employer, the architect, the quantity surveyor, the consulting engineers and the contractor signwritten thereon. Fixed:..... Time:..... Value:.....	Item	0		-
B	<i>Water</i> The contractor shall provide all water for the works, including all necessary temporary plumbing, removing same and making good on completion. Fixed:..... Time:..... Value:.....	Item	0		-
C	<i>Electricity and lighting</i> The contractor shall provide all necessary electricity and artificial lighting for the works, including all necessary temporary installation work, removing same and making good on completion. Fixed:..... Time:..... Value:.....	Item	0		-
D	<i>Telephones</i> The contractor shall provide, maintain and remove on completion a PT telephone on site for use by all persons engaged upon the works and shall be entitled to recover the cost of outgoing calls from those making them. Fixed:..... Time:..... Value:.....	Item	0		-
E	<i>Toilets</i> The contractor shall provide, maintain in a thoroughly clean and tidy condition proper toilets for the use of the workmen and remove same on completion. Fixed:..... Time:..... Value:.....	Item	0		-
					-

Item	Description	Unit	Qty		Amount
A	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
A	SPECIFIC PRELIMINARIES (Continued)				
	<i>Payment of preliminaries</i>The amount to be included in each monthly certificate in respect of preliminaries costs shall be calculated from the priced items within the preliminaries section of the bills of quantities. The contractor and project manager shall agree a division of the priced preliminaries items into:1) an initial or establishment charge, payment of which shall be made to the contractor on proof that the relevant expenditures have been made;2) a monthly charge, and 3) a final or dis-establishment chargeShould the contractor and project manager be unable to agree such division then the project manager shall make a fair and reasonable division.In arriving at such division cognisance shall be taken of such factors as:1) Premiums for policies of insurance and performance guarantees being renewable annually,2)Plant, scaffolding and the like remaining the property of the contractor or the hiring company and the capital cost thereof not being treated as part of the initial charge.In the event of an extension of time for the completion of the works the monthly charge be recalculated on the same basis as originally but taking into account the revised contract period and the amounts already paid to the contractor. Fixed:..... Time:..... Value:.....				
B	<i>Protection</i> The contractor shall provide for the protection of all work for which a certificate of practical completion has not been issued and which is liable to be damaged from any cause. The contractor shall be responsible for any damage which may occur and shall make good at his own expense. Fixed:..... Time:..... Value:.....	Item	0		-
		Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	SPECIFIC PRELIMINARIES (Continued)				
A	<i>Site security The contractor shall provide all watching and lighting necessary for general site security. Fixed:.....</i> <i>Time:..... Value:.....</i>	Item	0		-
B	<i>Notice before covering work The contractor shall give adequate notice to the project manager whenever any work or materials which are subjected to the project manager's inspection or remeasurement are to be covered in or concealed in any way. In default of such notice being received such work or materials shall be uncovered and later made good at the contractor's expense. Fixed:.....</i> <i>Time:..... Value:.....</i>	Item	0		-
C	<i>Disturbance The contractor shall execute the whole of the works with a minimum of disturbance to the adjoining premises, any parts of the works already handed over and the occupants of those premises and/or parts. Fixed:..... Time:.....</i> <i>Value:.....</i>	Item	0		-
D	<i>Clearing and cleaning The contractor shall regularly clean and clear away all rubbish and excess materials as the works proceed and, on completion, leave the works in a clean and satisfactory state for immediate use and occupation. Fixed:.....</i> <i>Time:..... Value:.....</i>	Item	0		-
E	<i>Vermin The contractor shall take all necessary precautions to keep the works and site free from vermin during construction and shall leave the works vermin free on completion. Fixed:..... Time:.....</i> <i>Value:.....</i>	Item	0		-
					-

Item	Description	Unit	Qty		Amount
	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
	SPECIFIC PRELIMINARIES (Continued)				
A	<i>Workmen's Compensation Insurance. The Contractor and domestic sub-contractors shall insure workmen in terms of the Employee Compensation Act 5 of 1995 and shall deposit immediately with the Project Manager written confirmation of evidence of registration under the Workmen's Compensation Act when signing the Contract. Persons not falling under the above mentioned Act must be insured under individual Personal Accident Insurance policies to the satisfaction of the Project Manager.</i> <i>Fixed:..... Time:.....</i> <i>Value:.....</i>	Item	0		-
B	<i>Open Fires. No open fires will be permitted except in such places as are approved by the Principal Agent. Any workmen or labourers lighting fires in unauthorised places are to be immediately dismissed. Fixed:.....</i> <i>Time:..... Value:.....</i>	Item	0		-
C	<i>Blasting The Contractor shall take all responsibility during blasting operations, should any be necessary, and must observe all conditions set forth in Government and Local Authority Regulations. The use of explosives is left to the discretion of the Contractor who must indemnify the Employer against any claims for damages to persons or property on or near the site from any cause whatsoever arising out of the use of explosives. The Contractor will be held solely responsible for and must immediately make good, at his own expense, any damage that may occur through the use of explosives. Fixed:.....</i> <i>Time:..... Value:.....</i>	Item	0		-
					-

Item	Description	Unit	Qty		Amount
A	PRELIMINARIES AND GENERAL				
	PRELIMINARIES (Continued)				
A	SPECIFIC PRELIMINARIES (Continued)				
	<i>As built drawings The position of construction breaks and the extent of individual concrete pours are to be recorded by the contractor on the structural engineer's drawings and are to be submitted to the architect and the structural engineer for their records. The contractor shall furnish the Project Manager with a set of marked drawings indicating the positions of all plumbing and drainage pipe work as actually built. Fixed:..... Time:..... Value:.....</i>				
B		Item	0		-
B	<i>Protection of trees Only those trees as are indicated by the Project Manager shall be removed. All other trees are to be protected during the building operations and no workmen may damage these trees in any way. The Contractor is to note that some trees may occur within the area of building operations. Before removing such trees, the Contractor is to obtain specific instructions from the Project Manager as whether such trees may be removed or not. Fixed:..... Time:..... Value:.....</i>				
		Item	0		-
					-

[illegible]

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	ALTERATIONS AND DEMOLITIONS				
	REMOVAL OF EXISTING WORK				
	Breaking down and removing brickwork etc				
A	Half brick wall	m ²	18		-
	Taking out doors, windows, etc, including thresholds, sills, etc, setting aside for re-use and later refixing in new position				
B	Timber door and and frame size 900 x 2 100mm	No.	5		-
C	Form opening in one brick wall for to form opening size 950 x 2 100mm high	No.	1		-
	Taking down and removing roofs, floors, panelling, ceilings, partitions, etc				
D	Existing cellootex' ceiling, including cornice and bandering	m ²	192		-
E	Remove existing fascia and barge board	m	0		-
	Taking out and removing sundry joinery work, fittings, etc				
F	Kitchen counter on steel brackets	m	2		-
G	Kitchen sink cupboard size 1 440 x 600 x 900mm with single bowl sink	No.	1		-
H	Kitchen wall cupboard size 800 x 300 x 600mm	No.	1		-
I	Kitchen wall cupboard size 900 x 300 x 600mm	No.	1		-
J	BedrOom cupboard size 3 000 x 600 x 2 700	No.	4		-
	Taking up and removing wood block floor coverings, vinyl floor coverings, carpets, etc and preparing screeds for new floor coverings				
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS (Continued)			
	ALTERATIONS AND DEMOLITIONS			
	REMOVAL OF EXISTING WORK			
	<i>Taking up and removing wood block floor coverings, vinyl floor coverings, carpets, etc and preparing screeds for new floor coverings (Continued)</i>			
A	Carpets from timber floors	m ²	177	-
B	Timber skirting	m	187	-
	Taking out and removing ironmongery			
C	Ironmongery from single timber door, including door lock, handles, etc.	No.	19	-
D	Ironmongery from single timber door, including door lock, handles, etc.	No.	1	-
E	Catches and stays from existing double side hung windows, including replacing with new	No.	23	-
F	Venetian blinds	No.	23	-
	<i>Taking out and removing sanitary fittings, tanks, geysers, etc, including disconnecting from pipes, traps, etc and making good floor and wall finishes (making good tiling and paintwork elsewhere)</i>			
G	Vitreous china urinal	No.	1	-
H	Vitreous china wc	No.	2	-
I	Vitreous china wash hand basin	No.	2	-
	Taking out/off and removing glass and mirrors			
J	Remove glass from existing timber doors and windows	m ²	7	-
	CUTTING THROUGH FLOORS AND			
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	ALTERATIONS AND DEMOLITIONS				
	CUTTING THROUGH FLOORS AND				
	Cutting through:				
A	Existing existing timber floor to accomodate new half brick wall	m	6		-
	BUILDING UP OPENINGS				
	Brickwork in 7MPa concrete bricks in Class II mortar in building up openings				
B	Half brick wall	m ²	2		-
C	One and a half brick wall	m ²	4		-
	OPENINGS THROUGH EXISTING WALLS				
	Altering openings				
D	Altering opening in one brick wall where 700 x 1500mm high timber window removed to form opening and build in timber single door and frame 950 x 2100mm high overall elsewhere removed by breaking out brickwork on both sides and bottom, including prestressed concrete lintels, making good cement plaster on both sides and into reveals and with 20MPa concrete threshold with steel trowelled finish (new door and frame and making good paintwork elsewhere)	No.	1		-
	Breaking out for and forming openings through brick walls for new doors and frames, including prestressed concrete lintels, making good cement plaster on both sides and into reveals and with 20 MPa concrete thresholds with steel trowelled finish (new doors and frames and making good paintwork elsewhere)				
E	Opening for door with timber frame 950 x 2100mm high overall through one brick wall	No.	1		-
					-

Item	Description	Unit	Qty	Amount
	<u>BUILDINGS (Continued)</u>			
	ALTERATIONS AND DEMOLITIONS			
	OPENINGS THROUGH EXISTING WALLS			
	<i>Breaking out for and forming openings through brick walls for new doors and frames, including prestressed concrete lintels, making good cement plaster on both sides and into reveals and with 20 MPa concrete thresholds with steel trowelled finish (new doors and frames and making good paintwork elsewhere) (Continued)</i>			
A	Plain opening through one brickwall size 1 500 x 2 100mm high overall	No.	1	-
	EARTHWORKS			
	SUPPLEMENTARY PREAMBLES			
B	Attention is directed to the relevant sections of the Model Preambles to All Trades which forms a part of this Bill and must be read in conjunction herewith.		0	-
C	Descriptions of carting away of excavated material shall be deemed to include loading excavated material onto trucks directly from the excavations or, alternatively, from stock piles situated on the building site.		0	-
D	The quantities of excavation, filling, carting away, etc. measured are the nett volumes and the Contractor is to make allowances in his prices for the bulking of material.		0	-
	EXCAVATION, FILLING, ETC			
	Excavation in earth not exceeding 2m deep			
E	Trenches	m ³	97	-
F	Holes	m ³	4	-
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	EARTHWORKS				
	EXCAVATION, FILLING, ETC				
	Extra over excavation in earth for excavation in				
A	Soft rock	m ³	15		-
B	Hard rock	m ³	5		-
	Extra over all excavations for carting away				
C	Extra over all excavations for carting away surplus materials from the excavations and/or stock piles on site to a dump site to be located by the Contractor, including allowing for bulking of materials	m ³	20		-
	Risk of collapse of excavations				
D	Sides of trench and hole excavations not exceeding 1,5m deep	m ²	344		-
	Keeping excavations free of water				
E	Keeping excavations free of water	No	1		-
	Earth filling obtained from the excavations and/or prescribed stock piles on site compacted to 95% Mod AASHTO density				
F	Backfilling to trenches, holes, etc.	m ³	72		-
G	Under floors, steps, pavings, etc.	m ³	16		-
	Earth filling supplied by the contractor compacted to 95% Mod AASHTO density				
H	Selected layer under floors, pavings, etc. of type G5 natural gravel well watered and compacted to 95% Mod AASHTO density (Minimum CBR of 25 at 95% Mod AASHTO Density)	m ³	26		-
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	EARTHWORKS				
	EXCAVATION, FILLING, ETC				
	<i>Coarse river sand filling supplied by the contractor</i>				
A	<i>25mm Thick layer of approved clean earth filling laid over poisoned areas under floors</i>	m ²	176		-
	COMPACTION OF SURFACES				
B	<i>Compaction of ground surfaces inside trenches, including scarifying for a depth of 100mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density</i>	m ²	84		-
C	<i>Compaction of ground surfaces under floors, paving, etc., including scarifying for a depth of 150mm, breaking down oversize material, adding suitable material where necessary and compacting to 95% Mod AASHTO density</i>	m ²	176		-
	SOIL POISONING				
	<i>Soil insecticide</i>				
D	<i>Under floors, pavings, etc. including forming and poisoning shallow furrows against foundation walls etc, filling in furrows and ramming</i>	m ²	176		-
E	<i>To bottoms and sides of trenches, holes, etc.</i>	m ⁴	437		-
	CONCRETE, FORMWORK AND				
	SUPPLEMENTARY PREAMBLES				
F	<i>Attention is directed to the relevant sections of the Model Preambles to All Trades which forms a part of this Bill and must be read in conjunction herewith</i>		0		-
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	CONCRETE, FORMWORK AND				
	CONCRETE				
A	<i>Prices for concrete cast against excavated surfaces shall include for casting against all types of material in the excavations and shall include for additional concrete required in filling to irregularities.</i>		0		-
B	<i>Prices for all concrete shall include for forming shaped tops and for striking off and curing of top surfaces of concrete.</i>		0		-
C	<i>Prices for concrete in surface beds cast in panels shall include for all formwork, fillets, etc. required in forming the panels.</i>		0		-
D	<i>The costs of making, storing and testing of concrete test cubes as required under clause 7 "Tests" of SABS 1200 G shall include the cost of providing cube moulds necessary for the purpose, for testing costs and for submitting reports on the tests to the Architect. The testing shall be undertaken by an independent firm or institution nominated by the Contractor to the approval of the Architect</i>		0		-
	UNREINFORCED CONCRETE				
	Class 15MPa/19mm concrete				
E	<i>Surface blinding cast against excavated</i>	m³	0		-
	Class 20MPa/19mm concrete				
F	<i>Surface beds on waterproofing</i>	m³	16		-
G	<i>Ramp on waterproofing</i>	m³	2		-
	Class 25MPa/19mm concrete				
					-

Item	Description	Unit	Qty		Amount
	<u>BUILDINGS (Continued)</u>				
	CONCRETE, FORMWORK AND				
	CONCRETE (Continued)				
	UNREINFORCED CONCRETE (Continued)				
	Class 25MPa/19mm concrete (Continued)				
A	<i>Strip footings</i>	m³	63		-
	REINFORCED CONCRETE				
	Class 20MPa/19mm concrete				
B	<i>Steps, urinal steps, cupboard platforms, etc</i>	m³	5		-
C	<i>Column bases</i>	m³	1		-
	Class 25MPa/19mm concrete				
D	<i>Rectangular columns in foundations</i>	m³	0		-
E	<i>Slabs inclusive of beams and inverted beams</i>	m³	2		-
F	<i>Beams and isolated beams</i>	m³	0		-
G	<i>Filling to cavity of hollow wall</i>	m³	12		-
	TEST BLOCKS				
	<i>Making and testing 150 x 150 x 150mm concrete strength test cube</i>				
H	<i>Allow for the manufacture of a set of six concrete strength test cubes as described, size 150mm x 150mm x 150mm, transporting to and handing over to an approved testing authority and paying all costs and charges related thereto</i>	No	10		-
	CONCRETE SUNDRIES				
	<i>Finishing top surfaces of concrete smooth with a wood float</i>				
					-

Item	Description	Unit	Qty	Amount
	<u>BUILDINGS (Continued)</u>			
	CONCRETE, FORMWORK AND			
	CONCRETE (Continued)			
	CONCRETE SUNDRIES (Continued)			
	<i>Finishing top surfaces of concrete smooth with a wood float (Continued)</i>			
A	Surface beds, slabs, etc.	m ²	188	-
	FORMWORK			
B	<i>Descriptions of formwork shall be deemed to include use and waste only (except where described as "left in" or "permanent"), for fitting together in the required forms, wedging, plumbing and fixing to true angles and surfaces as necessary to ensure easy release during stripping and for reconditioning as necessary before re-use. The vertical strutting shall be carried down to such construction as is sufficiently strong to afford the required support without damage and shall remain in position until the newly constructed work is able to support itself. Formwork to soffits of solid slabs, etc. shall be deemed to be to slabs not exceeding 250mm thick unless otherwise described. Formwork to sides of items described as "in ground" means formwork from top of bearing level to top of surface bed. Where a height above bearing level is stated, the bearing level is taken to be the surface bed or slab level as the case may be. Formwork to sides of bases, pile caps, ground beams, etc. will only be measured where it is prescribed by the Engineer for design reasons. Formwork necessitated by irregularity or collapse of excavated faces will not be measured and the cost thereof shall be deemed to be included in the allowance for taking the risk of collapse of the sides of the excavations, provision for which is made in "Earthworks".</i>		0	-
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	CONCRETE, FORMWORK AND FORMWORK				
	SMOOTH FORMWORK (DEGREE OF				
	Smooth formwork to sides				
A	<i>Rectangular columns in foundations not exceeding 3.5m high above bearing level</i>	m ²	2		-
B	<i>Beams attached to slabs not exceeding 3,5m high above bearing level</i>	m ²	5		-
C	<i>Edges, risers, ends and reveals not exceeding 300mm high</i>	m	104		-
	Smooth formwork to soffits				
D	<i>Slabs not exceeding 250mm propped not exceeding 3.5m high above bearing level</i>	m ²	0		-
E	<i>Beams attached to slabs propped not exceeding 3.5m high above bearing level</i>	m ²	0		-
	Boxing in smooth formwork to form				
F	<i>25 x 25mm Vertical chamfer at corner</i>	m	27		-
	MOVEMENT JOINTS ETC				
	<i>Expansion joints with 6mm "Jointex" or similar and approved closed cell expanded polyethylene preformed joint filler between vertical concrete and brick surfaces</i>				
G	<i>12mm Joints not exceeding 300mm high</i>	m	172		-
	Saw cut joints				
H	<i>10mm x 40mm Saw-cut joints in top of concrete</i>	m	11		-
	REINFORCEMENT				
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS			
	CONCRETE, FORMWORK AND REINFORCEMENT			
	REINFORCEMENT			
	<i>Mild steel reinforcement to structural concrete work</i>			
A	10mm Diameter bars	TON	0	-
	<i>High tensile steel reinforcement to structural concrete work</i>			
B	12mm Diameter bars	TON	0	-
C	16mm Diameter bars	TON	0	-
	Fabric reinforcement			
D	Wire fabric reinforcement Ref No. 245 cast into concrete	m ²	31	-
	PRECAST CONCRETE			
	PRECAST CONCRETE			
	<i>Precast concrete finished smooth on exposed surfaces including bedding, jointing and pointing</i>			
E	"Wibeku Saddleback" coping size 300 x 50mm with drip grooves both sides	m	80	-
	MASONRY			
	SUPPLEMENTARY PREAMBLES			
F	<i>Prices for brickwork shall include for setting up and building windows and door frames into position in brick walls, wedging, pinning, building solid against frames, etc., bedding of roof coverings, wall plates, base plates, etc., forming ventilation flues through walls for air bricks, etc., building ends of rafters, purlins, joists, bars, pipes, bolts, etc. into or through brickwork including wrapping in polyethylene sheeting as necessary.</i>		0	-
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS (Continued)				
	MASONRY (Continued)				
	SUPPLEMENTARY PREAMBLES				
A	<i>Prices for brickwork are to include for all raking or splay cutting and waste, forming of squint quoins or birdsmouth angles and the forming of straight joints at expansion or construction joints in walls and at windows, doors or plain openings, etc.</i>		0		-
B	<i>Descriptions of recessed pointing to fair face brickwork and face brickwork shall be deemed to include square recessed, hollow recessed, weathered pointing, etc</i>		0		-
	BRICKWORK				
	FOUNDATIONS				
	<i>Brickwork in 14MPa concrete bricks in Class I mortar</i>				
C	<i>Brick pier</i>	m³	13		-
D	<i>One brick wall</i>	m ²	266		-
E	<i>Half brick wall</i>	m ²	87		-
F	<i>One and a half brick wall</i>	m ²	88		-
G	<i>370mm Hollow walls of two half brick skins with 150mm reinforced concrete infill (concrete and reinforcement elsewhere)</i>	m ²	31		-
	SUPERSTRUCTURE				
	<i>Brickwork in 7MPa concrete bricks in Class II mortar</i>				
H	<i>Half brick wall</i>	m ²	262		-
I	<i>One brick wall</i>	m ²	393		-
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	MASONRY				
	BRICKWORK				
	BRICKWORK SUNDRIES				
	Brickwork reinforcement				
A	75mm Wide reinforcement built in horizontally	m	771		-
B	150mm Wide reinforcement built in horizontally in foundation	m	2,880		-
C	150mm Wide reinforcement built in horizontally	m	740		-
D	75mm Wide reinforcement built in horizontally in foundations	m	341		-
E	225mm Wide reinforcement built in horizontally in foundation	m	1,037		-
	Prestressed fabricated lintels including any necessary temporary support				
F	110mm x 76mm Lintels in lengths not exceeding	m	31		-
	WATERPROOFING				
	DAMP-PROOFING OF WALLS AND				
	One layer of type FV damp proof course				
G	In walls	m ²	47		-
	One layer of 375 micron "Consol Plastics Hyperlastic Orange" waterproof sheeting sealed at laps with "Superstik" tape				
H	Under floors, including dressing up against walls, etc.	m ²	176		-
	Two coats "Brixal" bitumen emulsion waterproof coating				
I	On walls	m ²	277		-
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS			
	WATERPROOFING			
	WATERPROOFING TO ROOFS,			
	<i>4mm "SIKA INDEX VIS POLYESTER" or similar and plastomeric distilled polymer-bitumen waterproofing membrane, reinforced with a rot-proof "non-woven" polyester fabric stabilized with fibreglass mat applied in strict accordance with the manufacturer's instructions, including all necessary primers, etc.</i>			
A	Screeded concrete roofs	m ²	12	-
B	Extra for 150mm turnup	m	49	-
	JOINT SEALANTS ETC			
	<i>? two-part grey polysulphide sealing compound including backing cord, bond breaker, primer, etc</i>			
C	Joints	m	172	-
	ROOF COVERINGS			
	PROFILED METAL SHEETING AND			
	<i>"Global Roofing Solutions Klip-Lok 406" or similar and approved profile with 406mm cover roll-formed in continuous lengths from 0.47mm thick Zinalume AZ150 coated spelter G550 steel sheeting with a standard colour "Clean Colorbond ThermoTech" or similar and approved top coat and Shadow Grey backing coat roof sheeting fixed to steel intermediate purlins at maximum 2 000mm centres and eaves and ridge purlins at maximum 1 700mm centres using "Global Roofing Solution KL65" or similar and approved clips fixed with 10No. 16 x 16mm long self-drilling wafer head PH2 screws</i>			
				-

Item	Description	Unit	Qty	Amount
	BUILDINGS (Continued)			
	ROOF COVERINGS (Continued)			
	PROFILED METAL SHEETING AND ACCESSORIES (Continued) "Global Roofing Solutions Klip-Lok 406" or similar and approved profile with 406mm cover roll-formed in continuous lengths from 0.47mm thick Zincalume AZ150 coated spelter G550 steel sheeting with a standard colour "Clean Colorbond ThermaTech" or similar and approved top coat and Shadow Grey backing coat roof sheeting fixed to steel intermediate purlins at maximum 2 000mm centres and eaves and ridge purlins at maximum 1 700mm centres using "Global Roofing Solution KL65" or similar and approved clips fixed with 10No.16 x 16mm long self-drilling wafer head PH2 screws (Continued)			
A	Roofcoverings not exceeding 25 degrees	m ²	167	-
B	Ride capping	m	19	-
	CARPENTRY AND JOINERY			
	EAVES, VERGES, ETC			
	Everite FC77 pressed fibre-cement			
C	10 x 225mm Fascia	m	94	-
	DOORS ETC			
	Wrought meranti doors			
D	Labour-only for building in timber door door and frame eslwhere removed	No.	3	-
	FITTINGS			
	KITCHEN CUPBOARDS			
	Kitchen cupboards etc constructucted of MDF (High Density Fibreboard) with "Melawood Supagloss" or similar and approved drawer fronts and doors with soft close hinges, stainless steel type "Bar handle straight 200" handles and heavy duty ball bearing telescopic drawer slides			
				-

Item	Description	Unit	Qty	Amount
	BUILDINGS (Continued)			
	CARPENTRY AND JOINERY (Continued)			
	FITTINGS (Continued)			
	KITCHEN CUPBOARDS (Continued)			
	<i>Kitchen cupboards etc constructed of MDF (High Density Fibreboard) with "Melawood Supagloss" or similar and approved drawer fronts and doors with soft close hinges, stainless steel type "Bar handle straight 200" handles and heavy duty ball bearing telescopic drawer slides (Continued)</i>			
A	<i>Kitchen sink cupboard size 2 000 x 600 x 900mm complete with with counter suitable for single bowl sink</i>	No.	3	-
	COUNTERS			
B	<i>Provisional amount for reception counter</i>	No.	1	-
	CEILINGS, PARTITIONS AND ACCESS			
	SUSPENDED CEILINGS			
	<i>9,5mm "Rhino" or similar and approved gypsum plasterboard ceiling with taped and skimmed joints finished with gypsum skim plaster trowelled to a smooth polished surface fixed to "Donn screw up" or similar and approved grid system</i>			
C	<i>Sloping ceiling suspended not exceeding 1,0m below steel rafters and lipped channel purlins</i>	m ²	145	-
D	<i>Ceiling suspended not exceeding 1,0m below timber trusses</i>	m ²	263	-
	Cornices to suspended ceilings			
E	<i>"Donn SM25" or similar and approved wall channel secured to wall at 450mm maximum centres (Colour: White)</i>	m	0	-
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	CEILINGS, PARTITIONS AND ACCESS				
	PARTITIONS ETC				
	<i>Rhino-Drywall System No 1 steel stud partitioning with "Rhino Wallboard" on both sides</i>				
A	76mm Drywall partition 3 900mm high	m	5		-
B	Extra-over 3 900mm high partition for vertical abutments against plastered wall	No.	2		-
C	Extra-over 3 900mm high partition for plain opening for aluminium or timber door size 900 x 2 100mm high (Door elsewhere)	No.	1		-
	IRONMONGERY				
	LOCKS				
	Dormakaba				
D	"Dormakaba D02725 SS " or similar and approved stainless steel narrow stile dead lock operating with european profile cylinder	No.	19		-
E	"Dormakaba D02725 SS " or similar and approved stainless steel narrow stile dead lock operating with european profile cylinder for double door	No.	1		-
	HANDLES				
	Dormakaba				
F	"Dormakaba CB300" or similar and approved stainless steel lever handle with cylinder keyhole	No.	11		-
G	"Dormakaba DHP-430-CL-SF 170X170" or similar and approved stainless steel pull handle and plate	No.	8		-
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS (Continued)				
	IRONMONGERY (Continued)				
	HANDLES (Continued)				
	Dormakaba (Continued)				
A	"Dormakaba DHP-430-CL-SF 170X170" or similar and approved stainless steel pull handle and plate for double door	No.	1		-
	BATHROOM FITTINGS				
	Bathroom Butler				
B	"4601BRSH" Brushed stainless steel toilet paper holder	No.	6		-
C	"4604BRSH" Brushed stainless steel spare toilet paper holder	No.	6		-
D	"4610BRSH" Brushed stainless steel single robe hook	No.	6		-
E	"4640BRSH" Brushed stainless steel towel ring	No.	6		-
	Franke				
F	"Franke CNTX600" Straight grab rail	No.	6		-
G	"Franke CNTXPAR" Paraplegic grab rail	No.	6		-
H	"Franke RODX672" toilet paper holder	No.	6		-
	Taurus				
I	"Taurus 48-CL00004" Stainless steel soap dispenser	No.	6		-
J	"Taurus SD1117" Stainless steel lever control paper towel dispenser	No.	6		-
K	"Taurus SD1136 (SS)" Stainless steel paper disposer	No.	6		-
	SUNDRIES				
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	IRONMONGERY				
	SUNDRIES				
	Union				
A	Door stop	No.	21		-
	STRUCTURAL STEELWORK				
B	The Tenderer is advised to refer to the "Model Preambles for all Trades" before pricing this Bill.				
	(1)		0		-
C	Descriptions Descriptions of bolts shall be deemed to include nuts and washers. Descriptions of L-shaped and U-shaped anchor bolts shall be deemed to include bending, threading, nuts and washers and embedding in concrete. Descriptions of expansion anchors and bolts and chemical anchors and bolts shall be deemed to include nuts, washers and mortices in brickwork or concrete. All steel to be painted with red oxide primer before delivery to site. Shop drawings shall be prepared and submitted for approval prior to manufacture.		0		-
	STEEL COLUMNS AND BEAMS				
	Welded columns in single lengths with flat section base, top, bearer and connection plates bolted to ?				
D	180mm x 10mm x 44.319 kg/m Square hollow section columns	TON	1		-
	Welded beams in single lengths with flat section bearer and connection plates bolted to ? columns				
E	254 x 254 x 84.7kg/m Univeral bearing pile fixed to top of brickwall	TON	4		-
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS (Continued)			
	STRUCTURAL STEELWORK (Continued)			
	STEEL COLUMNS AND BEAMS			
	<i>Welded beams in single lengths with flat section bearer and connection plates bolted to ? columns (Continued)</i>			
A	76 x 50mm x 2.5mm x 4.77 kg/m Square hollow section beams	TON	0	-
B	100 x 50 x 2.5mm x 5.69 kg/m Rectangular hollow section rafters	TON	0	-
	Bolts to columns, beams, etc			
C	Baseplates	No.	27	-
	PURLINS, GIRTS, BRACING, ETC			
	<i>Purlins and girts bolted to steel</i>			
D	75 x 50 x 20 x 2.5mm Lipped channel section purlin	TON	1	-
	METALWORK			
	SUNDRY STEELWORK			
	<i>Purpose-made steel fireplaces, barbeques, etc.</i>			
E	'1500mm Hifire Deluxe" or similar and approved built-in braai complete	No.	1	-
	ALUMINIUM WINDOWS, DOORS, ETC			
	<i>Black powder coated aluminium windows of 'Clip 44' or similar and approved sections glazed with "Solarvue" or similar and approved grey high penetration resistant PVB laminated safety glass (minimum 6.76mm thick) and plugged to brickwork or concrete with chemical anchors</i>			
F	Window type PT99 size 900 x 900mm high	No.	3	-
				-

Item	Description	Unit	Qty		Amount
	<u>BUILDINGS (Continued)</u>				
	METALWORK (Continued)				
	ALUMINIUM WINDOWS, DOORS, ETC				
	<i>Black powder coated aluminium windows of 'Clip 44' or similar and approved sections glazed with "Solarvue" or similar and approved grey high penetration resistant PVB laminated safety glass (minimum 6.76mm thick) and plugged to brickwork or concrete with chemical anchors (Continued)</i>				
A	<i>Purpose-made window of two top opening panes and two fixed panes size 580 x 2 400mm high (W03)</i>	No.	2		-
B	<i>Purpose-made window trapezium shaped window of three fixed panes size 1 000 x 3 496mm high overall (W05)</i>	No.	1		-
C	<i>Purpose-made window of two top opening panes and two fixed panes size 750 x 2 680mm high (W06)</i>	No.	6		-
D	<i>Purpose-made window of two top opening panes and two fixed panes size 750 x 2 920mm high (W04)</i>	No.	2		-
E	<i>Purpose-made window trapezium shaped window of three fixed panes size 1 000 x 3 496mm high overall (W05)</i>	No.	2		-
F	<i>Purpose-made window of three fixed panes size 1 679 x 350mm high (W07)</i>	No.	3		-
G	<i>Purpose-made window trapezium shaped window of seven unequal fixed panes size 4 810 x 3 280mm high overall (above D07)</i>	No.	1		-
	<i>Black powder coated aluminium doors, sidelights and fanlights glazed with "Solarvue" or similar and approved high penetration resistant PVB laminated safety glass (minimum 6.76mm thick) and plugged to brickwork or concrete with chemical anchors</i>				
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS (Continued)			
	METALWORK (Continued)			
	ALUMINIUM WINDOWS, DOORS, ETC			
	<i>Black powder coated aluminium doors, sidelights and fanlights glazed with "Solarvue" or similar and approved high penetration resistant PVB laminated safety glass (minimum 6.76mm thick) and plugged to brickwork or concrete with chemical anchors (Continued)</i>			
A	<i>Single entrance door door with sidelight and toplight size 1 500 x 2 639mm high overall (D11) complete with ironmongery, floor springs, etc.</i>	No.	1	-
B	<i>Double entrance door door with two sidelightss size 3 720 x 2 400mm high overall (D07) complete with ironmongery, floor springs, etc.</i>	No.	1	-
C	<i>Single alumniun door and frame size 900 x 2 400mm high overall</i>	No.	14	-
	STEEL STRONGROOM DOORS,			
	<i>Strongroom doors etc suitable for 230mm walls fixed to brickwork or concrete</i>			
D	<i>"Falcon Record Room Door" or similar and approved record room door with a 6mm steel plate for a wall opening of 880 x 1 930mm high with one 7 lever keylock set complete with heavy duty door stop, inner release and double ended vent</i>	No.	2	-
	PLASTERING			
	SCREEDS			
	<i>Screeds wood floated on concrete</i>			
E	<i>Average 50mm thick screed to falls and cross falls</i>	m ²	12	-
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS (Continued)				
	PLASTERING (Continued)				
	SCREEDS (Continued)				
	Screeds wood floated on concrete (Continued)				
A	25mm Thick screed	m ²	290		-
	Cement plaster screeds wood floated on concrete including "Sikalite" or similar and approved powdered waterproofing admixture added as per manufacturer's instructions				
B	25mm Thick screed	m ²	172		-
	INTERNAL PLASTER				
	Compo plaster on brickwork				
C	Narrow widths	m ²	33		-
D	Walls	m ²	658		-
	Compo plaster on concrete				
E	Soffit of slabs	m ²	7		-
	EXTERNAL PLASTER				
	Cement plaster on brickwork				
F	On brickwork	m ²	828		-
G	On brickwork in foundations	m ²	377		-
	Cement plaster on concrete				
H	Projecting and isolated concrete columns and beams	m ²	4		-
	TILING				
	WALL TILING				
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	TILING				
	WALL TILING				
	600 x 600 x 7.5mm "Durham Grey " or similar and approved matt finish glazed hardbody wall tiles fixed with and including an approved tile adhesive to plaster (plaster elsewhere measured) and flush pointed with an approved waterproof cement grouting				
A	On walls	m ²	142		-
B	On narrow widths	m ²	7		-
	FLOOR TILING				
	600mm x 600mm x 10mm Approved full body porcelain floor tiles fixed with an approved high traffic adhesive to screed (screed elsewhere measured) and flush pointed with tinted waterproof jointing compound (PC = N\$450.00/m ²)				
C	On floors	m ²	462		-
D	100mm High cut tile skirting	m	618		-
E	Treads and risers of stair	m	38		-
	DIVIDING STRIPS, EDGE STRIPS, ETC.				
	Schluter Systems				
F	"RENO-AU/-AEU" Profile 10mm high	m	15		-
	Kirk Marketing				
G	M-Trim SSE250 stainless steel straight edge	m	668		-
	PLUMBING AND DRAINAGE				
	SANITARY FITTINGS				
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	PLUMBING AND DRAINAGE				
	SANITARY FITTINGS				
	Duravit				
A	"DuraSystem® WD1028000040" concealed cistern for wet installation supplied and installed complete with "Gerberit Twinline 30" flush actuator	No.	6		-
B	"No.1 DUR-21830900002" White close coupled rimless pan with back inlet complete with #0075081000 chrome water connection	No.	6		-
	Franke				
C	"Maris MRG610-37" Fraganite white single bowl inset sink size 410 x 440mm with and including 90mm stainless steel basket waste	No.	2		-
	Gerberit				
D	"Selnova Square GEB-500.310.01.1" White wall-hung basin with centre tap hole size 500 x 420mm widewith overflow and slotted pop-up waste	No.	6		-
	TRAPS, ETC.				
	Wirquin				
E	"Espace" single bowl sink trap	No.	2		-
	Gio Design				
F	"Gio Design A186-32" 32mm Round chrome bottle trap	No.	6		-
	TAPS, VALVES, ETC				
	Cobra Watertech				
G	15mm "Cobra 232/350" Angle regulating valve with 350mm service connection	No.	22		-
					-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	PLUMBING AND DRAINAGE				
	TAPS, VALVES, ETC				
	Logis				
A	"Logis HG-71090-000" chrome plated basin mixer 190 with pop-up waste	No.	6		-
B	"Logis M31 HG-71835000" Chrome sink mixer	No.	2		-
	SANITARY PLUMBING				
	PIPES				
	uPVC pipes				
C	40mm Pipes	m	40		-
D	50mm Pipes	m	40		-
	Extra over uPVC pipes for fittings				
E	40mm Bend	No.	16		-
F	40mm Access bend	No.	16		-
G	50mm Bend	No.	16		-
H	50mm Access bend	No.	16		-
I	40mm Junction	No.	16		-
J	40mm Access junction	No.	16		-
K	50mm Junction	No.	16		-
L	50mm Access junxction	No.	16		-
M	50mm Reducer	No.	16		-
	WATER SUPPLIES				
	PIPES (METHOD "B")				
					-

Item	Description	Unit	Qty	Amount
	BUILDINGS			
	PLUMBING AND DRAINAGE			
	WATER SUPPLIES			
	PIPES (METHOD "B")			
	Class 0 copper pipes			
A	15mm Pipe	m	80	-
B	22mm Pipes	m	20	-
	<i>Extra over class 0 copper pipes for capillary fittings</i>			
C	15mm Fittings	No.	40	-
D	22mm Fittings	No.	10	-
	WATER HEATERS			
	Undercounter electric water heater			
E	<i>"Kwikot Prisma Classique" or similar and approved 10litre under basin geyser</i>	No.	2	-
	GLAZING			
	GLAZING TO WOOD WITH PUTTY			
	<i>6.38mm "Solarvue" or similar and approved normal strength laminated coated safety glass</i>			
F	<i>Panes not exceeding 0.10m²</i>	m ²	7	-
	TOPS, SHELVES, DOORS, MIRRORS,			
	<i>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete</i>			
				-

Item	Description	Unit	Qty	Amount
	<u>BUILDINGS (Continued)</u>			
	GLAZING (Continued)			
	TOPS, SHELVES, DOORS, MIRRORS,			
	<i>4mm Silvered float glass copper backed mirrors with 10mm bevelled and polished edges holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork or concrete (Continued)</i>			
A	Mirror size 600 x 900mm high	No.	6	-
	PAINTWORK			
B	<i>Attention is directed to the relevant sections of the Model Preambles to All Trades which forms a part of this Bill and must be read in conjunction herewith</i>		10	-
	PAINTWORK ETC TO NEW WORK			
	ON FLOATED PLASTER			
	<i>One coat alkali resistant primer, one undercoat and two coats "Peralin PVA GRADE 1" acrylic emulsion paint</i>			
C	External smooth plastered walls	m ²	1,555	-
D	Internal smooth plastered walls	m ²	515	-
E	External smooth plastered concrete beams	m ²	4	-
F	Internal smooth plastered concrete soffits	m ²	7	-
	ON SMOOTH CONCRETE			
	<i>One coat bonding liquid and two coats exterior quality PVA emulsion paint</i>			
G	<i>On sloping top, ? edge(s) and ? projecting soffit(s) of copings ?mm girth</i>	m	80	-
	ON PLASTER BOARD			
				-

Item	Description	Unit	Qty		Amount
	BUILDINGS				
	PAINTWORK				
	PAINTWORK ETC TO NEW WORK				
	ON PLASTER BOARD				
	<i>One coat alkali resistant primer, one coat "Peralin SKIM COAT White" and two coats "Peralin PVA GRADE 1" acrylic emulsion paint</i>				
A	On ceilings and bulkheads	m ²	408		-
B	On drywall partition	m ²	37		-
	ON METAL				
	<i>Spot priming defects in pre primed surfaces with zinc chromate primer and applying one undercoat and two coats alkyd enamel paint on steel</i>				
C	Columns and beams	m ²	186		-
	ON WOOD				
	<i>Spot priming bare wood surfaces with wood primer in colours which have a value of 7 or less on the Munsell system in accordance with SABS 1091 on previously painted surfaces in bad condition</i>				
D	Fascia and barge boards	m ²	159		-
	PAINTWORK ETC TO PREVIOUSLY				
	ON FLOATED PLASTER				
	<i>One coat alkali resistant primer, one undercoat and ? coat/coats ? alkyd enamel paint in colours which have a value of 7 or less on the Munsell system in accordance with SABS 1091</i>				
E	Internal smooth plastered walls previously painted	m ²	593		-
					-

[illegible]

Item	Description	Unit	Qty		Amount
	EXTERNAL WORKS				
	BULK EARTHWORKS				
	SITE CLEARANCE, REMOVAL OF				
	Demolitions				
	Taking down and removing				
A	Carefully take-up and remove existing 60mm thick roadway concrete pavers and safely store on-site for later re-use	m ³	687		-
B	Reinforced concrete footings	m ³	15		-
C	Existing 330mm retaining wall	m ²	89		-
D	Existing diamond mesh fence 2 400mm high complete with ground and posts	m	143		-
E	Sewer pipe not exceeding 2,0m deep	m	36		-
F	Carefully take-up and remove existing precast storm water channel 300 x 150mm thick and safely store on-site for later re-use	m	29		-
G	Break-up and remove existing brick gulley size 450 x 450 x 750mm deep	No.	1		-
	Demolishing and removing				
H	Single storey garage building with pitched roof, 6,0 x 3,m on plan and 2,80m high at eaves, comprising unreinforced concrete surface bed, 220mm external walls, 110mm internal walls and corrugated iron roof covering on timber trusses (approximate dimensions given)	No.	1		-
I	Single storey ablution building with pitched roof, 3,0 x 1,50m on plan and 2,80m high at eaves, comprising unreinforced concrete surface bed, 220mm external walls, 110mm internal walls and corrugated iron roof covering on timber trusses (approximate dimensions given)	No.	1		-
					-

Item	Description	Unit	Qty		Amount
	EXTERNAL WORKS (Continued)				
	BULK EARTHWORKS (Continued)				
	<i>SITE CLEARANCE, REMOVAL OF TREES, ETC. (Continued)</i>				
	Demolitions (Continued)				
	Demolishing and removing (Continued)				
A	Single storey residential building with pitched roof, 4,50 x 3,m on plan and 2,80m high at eaves, comprising unreinforced concrete surface bed, 220mm external walls, 110mm internal walls and corrugated iron roof covering on timber trusses (approximate dimensions given)	No.	1		-
	Site clearance				
B	Digging up and removing rubbish, debris, vegetation, hedges, shrubs, bush, etc and trees not exceeding 200mm girth	m ²	1,014		-
	BULK EXCAVATION, FILLING, ETC.				
	Excavation in earth not exceeding 2m deep				
C	Open face excavation to reduce levels including forming platforms and compacting (Cut to fill)	m ³	279		-
	Earth filling obtained from the excavations and/or prescribed stockpiles on site compacted to 95% Mod AASHTO density (unless otherwise specified) in layers not exceeding 150mm thick or 100% Mod AASHTO density in case of sand				
D	Filling over site to raise levels	m ³	279		-
	Approved earthfilling supplied by the Contractor and compacted in layers not exceeding 150mm thick well watered and compacted to 95% Mod AASHTO density (Minimum CBR of 25 at 95% Mod AASHTO Density; unlessa otherwise specified)				
					-

Item	Description	Unit	Qty		Amount
	EXTERNAL WORKS (Continued)				
	BULK EARTHWORKS (Continued)				
	BULK EXCAVATION, FILLING, ETC.				
	<i>Approved earthfilling supplied by the Contractor and compacted in layers not exceeding 150mm thick well watered and compacted to 95% Mod AASHTO density (Minimum CBR of 25 at 95% Mod AASHTO Density; unlessa otherwise specified) (Continued)</i>				
A	G5 filling over site to raise levels	m³	540		-
	FENCING				
	SECURITY FENCING				
B	Hard rock	m³	34		-
	<i>"Betafence Securifor 358" or similar and approved high-security fencing panel system</i>				
C	2 400mm High fence fixed to "securifor" post (elsewhere)	m	33		-
D	Sliding vehicular gate size 4 480 x 2 340mm high complete including sliding tracks cast into top of concrete beam (beam elsewhere)	No.	0		-
	<i>"Betafence Securifor Post" or similar and approved rectangular safety post with inserts for frontal attachment of panels</i>				
E	"Betafence Securifor Post" size 80x60x2.5mm x 2 400mm high	No.	11		-
	EXTERNAL PLUMBING AND DRAINAGE				
	SOIL DRAINAGE				
	PIPES				
	uPVC pipes				
					-

Item	Description	Unit	Qty		Amount
	EXTERNAL WORKS (Continued)				
	EXTERNAL PLUMBING AND DRAINAGE				
	SOIL DRAINAGE (Continued)				
	PIPES (Continued)				
	uPVC pipes (Continued)				
A	110mm Pipes in ground not exceeding 1,0m	m	107		-
B	110mm Pipes in ground exceeding 1,0m and not exceeding 2,0m deep	m	36		-
C	110mm Pipes in ground exceeding 2,0m and not exceeding 3,0m deep	m	54		-
	Extra over uPVC pipes for fittings				
D	110mm Bend	No.	4		-
E	110mm Access bend	No.	4		-
F	110mm Junction	No.	4		-
G	110mm Access junction	No.	4		-
H	110mm Reducing junction	No.	4		-
I	110mm Double reducing junction	No.	4		-
	INSPECTION CHAMBERS, ETC.				
J					
	Excavate for and build 30Mpa/19mm stone unreinforced concrete inspection chamber size 1 200mm diameter internally with 12mm diameter mild steel reinforcement bars in cover slab with cast iron manhole cover (else where measured), exceeding 2 000mm and not exceeding 3 000mm deep to invert	No.	1		-
K	"Securex Y-560-C" or similar and approved Cast iron single seal manhole cover and frame	No.	1		-
					-

Item	Description	Unit	Qty	Amount
	EXTERNAL WORKS			
	EXTERNAL PLUMBING AND DRAINAGE			
	TAPS, VALVES, ETC.			
	Cobra watertech			
A	25 x 25mm "Universal / 1002/125-25" Brass full flow FxF gate valve	No.	1	-
B	15 x 15mm "Universal 1002/125-15" Brass full flow FxF gate valve	No.	1	-
	Kent			
C	25mm "PSM / AB813-893" 198mm Brass bodied water meter	No.	1	-
D	"DW407 / DW457" Black water meter box with blue lid	No.	1	-
	WATER SUPPLIES			
	PIPES			
	H.D.P.E. type IV pipes class 10 to SABS 533			
E	25mm Pipe	m	36	-
	Extra-over H.D.P.E. type IV pipes class 10 for compression fittings			
F	25mm Fittings	No.	15	-
	DRIVE WAYS AND PARKING			
	EARTHWORKS			
	Approved filling supplied by the Contractor			
G	Selected layer under floors, pavings, etc. of type G5 natural gravel well watered and compacted to 95% Mod AASHTO density (Minimum CBR of 25 at 95% Mod AASHTO Density)	m ³	181	-
				-

Item	Description	Unit	Qty	Amount
	Collection EXTERNAL WORKS			- - - - - -
				-

Item	Description	Unit	Qty	Amount
	OTHER CONTRACTS AND SUNDRY			
	ELECTRICAL INSTALLATIONS			
	Electrical installations			
A	Total from Annexure "A" - Electrical Installation brought forward	Item	1	-
B	Total from Annexure "B" - Electronic Installation brought forward	Item	1	-
	MECHANICAL INSTALLATIONS			
	Mechanical installations			
C	Total from Annexure "C" - HVAC Installation brought forward	Item	1	-
	OTHER SPECIALIST INSTALLATIONS			
	Landscaping			
D	Allow the Sum of N\$ 100,000.00 (ONE HUNDRED THOUSAND NAMIBIA DOLLARS NETT) for the Landscaping Installation executed complete	Item	1	-
	Signage			
E	Allow the Provisional Amount of N\$ 100,000.00 (ONE HUNDRED THOUSAND NAMIBIA DOLLARS NETT) for Signage and Artwork executed complete	Item	1	-
	Balustrade			
F	Allow the Sum of N\$ 50,000.00 (FIFTY THOUSAND NAMIBIA DOLLARS NETT) for the Balustrading Installation executed complete	Item	1	-
	Material testing			
G	Allow the Provisional Amount of N\$ 150,000.00 (ONE HUNDRED AND FIFTY THOUSAND NAMIBIA DOLLARS NETT) for Material Testing executed complete	Item	1	-

					-
Item	Description	Unit	Qty		Amount
A	OTHER CONTRACTS AND SUNDRY				
	CONTINGENCIES AND ESCALATION				
	Contingencies				
	<i>Allow the contingent sum of N\$ 500,000.00 (Five Hundred Thousand Namibia Dollars) for general contingencies to be used as directed by the Project Manager and to be deducted in part or whole if not required</i>	Item	1		-
					-

Item	Description	Unit	Qty	Amount
	Collection			
	OTHER CONTRACTS AND SUNDRY ITEMS			-
				-



**TECHNICAL SPECIFICATION FOR CONSTRUCTION AND RENOVATION OF THE
BIPA PROPERTY ON ERF 8681 WINDHOEK**

PROJECT NO: 2518

**SUPPLY, DELIVERY AND INSTALLATION OF THE ELECTRICAL
INSTALLATION WORKS**

Architect – Principal Agent

Marley Tjitjo Architects

Tel: (061) 220 604

P.O.Box 96088

WINDHOEK

Civil/Structural Engineers

Denchi Consulting Engineers

P.O. Box 80352

Tel: (061) 228 183

WINDHOEK

Quantity Surveyors

Dawid Nell Quantity Surveyors

Tel: (061) 244 779

P.O.Box 40113

WINDHOEK

Electrical/Mechanical Engineer

Denchi Consulting Engineers

Tel: (061) 228 183

P.O. Box 80352

WINDHOEK

BIDDER'S NAME :

BID AMOUNT :

DATE :

CONTENTS

<u>PART</u>	<u>DESCRIPTION</u>	<u>PAGES</u>
I	LIST OF DRAWINGS.....	1.1
II	DETAILED TECHNICAL SPECIFICATIONS.....	2.1
III	DOCUMENTS TO BE COMPLETED BY ELECTRICAL BIDDER.....	3.1
IV	BILL OF QUANTITIES.....	4.1
IIV	SCHEDULE OF RATES FOR VARIATIONS.....	8.1

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY
BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRICAL INSTALLATIONS

PART I: LIST OF DRAWINGS

The following drawings apply to this project:

1. DRAWINGS

<u>Drawing No.</u>	<u>Title</u>
2518 - E-01	LIGHTING LAYOUT
2518 - E-02	POWER LAYOUT
2518 - E-03	DB SCHEMATICS

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY**BID REFERENCE NO: W/ONB/00-00/00****CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRICAL INSTALLATIONS****PART II: DETAILED TECHNICAL SPECIFICATION****1. SCOPE OF CONTRACT**

This Contract covers in broad terms the supply, delivery, erection, commissioning, and maintenance guarantee for 12 months of the electrical installation as specified below:

- (a) Existing Building, New Building and Guard house electrical installations
- (b) Supply and installation of Distribution Boards
- (c) Supply and installation of 10kVA UPS
- (d) Supply and install wire ways for electronic services
- (e) Supply installation and commissioning of the Generator, and Change Over

All the Bidders shall submit certified proof of a valid license issued by CoW, to carry out installation works on 400V installations in the CoW operational area.

2. STANDARDS

All material and equipment supplied and/or installed under this contract shall be new and the best of their respective kinds and shall comply with the requirements laid down in the latest editions of the relevant SANS and their amendments (if any) and the requirements of this Specification.

In event of items bearing the SANS mark being available in respect of the materials and equipment required, only items bearing this mark will be acceptable. The workmanship under this Contract shall be of a high standard and to the satisfaction of the Engineer.

3. VALUE ADDED TAX, IMPORT TAXES AND DUTIES

Bidders shall allow in their tender for all VAT, Import Taxes and Duties, to be paid in respect of all items of material, labour and equipment to be supplied in terms of this Contract where relevant. The successful Bidder will be liable and responsible for paying all VAT, Import Taxes and Duties.

4. RADIO- AND TV-INTERFERENCE

All equipment installed under this contract shall comply with the Government Notice No. R.2246 and any other applicable rules and regulations in respect of radio- and TV-interferences. Any equipment found producing interference after commissioning, shall be suppressed or replaced to the satisfaction of the Engineer without any additional cost.

5. REGULATIONS

The work shall be carried out strictly in accordance with and all material and equipment supplied shall comply with the following laws and regulations where applicable.

- a) The latest edition of the "Code of Practice for the Wiring of Premises", SANS 10142 as amended.
- b) The "Electricity Supply By-Laws and Regulations" of the Supply Authority.

The Contractor will be responsible for serving all notices and paying all fees due in terms of the above laws and regulations.

6. LOCAL SYSTEM AND OPERATING CONDITIONS

All materials and equipment supplied and/or installed under this Contract shall be suitable for satisfactory operation and shall have prescribed characteristics under the following conditions:

- a) Ambient Operating Conditions
 - i) Altitude: 1 090 metres above sea level
 - ii) Minimum ambient temperature: -5 Degrees Celsius
 - iii) Maximum ambient temperature: +40 Degrees Celsius
 - iv) Humidity: Up to saturation point
- b) Electrical System Particulars
 - 11 kV-systems
 - 11 000 volt, 3-phase, 3-wire, 50 Hz AC system with LT neutral earthed.
 - LT System
 - 400V, 3 phases, 4 wires, 50Hz AC with earthed neutral

7. DRAWINGS AND INFORMATION TO BE SUBMITTED

Drawings and information to be submitted on completion of the Works:

- i) Two sets of paper prints of all the drawings showing all "as built" features of the installation.
- ii) One set of sepia prints for the drawings in (i) above.
- iii) Three complete sets of operating and maintenance manuals containing all drawings, test certificates, settings of equipment as commissioned, installation, commissioning and maintenance details, operating instructions, as well as a complete list of spare parts with reference numbers and technical description to enable the client's technical personnel to maintain service and repair the installation.

8. TEST CERTIFICATES AND TESTS

- 8.1 Where test certificates are required for individual pieces of equipment, these shall be submitted to the Engineer for approval immediately on receipt of such certificates.
- 8.2 Where witnessing of tests is required by the Engineer, arrangements shall be made by the Contractor for the Engineer to witness such tests.

9. BUILDER'S WORK

The Electrical Contractor shall be responsible for the making good of all builder's work connected with conduits, outlet boxes, distribution boards, cable entry sleeves etc., i.e. conduits installed in chases shall be covered by a layer of coarse sand and cement and backfilling around cable entry sleeves shall be compacted to 93% Mod AASHTO density.

10. DISTRIBUTION BOARDS & KIOSKS

10.1 General DB's

- i) General DB:
The main DB shall be surface mounted. The boards' locations are indicated on the power layout. The main DB shall be built to EN60439-1.
- ii) UPS Distribution Boards:
The distribution boards shall be surface mounted in the server room provided unless otherwise stated. The size of the DB's must be such that 20% spare space for future new circuits must be allowed for. All DB's are to have doors with square key or ring type locking facilities.

Plastic locking mechanisms shall not be accepted. Switchgear is to be Legrand or Merlin Gerin manufacture or equal approved. Fault levels and schematics are as indicated on relevant schematic drawings.

11. BUILDING INSTALLATIONS

11.1 Lighting

11.1.1 General

All light switches shall be 16A type Crabtree or equal approved, colour white, mounted 1200mm above finished floor level.

All light circuits shall be wired using 2,5mm² conductors. All earth wires are to be bare copper earth wires.

Schedule and mounting of luminaires:

TYPE	LUMINAIRE DESCRIPTION (OR EQUAL APPROVED)
A	RUBICON LIGHTING, Aegeon LED Downlight, non-dim, white, 100-110deg beam angle, HL, 120lm/w, 4K, 20W (or equal and approved)
A1	RUBICON LIGHTING, AEMELIA SURFACED MOUNTED LED DOWNLIGHT, 12W LED, 4000K, 960 LUMENS (or equal & approved)
B	RUBICON LIGHTING, THEI 600mmx600mm LED PANEL INCL. SURFACE MOUNT> KIT, 30W LED, 4000K (or equal & approved)
C	RUBICON LIGHTING, 1230mm LONG OPEN CHANNEL FITTING INCL. 2X18W LED TUBES, IP20, WHITE (or equal & approved)
D	BRIGHT STAR LIGHTING, PEN642 RATTAN PENDANT, 60W LED
E	SPAZIO LIGHTING, RATIONAL, RECESSED LED FOOTLIGHT, 3000K, 2W, LED
F	RUBICON LIGHTING, SATURN, 1 x 24W, LED, BULKHEAD BLACK (or equal & approved)
S	SPAZIO LIGHTING, OZO-SLIM DOWN FACE 3CCT

All light fittings shall be supplied and installed complete with lamps, ballasts control gear, diffusers, mounting rings, etc as applicable. All fixing screws shall be stainless steel or brass (none corroding).

11.2 16A Switched socket outlets

Socket outlets shall be Legrand 16A switched, colour white and mounted as indicated on the drawing. Socket outlet should be installed as specified below.

- (i) Single 16A switched socket outlet in trunking and flush
- (ii) Socket outlet with 1xschuko plug in trunking and flush

Wiring shall be 4mm² conductors and 4mm² bare copper earth wire.

All socket outlets shall be manufactured by one manufacturer to make for a standard uniform installation. Suitable socket outlet installations shall comply with SANS standard at all the times.

11.3 Telephone/Data points

The telephone installation shall be in accordance with the requirements of the specification for "Facilities for Telecommunication Services in Buildings" 1988 issued by the Namibian Post Office and Telecommunication Services. All cable sleeves and conduits are to be equipped with 1.6mm and 1.2mm diameter galvanised steel draw wires respectively.

11.3.1 Flush Wall Telephone Point

Telephone points shall comprise 100mm x 100mm flush conduit boxes complete with Legrand white cover plate fitted with RJ45 outlet. Conduits shall be 25mm dia.

11.3.2 Skirting Telephone Point

Telephone and data points in skirting trunking shall be RJ45 type Legrand Mosaic or equal approved.

11.4 Air-Conditioner Isolators

The weatherproof AC Isolators are to be Clipsal for externally mounted outdoor units. The Electrical Contractor is to ascertain the exact installation positions of outdoor units to allow installation of isolators in proximity. The AC Contractor shall also be responsible for the final AC connections.

11.5 Single phase isolator points (flush type)

Flush isolators shall be Legrand Alteur 20A double pole flush type or equal approved and conductors shall be 4mm² conductors with 4mm² bare copper earth wire for single-phase units. Isolators for larger power ratings shall be as detailed.

11.6 Power skirting

Power skirting shall be Legrand type, 2-compartment or equal approved. Dimensions shall be 65mm x 195mm. Power skirting shall be fixed to the wall and supported by the floor surface. The power skirting shall come complete with body joints, dividers, endcaps, internal angles, external angles, flat angle and joints as may be required. All sockets and outlets shall be Legrand Mosaic type and white in colour.

12. LT CABLE INSTALLATION

12.1 General

The LT cable installation shall be in accordance with the Standard Specification and SANS 10142 as amended.

12.2 LT Cable installation

All cables shall have standard copper conductors and shall be of the PVC SWA PVC type, 600/1000V Grade and shall comply with SABS 15078-1990. All cables shall be labeled with an approved tag on both sides identifying the cable by number. Cable numbers will be issued later but cable prices are to be included for the cable identification tags.

13. CABLE RACKING

14.1 Welded wire mesh

Welded wire mesh cable trays shall be hot-dipped galvanized to minimum 20 microns and complete with purpose made 45° and 90° bends and support system complete with 8mm threaded suspension rods etc. The mesh shall be 300mm & 150mm wide with a side-height of 60mm.

14.2 Channel

Cable channels shall be ceiling mounted and be supplied complete with 8mm threaded support rods and supports. The channel shall be P-8000 or P-9000 as specified, type 'O' line or equal approved.

15. UPS SYSTEMS

The UPS shall be rated 10kVA, 230V, 1 phase, as detailed.

15.1 General:

The UPS unit shall have a unit rating of 10kVA and with 30-minute battery capacity at full load. The UPS shall be manufactured to Eaton 9SX UPS or equal approved as follows:

- (i) On-line with double conversion technology.
- (ii) Input power factor greater than 0,95 and THDI less than 28% for load between 50% and 100%.
- (iii) Static and manual by-pass.
- (iv) Sealed batteries with 10-year guarantee.
- (v) In-built battery monitor.

- (vi) Temperature sensor.

Warranty:

The rectifier / charger and inverter subassemblies shall be guaranteed (parts and labour on site) for one year following the start-up date.

15.2 TECHNICAL REQUIREMENT FOR NEW UPS SYSTEMS

i) OPERATING PRINCIPLES

- a) The UPS unit shall operate in double-conversion mode (also called on-line mode), it shall be a VFI-type UPS (as per standard IEC 62040-2), made up of the components described in detail in this specification.
- b) Normal operation (normal AC source available): The rectifier supplies the inverter with DC current while the charger simultaneously floats charges the battery. The load is continuously supplied with dependable electrical power by the inverter.
- c) Operation on battery power (normal AC source not available or outside tolerances): Upon failure or excessive deterioration of the normal AC source, the inverter shall continue to supply the load from battery power without interruption or disturbance, within the limits imposed by the specified battery backup time.
- d) Battery recharges (normal AC source restored): When the normal AC source is restored, the rectifier shall again power the inverter, without interruption or disturbance to the load, while the charger automatically recharges the battery.

e) Transfer to bypass AC source:

- i) In the event of an overload exceeding system capabilities (short-circuits, heavy inrush currents, etc.) the load shall be automatically transferred, instantaneously and without interruption, to the bypass AC source, on the condition that bypass power is available and within tolerances.
- ii) To ensure transfer in complete safety, the system shall simultaneously control the static switches.

f) UPS maintenance:

- i) For maintenance purposes, all electronic components shall be accessible from the front of the UPS.
- ii) In addition, a built-in manually operated mechanical bypass system shall be installed in UPS unit.
- iii) For personnel safety during servicing or testing, this system shall be designed to isolate the UPS units while continuing to supply power to the load from the bypass AC source. Transfer to the manual bypass mode and back shall be possible without interruption to the load.
- iii) The UPS shall also include a device making it possible to isolate the rectifiers and the charges from the normal AC source.

g) Battery maintenance:

For safe maintenance on the battery of each UPS unit, the system shall include a circuit breaker to isolate the battery from the rectifier/charger and inverter. When the battery is isolated from the system, the UPS shall continue to supply the load without interruption or disturbance, except in the event of a normal AC source outage.

(i) Cold start (normal AC source absent):

The battery of each UPS shall be capable of ensuring UPS start-up even if normal AC power is not available and continuing operation within the specified back-up time (start on battery power shall be possible on the condition that the system was already started with AC power present).

15.3 SIZING AND GENERAL CHARACTERISTICS:

i) **Technology:** The UPS system shall be based on six-pack IGBT technology with built-in thermal monitoring and a high free-frequency chopping mode to dynamically optimise efficiency and power quality.

ii) **Rating:**

- The UPS system shall be sized to continuously supply the rated load, at a power factor (pf) of 0.9.
- The System shall be made up of 1 x 10kVA UPS units, with 30 minutes backup.

iii) **Battery backup time:**

- The backup time of each battery in the event of a normal AC source outage shall be 30 minutes for UPS
- The service life of each battery shall be equal to at least 10 years.
- Batteries shall be selected and size accordingly.

iiii). **Types of loads accepted:**

- If all the connected loads are non-linear (100% non-linear loads), the UPS unit shall accept high crest factors (3:1) without derating of output.
- For both linear and non-linear loads, the voltage total harmonic distortion at UPS output:
 - THDU downstream ph/ph and ph/N $\leq 1.5\%$ for linear loads.
 - THDU downstream ph/ph and ph/N $\leq 3.5\%$ for non-linear loads.

iv) **Limitation of harmonics upstream of the UPS system:**

- The UPS system shall now draw a level of harmonic currents that could disturb the upstream AC system, i.e. it shall comply with the stipulations of guide IEC 61000-3-4 (formerly IEC 1000 3-4).
- In particular, the UPS shall respect the following characteristics at the normal AC input:
 - Total harmonic current distortion (THDI) upstream of the rectifier not exceeding:
 - a) -3% at full rated load for an RCD (computer) load, at Pn,
 - b) -5% from 30% to 100% of the full rated load,
 - Input power factor (pf) greater than or equal to 0.9.
 - These performances levels, due to the "clean" input rectifier drawing sinusoidal current, limit upstream distortion and avoid oversizing of upstream equipment (cables, circuit breakers, etc.), without requiring additional filters.

i) **Efficiency:**

Overall efficiency of the UPS unit shall be greater than or equal to: 95% @ full load.

ii) **Noise level:**

The noise level, measured as per standard ISO 3746, shall be less than: 66 dBA.

15.4 AC SOURCES:

(ii) **Normal AC sources (rectifier input):** The normal AC source supplying the UPS shall, under normal operating conditions, have the following characteristics:

- Rated voltage 230V at full rated load.
- Number of phases: 1ph + earth. The neutral is not necessary.
- Frequency: 50Hz $\pm 8\%$.

- i) **Bypass AC sources (static-bypass input, if separate from rectifier input):**
 - The bypass AC source shall continue to supply the load, without interruption, if its characteristics remain within voltage tolerances (220-230volts).
 - Outside these tolerances, it shall be possible to supply the load, but in downgraded mode.

15.5 ELECTRICAL CHARACTERISTICS:

a) Rectifier and charger:

- i) **Supply:** The rectifier and charger module shall be supplied via the normal AC input. It must be capable of operating without a neutral.
- ii) **Inrush current:** A device shall be provided to limit inrush currents. When AC power fails and during genset start, the rectifier shall limit the power drawn to 70% of its rating for ten seconds. The remaining 30% shall be supplied by the battery.
- iii) **Operating mode:** The standard charger shall be sized to recharge the battery rapidly
- iv) **Battery-current limiting:** For long battery life, an electronic device shall automatically limit the charging current to the maximum value specified by the battery supplier (0.1 x C10 for a sealed lead-acid battery).
- v) **Voltage regulation:** Rectifier / Charger regulation shall consider the ambient temperature of the battery and shall ensure DC output voltage fluctuations of less than 1% irrespective of load and AC input voltage variations (within the specified limits).

b) Batteries: the UPS unit shall be equipped with its own battery as follows:

- i) Batteries in a separate cabinet:
 - Sealed lead-acid type, factory mounted and wired in a cabinet identical to that of the UPS with a service life of 10 years.
 - The battery shall be installed in a cabinet identical in appearance to that of the UPS.
 - The battery shall be sized to ensure continuity in the supply to the inverter for at least 30 minutes for the 8kVA UPS units.
- ii) Each battery shall be sized to ensure continuity in the supply of power to the corresponding inverter for the stated time, in the event of a normal AC source failure, with the inverter operating at full rated load.
- iii) Sizing calculations shall assume an ambient temperature between 0°C and 40°C.
- iv) The UPS system shall include devices to ensure:
 - Effective battery protection,
 - Battery management,

c) Inverter: the inverter shall be sized to supply a load rated at a power factor (pf) of 0.8 taking into account the characteristics presented below:

d) Output voltage:

(i) Rated voltage:

230 volts rms, adjustable via the user interface within tolerance of $\pm 3\%$ for the 8kVA UPS.

(ii) Number of phases:

1 phase + natural + earth for 8kVA.

(iii) Steady-state conditions:

The variation in the rated voltage shall be limited to $\pm 2\%$ for a balanced load between 0 and 100% of the rated power, irrespective of normal AC input and DC voltage levels, within the specified limits.

(iv) Voltage variations for load step changes:

Output voltage transients shall not exceed $\pm 1\%$ of rated voltage for 0 to 100% or 100 to 0% step loads. In all cases, the voltage shall return to within steady-state tolerances in less than 100 milliseconds.

e) Output frequency:

(i) Rated frequency: - 50Hz

(ii) **Variations:** ± 0.5 Hz

f) Synchronisation with bypass power:

(i) When bypass power is within tolerances:

To enable transfer to bypass power, the inverter output voltage shall be synchronised with the bypass source voltage whenever possible. To that end, during normal operation, a synchronisation system shall automatically limit the phase deviation between the voltages to 3 degrees, if the bypass source frequency is sufficiently stable (within adjustable tolerances of $\pm 0.5\%$ to $\pm 0.8\%$ with respect to rated frequency).

(ii) Synchronisation with an external source:

It shall be possible to synchronise with all types of external source. For example, if the bypass source is a generator set, the synchronisation tolerances shall be approximately $\pm 8\%$ (adjustable) with respect to the rated frequency.

(iii) Autonomous operation following loss of synchronization with bypass power:

When the bypass source frequency deviates beyond these limits, the inverter shall switch over to free-running mode with internal synchronisation, regulating its own frequency to within $\pm 0.1\%$. When bypass power returns to within tolerances, the inverter shall automatically resynchronise.

(iv) Variation in frequency per unit time:

During the switch to free-running mode and the switch back to synchronised mode, frequency variations per unit time (dF/dt) shall be limited to 1 Hz/s or 2 Hz/s (user defined).

g) Overload capacity:

- (i) 10 minutes at a load representing 125% of the rated load.
- (ii) 1 minute at a load representing 150% of the rated load.
- (iii) 1 second at a load representing 210% of the rated load.
- (iv) If necessary, the UPS shall operate as a generator (current limiting) with a peak capacity of 270% for 150 milliseconds, to allow highly disturbed transient operating states (high overloads, very high crest factors, etc.) without transferring the load to the bypass.

h) Static bypass: Load transfer to the static bypass:

- The UPS unit shall be equipped with a static bypass comprising a static switch. The static bypasses shall be controlled simultaneously by a built-in system. Instantaneous transfer of the load from the inverters to bypass power and back shall take place without a break or disturbance in the supply of power to the load, on the condition that the bypass source voltage and frequency are within the specified tolerances and that the inverters are synchronised.
- Transfer shall take place automatically in the event of a major overload or an internal inverter fault.
- Manually initiated transfer shall also be possible.
- If the bypass power is outside the specified tolerances or is not synchronised with the inverter, automatic transfer of the load from the inverter to bypass power shall take place after a calibrated interruption adjustable from 13 to 1000 ms.

i) Static-switch protection:

- Each static switch shall be equipped with an RC filter for protection against switching overvoltage's and lightning strikes.

j) Discrimination and short-circuit capacity:

- If the bypass power is within the specified tolerances, the presences of the static switch shall make it possible to use the short-circuit power of the bypass source to trip the downstream protection devices of common inverter output.
- To ensure tripping in a selective manner, the available power shall be sufficient to trip protection devices with high ratings (circuit breaker rated $I_n/2$ or UR fuses rated $I_n/4$, where I_n is the rated UPS-system current).

- If the bypass source is outside the specified tolerances, the UPS system on its own shall, for the same discrimination requirements, be capable of tripping circuit breakers rated $I_n/2$ or UR fuses rated $I_n/4$, irrespective of the type of short-circuit.
- Parallel; connection of a number of UPS units significantly improves discrimination.

k) System earthing arrangements:

The UPS shall be compatible with the local system earthing arrangement.

15.5 MECHANICAL CHARACTERISTICS:

(i) Mechanical structure:

The UPS and batteries shall be installed in cabinet(s) with a degree of protection IP20 (standard IEC 60529). Access to the subassemblies making up the system shall be exclusively through the front.

(ii) Scalable design (Concerns only UPS with the battery installed in a separate cabinet):

- The UPS shall be designed to allow the installed power to be easily increased on site by connection of additional UPS units, either to meet new load requirements or to exchange system availability by introducing redundancy.
- The transformation shall be possible directly on site, without returning the equipment to the factory and without causing excessive system downtime.

(iii) Dimensions:

The UPS shall require as little floor space as possible. To gain space, it shall be possible to install the UPS with the back to the wall.

(iv) Connections

- To facilitate connections, all terminal blocks must be easily accessible from the front when the UPS is installed with back to the wall. Entry of upstream and downstream power cables, as well as any auxiliary cables, shall be possible through the bottom for a false floor.
- The UPS shall be equipped with an earth-circuit connector, in compliance with the listed standards.
- The cables shall comply with the listed standard and be mounted in compliance with the stipulations. The neutral conductor shall be oversized for any third-order harmonic currents and their multiples (the size of the neutral shall be 1.5 times that of each phase).

(v) Safety:

- The equipment shall meet the requirements of degree of protection index IP21, in compliance with standard IEC 60529.
- For the safety of maintenance personnel, the cabinet shall be provided with a manually operated mechanical bypass designed to isolate the rectifier, charger, inverter and static switch while continuing to supply the load from the bypass AC source.
- It shall be possible to send to the UPS an external EPO order resulting in opening of the battery circuit breaker and the upstream circuit breaker.

(vi) BATTERY MANAGEMENT:

a) Battery meter:

A battery-meter function shall estimate the available backup time of the UPS system as a function of the battery charge and the percent load. It shall be possible to set the battery meter so that it can take into account the exact battery configuration installed with the UPS.

b) Digital battery monitoring:

- The UPS shall be equipped with a system for battery digital management.
- Based on a number of parameters (percent load, temperature, battery type and age), the system shall control the battery charge voltage and continuously calculate:
 - 1) The true available backup time,
 - 2) The remaining service life,

15.6 DISPLAYS AND CONTROLS:

(i) User interface:

The UPS operation shall be facilitated by a user interface, comprising:

- (a) A graphic display (at least quarter VGA and high resolution are preferable),
- (b) Controls,
- (c) Status indications with mimic panel,
- (d) The information and controls shall be centralised by a system (electronic board) built into one of the UPS units.

(ii) Graphic display:

The graphic display shall facilitate operation by offering the functions listed below:

(a) Operating language:

It shall be possible to display in the English language all the operating information supplied on the screens.

(b) Step by step operating help:

The graphic display shall assist the user by providing step by step help in the user's language.

(c) Animated colour mimic diagram:

The mimic diagram shall enable display of installation parameters, configuration, operating status and alarms and indication of operator instructions for switching operations (e.g. bypass).

(d) Display of measurements:

- shall be possible to display the following measurements:
- It Inverter output phase-to-phase voltages,
- Inverter output currents,
- Inverter output frequency,
- Voltage across battery terminals,
- Battery charge or discharge current,
- Rectifier/charger input phase-to-phase voltages,
- Rectifier/charger input currents,
- Crest factor,
- Active and apparent power,
- Power factor of the load,
- Battery temperature,

(c) Display of status conditions and events:

It shall be possible to display the following indications:

- Load on battery power,
- Load on UPS,
- Load on automatic bypass,
- General alarm,
- Battery fault,
- Remaining battery backup time,

- Low battery warning,
- Bypass AC source outside tolerances,
- Battery temperature,
- Additional information shall be provided in view of accelerating servicing of the system.

(d) Controls:

The UPS shall comprise the following controls:

- **Two ON and OFF buttons:** Located on the front panel of the UPS, they shall control UPS unit ON/OFF status. It shall be possible to turn OFF the UPS externally via an isolated dry contact.
- **EPO terminal block:** The UPS shall be equipped with an emergency power off terminal block for complete system shutdown following reception of an external control signal. The EPO command shall result in:
 - ✓ Shutdown of UPS units,
 - ✓ Opening of the static switch on the bypass line and of the battery circuit breaker,
 - ✓ Opening of an isolated dry contact on the programmable card,
- **Alarm reset button:** This button shall turn off audio alarms (buzzer). If a new alarm is detected after clearing the first, the buzzer sounds again.

15.7 COMMUNICATION:

- a) **Standard communication:** It shall be possible to remote the following controls, indicators and measurements. To that end, the UPS unit shall have standard equipment.
- (i) A programmable card for input/output information. This card shall provide eight dry contacts: six for incoming information and two for outgoing information.
- (ii) At least three communication ports for later addition, without interrupting operation of communication cards implementing different protocols, e.g. SNMP, J Bus/ModBus, RS232, USB, XML.

15.8 OPERATION:

15.9.1 PROTECTION:

a) UPS: The UPS shall include protection against AC-source overvoltage's (as per standard IEC 60146), excessive external or internal temperature rise and vibrations and impacts during transport.

b) Rectifier and charger: The rectifier and charger shall automatically shut down if the DC voltage reaches the maximum value specified by the battery manufacturer or if the temperature exceeds the limits specified above.

c) Inverter: Inverters shall self-protect against overloads and short-circuits, irrespective of the operation mode (AC power or battery power).

d) Batteries:

(i) **Protection against deep discharge and self-discharge:** the UPS shall comprise a device designed to protect the battery against deep discharges, taking into account the characteristics of the discharge cycles, with isolation of the battery by a circuit breaker.

(ii) **Independent regulation and monitoring system:**

- A regulation system shall regulate the battery voltage and the charge current.
- A second system, independent of the regulation, shall monitor the battery voltage and the charge current. Consequently, if the regulation system fails, the monitoring system steps in to shut down the charger and avoid overcharging.

(iii) Regulation of the battery voltage depending on the ambient temperature:

- A temperature sensor adapts the charge voltage to the ambient temperature.
- This regulation system takes into account the chemical reaction and prolongs the battery service life.
- The permissible temperature range is set in the personalisation parameters.
- An alarm shall be issued for temperatures outside the permissible range.

(iv) Self-test:

- An automatic device shall carry out Battery monitoring. Self-test intervals shall be set to one month by default, but shall be adjustable.
- This self-test system shall, where necessary, initiate indications via LEDs on the front panel or a message to a remote monitoring system.

15.9.2 MAINTAINABILITY:

Local and remote diagnostics and monitoring - E. Services: The UPS shall be equipped with a self-test system to check operation of the system each time it is started. To that end, the supply control/monitoring electronics shall offer:

- a) Auto-compensation of component drift,
- b) Acquisition of information vital for computer-aided diagnostics or monitoring (local or remote);
- c) Overall readiness for remote supervision services provided by the manufacturer.

15.9.3 STANDARD AND TESTS:

All equipment shall be designed and built-in accordance with accepted engineering practice and applicable international standards, listed below:

- a) IEC 6014A-4: UPS – Safety,
- b) IEC 62040-1 and EN 62040-1: UPS – Safety,
- c) IEC 62040-2 and EN 62040-2: UPS – Electromagnetic compatibility – (level C3 / C2 class A is optional),
- d) IEC 62040-3 and EN 62040-3: UPS – Performance,
- e) IEC 60950 / EN 60950: Safety of IT equipment, including electrical business equipment.
- f) IEC 61000-2-2: Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems.
- g) IEC 61000-3-4: Limits for harmonic current emissions (equipment input current >16 A/ph.
- h) IEC 61000-4: EMC – Electrical fast transient/burst immunity.
- i) EN 55011 and EN 55022: Limits and methods of measurement of radio interference characteristics and industrial, scientific and medical (ISM) radio-frequency equipment-Level A conducted and radiated emissions.
- j) IEC 439: Low-voltage switchgear and control gear assemblies.
- k) IEC 60529: Degrees of protection provided by enclosures (IP Code)
- l) ISO 3746: Sound power levels
- m) CE marking

What is more, the equipment must comply with environmental-protection standards, with production taking place on premises certified ISO 14001. The UPS design procedure shall be covered by an ISO 9001 quality system as well as a dependability study to ensure maximum reliability.

- c) **Certification of conformity:** The manufacturer shall provide, on request, a complete qualification file demonstrating compliance with the above standards. What is more, the indicated levels of performance shall be confirmed by certification from independent laboratories (e.g. TUV or Veritas)

15.10 BACKUP SERVICES:

- a) **Maintenance:** The supplier shall propose contracts covering two levels of maintenance.
 - 1) Level one: simple checks and settings, procedures accessible without any dismounting and involving no risk.
 - 2) Level two: preventive maintenance, check not inhibiting continuous operation of the system and preparing operations for Manufacturer services.
- b) **Technical competency:**
Customer operations: the supplier shall offer a training programme
Service personnel: the supplier shall ensure that service personnel are qualified.
- c) **System start-up:** the system and equipment shall be started up on site by the supplier or its authorised agent. The procedure shall include checks on the characteristics of the upstream and downstream protection devices and on the UPS installation parameters.
- d) **Replacement parts:** The supplier shall undertake to provide certified original replacement parts for at least ten years following the date of delivery.

16 UPS CABINET

All the UPS must be installed in the closed cabinet as specified below.

- (i) Floor-standing cabinet, 25U glass door must be installed in the UPS room
- (ii) Dimensions: 1250x600x800
- (iii) Cable Entry: Top and Bottom
- (iv) Colour: Gray
- (v) Protection Degree: IP 20

17 EARTHING AND BONDING

17.1 Bonding

All exposed metal parts including roofs, gutters, down pipes, waist pipes etc. shall be bonded in accordance with SANS 10142 as amended.

17.2 Building Earths

The building earth shall be supplied and installed by a specialist earthing company.

17.3 Distribution board Earths

Each ground level distribution board shall be earthed by using the supply cable earth conductors.

18 USER OPERATING & MAINTENANCE TRAINING

This type of training shall be provided on site by the system manufacturer/supplier and shall be scheduled as follows,

- During system commissioning
- At practical completion
- During defects liability period

Training shall involve a familiarization course for at least three User Client / MOH / MOW members with the system and basic trouble shooting procedures and techniques.

19 MANUALS, SPARES & SYSTEM SOFTWARE

Three full sets of all operating and maintenance manuals, system layouts, wiring and interconnection drawings shall be provided both in hard copy and electronic format. Drawings are to be delivered in DWG and DXF formats, AutoCAD 2000 or later releases together with a list of recommended spares.

The contractor shall also provide one (1) set of recommended (in a suitable container) as specified by the supplier/manufacturer of the Two-Way VHF Radio Communication system.

The contractor shall supply these items prior to Project Practical Completion

20 Training & Handover (O&M) Documentation:

20.1 Training:

The appointed contractor shall train a number of representatives of the client in the operation of the relevant system installed by the contractor. The training should cover the following aspects of the system.

Description of the system architecture configuration of any GUI's and operation of any controls at the displays Configuration of any databases Monitoring and acknowledging of any alarms Creating, configuring and generating trend/other reports Creating and configuring any time schedules Manually controlling any field points (if relevant) Any first-line maintenance procedures required for the hardware The contractor should provide separate printed and electronic copies of Operator's handbooks and training materials for all attendees.

20.2 O&M Manuals:

The contractor shall provide a complete set of Operation and Maintenance manuals for this project. The documentation shall include (if applicable to the system installed):

Updated design specification including listings and descriptions of any application programs

As-builts: site plans and floor plans showing labelled locations of hardware and network equipment, controllers, sensors and routes for cabling and cable containment (The engineers may assist with the "Cadding" process). Schematic diagrams of the system including logical device locations and networking addressing.

Itemised list of equipment installed indicating make, model, serial number, size and range of operation A datasheet for each item of equipment in the system Configuration data detailing any user configurable parameters and a definition of what the configuration parameter affects Instructions for installing software Instructions on report generating Instructions on using real time display Instructions on using alarm and event handlers Instructions on archiving any databases testing and commissioning results Maintenance instructions for all software and hardware fault finding guide

detailing common issues and steps for rectification Documentation should be submitted electronically on a CD.

20 MATERIAL DETAIL SPECIFICATIONS:

20.1 LV Reticulation Material Specification

ITEM	DESCRIPTION	SUPPLIER CODE/SPECIFICATION
1. 1.1 1.2	Low Voltage Cables PVCPVCSWAPVC Cables Earth continuity conductors connection cable	SANS 1507 : 1990 SANS 1411 : part 1 - 1986
2. 2.1	PVCPVCSWAPVC cable accessories Cable terminations	SANS 808 Complete with lugs and cable shroud 3 m Bimetallic
3.1 3.1.1 3.2 3.2.1 3.2.2 3.4	<u>Meters kWh</u> Three phase <u>Moulded case circuit breaker</u> 5 - 100 A, SP and TP 125 - 500 A, TP Moulded case circuit breaker - secondary	3 Phase, 230V 25/100A Actaris complete with modem CBI Type SF, 5 kA CBI Type JSO Heinemann, 2.5 kA

21 AUTOMATIC STANDBY GENERATOR SET

21.1 General

The AMF set shall be rated 60kVA prime rating super silent canopy type package unit to be installed on a slab outdoors.

The diesel engines shall comply with BS-5514 and shall be multi-cylinder, naturally aspirated or turbo-charged, four-cycle, heavy duty, water- or air-cooled units, suitable for cold starting and operating on commercial diesel fuel as available in Namibia.

The engines must be capable of producing sufficient power, at the altitude and ambient temperature at which the engines must operate to continuously drive the alternators at their rated full load outputs, or at a 10% overload for one hour in any consecutive twelve-hour period without overheating.

The sets shall be able to, within 15 seconds, accept at least 80% of the specified generator full load kVA output in one step as soon as the operating speed has been obtained. The engines shall be capable of accepting full load at rated voltage within sixty seconds of start-up.

21.2 Speed

Engine speed shall not exceed 1500 r/min and the flywheel shall be such that the cyclic irregularity meets the requirements of BS 649.

21.3 Fuel system

The fuel pumps shall be suitable to pump fuel that complies with SABS 342. Primary and secondary filters with replaceable elements shall be fitted immediately before the fuel pumps.

The filters shall be fitted with pressure differential switches ahead of the fuel pumps which shall energize a red alarm indicator light and screen on the generator control panel to indicate dirty filters when the pressure differential rises above the factory recommended value. Water traps shall be fitted upstream from the fuel filters.

21.4 Governor

The governors fitted to the engines shall control the speed to $\pm 4\%$ of the specified speed or ± 2 Hz on the frequency according to BS-2613.

When full load is disconnected/connected suddenly the temporary speed variation shall not exceed 15% of nominal value and the permanent speed variation not more than 5%.

The engines shall also be fitted with overspeed cut-outs to stop the engines should the speed rises to 10% above nominal speed. Manual adjustment of the nominal engine speed shall be possible via a linkage with an adjusting knob and locknut.

21.5 Lubrication

The engines shall have a pressure feed lubrication system which shall deliver oil to all components of the engine via full flow filters with replaceable elements, oil strainers, oil coolers and pressure relief valves. The oil pumps shall be of the positive displacement type.

Low oil pressure switches shall activate fuel cut off solenoids when the oil pressure drops below the manufacturer's minimum operating pressure and activates a red indicator light on the generator panel.

21.6 Cooling

The engines shall be water cooled. Water cooled engines must be pressurized with water circulated through the engines and radiators by centrifugal pumps. The pumps shall be of belt, gear or electrical motor driven type. The radiators shall be heavy duty, cross or vertical flow type and of adequate size to ensure adequate cooling to meet designed power output.

Cooling air shall be forced through the radiators by pusher-type fans, the capacity of the fans being sufficient to displace an adequate volume of air through the radiators against the extra resistance of the cooling air ducting between the radiators and the louvered openings in the wall of the generator room, to maintain the water within the required temperature range for adequate cooling of the engines. The fans shall be covered with suitable shrouds or cowls which shall be securely bolted to the radiators to prevent injury to maintenance personnel.

The engines shall be fitted with over-heating protection systems to shut down the engines in case of overheating of the cooling water, fan belts or fan failure and shall have low water level cut-outs in the radiator top tanks.

The flow of water through the cooling system shall be controlled by thermostats. The thermostats shall control the flow of water to ensure rapid heating of the water to a temperature suitable for the design operating conditions of the engines.

Air cooled engines shall have a suitable blower capable of displacing an adequate volume of air to maintain the engine within the designed operating temperature range. The blower shall be adequately shielded to prevent injury to maintenance personnel. The capacity of the blower shall be sufficient to allow for the extra resistance of the cooling air ducting between the engine and the louvered openings in the generator room walls.

21.7 Starting

DC starter motors shall be fitted with starters engaging on toothed gears on the engine flywheel.

Provision shall be made to prevent the starter from engaging before the engine has come to a

standstill in case of unsuccessful starting attempts.

The engine shall be able to start up during summer and winter conditions without any special ignition devices.

The generator control panel shall be equipped with a three start attempt device which shall allow up to three consecutive starting attempts, then preventing further starting attempts and activate a red indicator light, labelled start failure, on the control panel.

21.8 Battery charging

The engines shall not be fitted with battery charging alternator. Batteries shall be charged via mains solid state trickle chargers. The Trickle chargers shall be fitted in the control panels and shall form part of this contract.

21.9 Air Cleaners

The engines shall be fitted with Donaldson type, heavy duty, dry element two, stage air cleaners. The air cleaners shall be complete with indicators to indicate the air cleaner element condition.

21.10 Instruments

All instruments shall be clearly marked with the normal operating range. The following instruments shall be fitted in the generator control panel.

- i) Oil temperature EC
- ii) Oil pressure kPA
- iii) Cooling water temp EC
- iv) A hour meter with five-digit display
- i) Engine tachometer calibrated in r/min
- vi) Centre zero Ammeter, Battery charging
- vii) Battery Voltmeter
- viii) Exhaust temperature EC

21.11 Generator

The generator shall be rated 400V, three phase and be able to supply 55kVA prime at elevation in Windhoek at an ambient temperature of 30°C. The generator shall be capable of sustaining a 10% overload at rated voltage for one hour in any consecutive twelve-hour period in accordance with to BS 649.

The generators shall be drip proof, fan ventilated, brushless and screen protected and constructed in accordance with BS-2613. Insulation shall be Class E.

The generators shall be self-exciting and be able to control the output voltage within $\pm 2,5\%$ between full load and no-load at PF of 0,8 lagging to unity, including speed variation of $\pm 4\%$ from rated speed.

The generator shall be able to generate the specified output at the specified altitude and temperature at 0,8 power factor and at rated speed.

An automatic voltage regulator with manual operated trimmer shall be installed in the generator control panel.

When full load is applied, the voltage shall recover to $\pm 2,5\%$ of rated voltage within 300msec. and the transient voltage dip shall not exceed 15% of rated voltage.

The generator shall be able to handle an overload 2,5 times the rated output for at least 10 seconds at close to zero power factor.

The generator shall be adequately suppressed against radio and television interferences.

21.12 Coupling

The generator-engine coupling shall be suitably protected to prevent injury of maintenance staff.

21.13 Mounting

The Generator and engine shall be mounted on a common rigid I-beam frame. Anti-vibration mountings shall be used to mount the engine and alternator to the mounting frame.

The frame shall have factory made holding-down bolt holes.

21.14 Battery

The battery shall be maintenance free type located next to the generator.

The battery banks shall either be 12V or 24V with sufficient capacity for six consecutive non-start start-ups, each 20 sec long at the startup speed of the engines. The battery is to be kept charged by solid state chargers that automatically adjust the rate of charge.

21.15 Exhaust system

The total installation shall operate with minimum noise and vibration. The installation shall meet the requirements of SABS 083, and the noise shall not exceed NC 50, 3 metres from the building. As this project is in a noise-sensitive eco-environment, the generator sets must both be sound attenuated and operate at between 69 and 73 dBA at full load at 7 metres.

The engine shall be fitted with a domestic or hospital type low noise silencer.

The exhaust pipe shall be so designed that rainwater, or birds cannot enter the system.

21.16 Storage of fuel

The generator shall have an in-built fuel tank allowing a minimum of 16 hrs continuous operation. All pipework, filters etc shall be standard.

In addition, a 2000 litre outdoor diesel tank is to be supplied and installed complete with all piping to the generators, tank shall be installed as to allow natural flow of diesel to the generator without the need of pumps.

21.17 Generator Control Panel

These panels shall be sheet steel wall mounted boards with IP55 protection.

The control panel shall provide the following control functions:

- 1) An automatic mains failure control panel shall be provided to start the Generator automatically on a Mains failure and adjustable load transfer time of 1 min to 15 min and engine shut down after load transfer delay time.
Change over contactors shall be mechanically and electrically interlocked.
- 2) Three starts attempt before lock-out.
- 3) Urgent alarms shall be blocked off during starting
- 4) Generator running shall be indicated when generator voltage is more than 30% of rated voltage or if applicable when the tachometer generates the run signal required. A potential free contact shall also be prewired for telemetry signals.
- 5) Auto-off-test selector switch.
- 6) Emergency stop push button with key operated release.
- 7) Battery charger.

The following engine protection shall be provided for each generator set.

- 1) Low oil pressure, engine shut down, alarm.
- 2) Low water level in radiator, engine shut-down, alarm.
- 3) High water temperature, engine shut-down, alarm.

- 4) Dirty fuel filters or blocked filters, alarm.
- 5) Over/under speed engine shut-down, alarm.
- 6) Fan belt drive failure, alarm.
- 7) Day tank level low (10% - engine shut-down, alarm).
- 8) Low battery voltage, alarm.

A red indicator light shall be provided for each fault as well as a common alarm potential free contact prewired for telemetry signals.

The following instruments shall also be mounted on the generator control panel.

All instruments shall be 72 mm square.

- 1 x Voltmeter - 0 - 500V plus seven position selector switches
- 3 x Ammeters - Maximum demand instantaneous - CT operated
- 1 x Frequency meter, Reed type
- 1 x Hour counter per engine
- 1 x Circuit breaker rated for Generator size
- 1 x Isolator rated for Mains supply cable
- 1 x Set of automatic change-over contactors, electrically and mechanically interlocked.

21.18 Electrical

All control wiring shall be carried out using 1,5mm² PVC insulated conductors. A set of outgoing terminals shall be provided in each panel associated with the generator set. All cables shall enter each panel from the bottom. The generator supply cables shall be rated to match the maximum output of the alternator.

The generator installation shall be earthed in accordance with the SABS 0142 as necessary.

The earth continuity conductors shall be suitably crimped to lugs before being secured using brass bolts and nuts. The generator control panel earth bar shall be connected to the following: -

- i) The generator neutral
- ii) The generator mounting frame
- iii) All non-current carrying metal parts
- iv) The Main DB earth bar.

All earth continuity conductors will be of stranded copper conductors. Aluminium conductors are not acceptable.

21.19 Sound attenuators

The diesel generator set shall be a super silent soundproofed machine of the weatherproof canopy type.

21.20 Commissioning and hand-over

The Tenderer is to allow in his tendered price for the training of the users staff members in the operation and normal servicing of the generator sets.

Before hand-over, the tenderer shall carry out the following: -

- ii) Once the successful tenderer has satisfied himself that the works are complete in every detail as specified in the contract documents, he shall inform the Engineer in writing of a proposed date for a first delivery inspection. The Engineer shall be given at least 7 days notice of such a date.

The Engineer will confirm in writing the acceptability of such a date.

- ii) All maintenance and operating manuals, drawings, spare fan belts, filters etc. shall be handed over to the Engineer before the first delivery inspection takes place.
- iii) At the inspection the successful tenderer shall carry out operational start-up/shut-down and full load tests. All equipment required for the tests shall be provided by the successful tenderer at his own expense. These tests shall be carried out at the tenderers premises before delivery to site.

Any defect or items requiring attention will render the first delivery inspection invalid and the tenderer will be required to rectify the defects or items before again arranging for a first delivery inspection.

- iv) The Engineer reserves the right to inspect any part of the works at any time during the contract period.
- vi) Final delivery inspection will be arranged on completion of the works on the same basis as for first delivery inspection. Final delivery will not be carried out before the last day of the guarantee period. The completion certification will be issued to the tenderer only after the satisfactory completion of the first and final delivery inspections.

22 TRAINING AND HANDOVER (O&M) DOCUMENTATION

22.1 Training.

The appointed contractor shall train a number of representatives of the client in the operation of the relevant system installed by the contractor. The training should cover the following aspects of the system.

Description of the system architecture configuration of any GUI's and operation of any controls at the displays configuration of any data bases monitoring and acknowledging of any alarms creating, configuration and generating trend/other reports creating and configuration any field points (if relevant) any first-time maintenance procedures required fro the hardware the contractor should provide separate printed and electronic copies of Operator's Handbooks and Training Materials for all attendees.

22.2 Maintenance Manuals.

The appointed contractor shall provide a complete set of Operation and Maintenance manuals for

this project. The documentation shall include (if applicable to the system installed). Updated design specification including listings and descriptions of any application programs.

As-builds: site plans and floor plans showing labelled locations of hardware and network equipment, controllers, sensors and routes for cabling and cable containment (the engineers may assist with the Cladding process. Schematic diagrams of the system including logical device locations and networking addressing.

Itemised list of equipment installed indicating make, model, serial number, size and range of operation A datasheet for each item of equipment in the system Configuration data detailing any user configurable parameters and a definition of what the configuration parameter affects Instructions for installing software Instructions on report generating Instructions on using real time display Instructions on using alarm and event handlers Instructions on archiving any databases testing and commissioning results Maintenance instructions for all software and hardware fault finding guide detailing common issues and steps for rectification Documentation should be submitted electronically on a USB.

23 Signage:

Contractors shall make provision for the procurement and fixing of all mandatory notices. Signage shall be provided in the areas as designated by the Engineers.

The following signage listing is intended as a guide:

- Water extinguisher prohibition signs,
- Notices prohibiting unauthorised persons from handling or interfering with equipment,
- Notices containing the procedure in case of fire,
- Directions for the resuscitation of persons suffering from the effects of electrical shock,
- Signage prohibiting unauthorised entrance in areas of operational MV equipment Single Line diagrams or drawings,

24 Maintenance and Guarantee Period:

The entire installation shall be guaranteed for Twelve (12) months on all parts and workmanship. Date of commencement of guarantee period shall start after the Practical completion date.

The installation shall be maintained for the same period of twelve months, and the cost of the maintenance shall be included in the tendered price. The Contractor shall also allow for two complete simulated fire drills carried out with the tenant staff at times to be fixed within the guarantee period.

Both fire drills shall be organised and conducted by an experienced and competent instructor of the Contractor's staff.

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY**BID REFERENCE NO: W/ONB/00-00/00****CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRICAL INSTALLATIONS****PART III: FORMS TO BE COMPLETED BY BIDDER**

- A INFORMATION ABOUT THE BIDDER
- B AUTHORITY FOR SIGNATORY
- C SCHEDULE OF WORK EXECUTED BY THE BIDDER
- D SCHEDULE OF WORK TO BE SUB-LET
- E AUTHORITY TO WORK ON LV (400V) INSTALLATIONS IN OSHAKATI

A. INFORMATION ABOUT THE BIDDER

1. IF THE BIDDER IS A COMPANY

1.1 Directors of the Company

List the Directors of the Company, their nationality together with the date on which each Director has been appointed:

<u>Name of Director</u>	<u>Date of Appointment</u>	<u>Nationality</u>
.....		
.....		
.....		
.....		

1.2 Shareholding

(a) List all the shareholders of the Company:

<u>Full names</u>	<u>Nationality</u>
.....	
.....	
.....	
.....	

(b) List of all companies of which the Company is a shareholder:

.....

.....

.....

.....

2. IF THE BIDDER IS CLOSED CORPORATION

List the members of the Closed Corporation, their nationality including, their date of appointment as well as their percentage interest in the C.C.

<u>Name of Member</u>	<u>Date of Appointment</u>	<u>% Interest in C.C.</u>	<u>Nationality</u>
.....			
.....			
.....			

3. IF THE BIDDER IS A PARTNERSHIP

List the partners in the Partnership, the date of accession as well as each one's profit/loss distribution ratio.

<u>Name of Partner</u>	<u>Date of Accession</u>	<u>Profit/loss Distribution Ratio</u>	<u>Nationality</u>
.....			
.....			
.....			
.....			

4. IF THE BIDDER IS AN INDIVIDUAL

Supply the full names, and I.D. number of the Bidder:

<u>Full names</u>	<u>I.D. Number</u>	<u>Nationality</u>
.....		
.....		
.....		

SIGNED ON BEHALF OF BIDDER:

B. AUTHORITY FOR SIGNATORY

Signatories for Companies, Partnerships or Closed Corporations must establish their authority by attaching a copy of the relevant resolution of their Board of Directors, Members or Partners duly signed and dated. An example is shown below for a Company:

By resolution of the Board of Directors at a meeting on.....

.....2026.

at

Mr.....

whose signature appears below, has been duly authorized to sign all documents in connection with this

Bid Reference No.

on behalf of (block capitals)

SIGNED ON BEHALF OF COMPANY:

IN HIS CAPACITY AS:

DATE:

SIGNATURE OF SIGNATORY:.....

WITNESSES: 1.

2.

C. SCHEDULE OF WORK EXECUTED BY THE BIDDER**1. COMPLETED CONTRACTS**

The Bidder must insert in the spaces provided below a list of work completed by him during the past five (5) years. Only work of a similar nature to this Contract must be listed.

EMPLOYER	CONSULTING ENGINEER NAME AND TEL.	NATURE OF WORK	YEAR COMPLETED

2. CURRENT CONTRACTS

The Bidder must insert in the spaces provided below, a list of work at present under construction by his firm.

EMPLOYER	CONSULTING ENGINEER NAME AND TEL.	NATURE OF WORK	VALUE OF WORK	EXPECTED COMPLETION DATE

SIGNED ON BEHALF OF BIDDER:

D. SCHEDULE OF WORK TO BE SUB-LET

The Bidder shall list below items of specialized work on this Contract which he intends to sub-let.

If the Bidder intends to carry out specialized work himself, he shall state this.

The acceptance of this Bid shall not be construed as approval of the work to be sub-let. Should any or all of the Sub-contractors not be approved after acceptance of Quotation, this shall in no way invalidate this Bid and the quoted rates and prices for the various items of work shall remain final and binding even in the event of a Subcontractor not listed below, being approved by the Engineer.

ITEM	DESCRIPTION OF WORK	NAME OF SUBCONTRACTOR

SIGNED ON BEHALF OF BIDDER:

E. AUTHORITY TO WORK ON MV (11 kV) & LV (400V) INSTALLATIONS IN WINDHOEK.

I herewith certify that I

representative of (bidder)

.....

of (address)

.....

.....

telephone number

telex number

fax number

am authorised by City of Windhoek to carry out MV (11kV) and LV 400V installation works in Windhoek.

I further certify that I ascertained myself of all local conditions which may affect the work or the cost thereof and that I am satisfied with the description of the works and that I fully understood the work included in the contract as specified or implied.

A copy of the licence is attached. Yes / No

SIGNED ON BEHALF OF BIDDER:

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY
BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRICAL INSTALLATIONS

PART IV: BILL OF QUANTITIES

The quantities in these Bills of Quantities are not to be used for ordering materials.

The Bill of Quantities forms part of and must be read in conjunction with the specification, which contains the full description of the work described in the Bills of Quantities, reference should be made to the specification for the full meaning or description of work to be done and materials and equipment to be used in this service.

The total bid price on the bid Form shall constitute the contract price of the successful bidder. Bidders are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.

No alteration, erasure or addition is to be made in the text of the Bill of Quantities. Should any alteration or erasure be made, it will not be recognized but the original wording of the Bills of Quantities will be adhered to.

The priced Bill of Quantities of the successful bidder will be checked, and the Engineer reserves the right to call for adjustments to any individual price and to rectify the discrepancy.

Variations in the scope and extent of the work included in the Bill shall be allowed to meet the Employer's requirements and shall be measured and costed at rates entered in the Bill, where appropriate, and shall form additions to or deduction from the total of the Bill.

Any items or variations for which rates have not been included in the Bill shall be agreed and priced as non-scheduled items in accordance with the provisions of the contract.

The rules covering the extent and cost of the variation shall be those provided for in the form of conditions of contract.

Unless a separate rate for the supply and for the installation of any item is specifically called for, the supply and installation costs of any item shall be fully included in the unit price.

The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, patterns, models and templates, plant, temporary works, return of packing's, establishment charges, profit and all other obligations arising out of the conditions of contract.

All fittings and accessories always include the connections thereto.

All measurements are net, unless otherwise stated, and tenders must allow in their rates of wastage.

The quantities and rates included for day work shall form part of the bid price, but bidders shall note that
 \\dnqshost\ProjectData\2025 Projects\2025-04 - BIPA Revised concept\February 2026\BIPA - M&E Bid
 Documentation\Electrical\2518 - Elec Tech.Spec.doc

this item must be regarded as provisional and will only be payable to the contractor if and when a written order to this effect has been issued.

All provisional sums shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

All taxes, duties both import and/or customs, and any other surcharges, surtaxes and charges shall be included in all prices given in this priced Bill of Quantities.

VAT is to be added only in the price summary of the Bill of Quantities.

4A**SCHEDULE OF TECHNICAL DETAIL**

The Tenderer shall complete the following schedule as part of his Tender submission.

ITEM	DESCRIPTION	MANUFACTURER
1	Distribution Boards	
2	400V Switchgear	
3	1000V PVC SWA PVC	
4	Telephone Points	
5	Socket outlets	
6	Geyser outlets	
7	TV outlets	
8	Light switches	
9	Light fittings type: A A1 B C D E	
10	F S Weatherproof Isolators	
11	Power Skirting	
12	Floor boxes	
13	P-9000 Channel	
14	Welded wire mesh cable tray	
15	Heavy duty cable tray	
16	UPS System	
17	UPS Batteries	
18		

19	Mini-Sub 11kV Switchgear	
20	MV Cable	
21	Generator	
22	Change over	
23		
24		
25		
26		

.....
SIGNATURE OF BIDDER

.....
DATE

PART IV: SCHEDULE OF RATES FOR VARIATIONS

4.1 GENERAL

4.1.1 The rates entered in this schedule shall serve unaltered to calculate the value of variation orders (additions or omissions) issued in terms of the Contract.

4.1.2 The rates entered shall exclude the Main/Principal Contractor's discount.

4.1.3 These rates shall include the following items necessary for the supply, delivery, handling and installation of all applicable equipment:

Nett cost of material.

- Profit, storing cost, handling charges, etc. for material.
- Nett costs of labour.
- Labour overheads and profit on labour.
- General sales tax and any other duties payable.
- Attributable overhead costs.

4.1.4 As the rates entered will only be used to calculate the value of variations, **the Bidder shall complete only list those rates of items to be used under this contract.**

4.2 PROFIT ON MATERIAL FOR OMISSION AND ADDITIONS: (%)

The following percentage profit will be required on all materials for additions or omissions not covered by any other section of this schedule. This percentage shall include all direct overheads, handling charges, etc.

Nett percentage: -----%

4.3 RATES FOR ADDITIONAL LABOUR: (N\$/h)

These rates shall be applied to determine labour costs not covered by any of the other sections of this schedule.

<u>Supervisor/ Foremen</u>	<u>Qualified artisan</u>	<u>Appren- tice</u>	<u>Conduit installer</u>	<u>Labourer</u>
Normal rate	-----	-----	-----	-----
Overtime (week)	-----	-----	-----	-----
Saturday time	-----	-----	-----	-----
Sunday time	-----	-----	-----	-----

4.4 RATES FOR TRANSPORT : (N\$/km)

Rates shall include the cost of a licensed driver fuel, oil, maintenance, etc.

<u>Vehicle capacity</u>	<u>Rate per kilometer</u>
Up TO 1500 kg	-----
1600 to 3000 kg	-----
3100 to 7000 kg	-----

SIGNATURE OF BIDDER : _____ DATE: _____

NAME OF BIDDER : _____

ADDRESS : _____

: _____

: _____

TELEPHONE NUMBER : _____

FACSIMILE NUMBER : _____

[illegible]

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

Sec. 3: 1000V Cable Reticulation

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	1000V Cable Reticulation						
3.1	Supply and delivery and installation of 1000V PVC SWA PVC cables (copper)						
	i) 35mm ² x 4C (SPLIT BOX)	m	35				
	ii) 25mm ² x 4C (MDB)	m	15				
	iii) 16mm ² x 2C (DB-1)	m	40				
	iv) 10mm ² x 2C (GDB)	m	15				
	v) 6mm ² x 2C (UPS)	m	10				
3.2	Supply and delivery and installation of bare copper earth wire.						
	i) 25mm ²	m	35				
	ii) 16mm ²	m	15				
	iii) 10mm ²	m	40				
	iv) 6mm ²	m	25				
3.3	Supply and delivery and installation of termination units including mechanical clamps, lug, corrosion, proof bolts, nuts washer etc. to terminate the following cables:-						
	i) 35mm ² x 4C	No	2				
	ii) 25mm ² x 4C	No	2				
	iii) 16mm ² x 2C	No	2				
	iv) 10mm ² x 2C	No	2				
	v) 6mm ² x 2C	No	2				
	vi) 25mm ² BCEW	No	2				
	vii) 10mm ² BCEW	No	2				
	viii) 6mm ² BCEW	No	4				
3.4	Supply and installation of Split Box as follows:						
	i) Ground mounted enclosure with 20% spare space	No	1				
	ii) 100A TP MCB	No	1				
	iii) 80A TP MCB (MDB)	No	1				
	iv) 60A DP MCB(DB-1)	No	1				
TOTAL CARRIED FORWARD TO SUMMARY							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

Sect 4 : Existing Building Electrics

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	Existing Building Electrics						
4.1	Supply and installation of DBs as follows:						
	(a) Main-DB						
	i) Surface in duct mounted enclosure with 20% spare space	No	1				
	ii) 80A TP MCB, 6kA	No	1				
	iii) 32A DP MCB, 6kA (GDB)	No	12				
	iv) 30A DP MCB, 6kA	No	12				
	v) 43A TP E/L isolator, 6kA	No	3				
	vi) 20A DP MCB, 6kA	No	9				
	vii) 16A SP MCB, 6kA	No	4				
	viii) 6A	No	1				
	ix) Surge Arrestors	No	4				
	(b) UPS-DB						
	i) Surface in duct mounted enclosure with 20% spare space	No	1				
	ii) 20A SP MCB, 6kA	No	5				
	vi) Surge arrestors	No	2				
4.2	Supply and installation of light fitting as follows:						
	i) Type A	No	20				
	ii) Type A1	No	15				
	iii) Type B	No	20				
	iv) Type C	No	5				
	v) Type D	No	3				
	vi) Type E	No	11				
	vii) Type F	No	11				
	vii) Type S	No	26				
TOTAL CARRIED FORWARD							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
BROUGHT FORWARD							
4.3	Supply and installation of light points complete with 2.5mm wiring, conduits, etc	No.	111				
4.4	Supply and installation of UPS Isolator point complete with 6mm wiring, etc	No.	2				
4.5	Supply and installation of light switches:						
	i) One way: 1 lever	No	10				
	2 lever	No	7				
	i) Two way: 1 lever	No	5				
	2 lever	No	5				
	iii) Daylight switch	No	1				
4.6	Supply and installation of earth rods plus 35mm ² conductor from earth to Roof structure via 25mm Ø conduit and 100 x 100 flush inspection box.	No	4				
4.7	Supply and installation of telephone / data						
	i) in trunking	No	35				
4.8	16 Amp socket outlets including 4mm ²						
	i) 16A SSO - in trunking	No	25				
	ii) 16 A UPS SSO - in trunking	No	25				
	iii) 16A combination SSO (1x3pin plug, 1x2 pin round plug & 2x2USB) - flush	No	15				
	iv) TV POINT including sleeves to television satellite dish	No	2				
4. 9	Supply and installation of isolators as follows:						
	i) 6A DP isolator for fans	No	1				
	ii) 20A DP isolator complete including 4mm ² conductors and 4mm ² BCEW for geyser	No	1				
4. 9	Supply and installation of isolators as follows:						
	i) 6A DP isolator for fans	No	6				
	ii) 20A DP isolator complete including 4mm ² conductors and 4mm ² BCEW for geyser	No	2				
	iii) 30A DP isolator complete including 6mm ² conductors and 4mm ² BCEW for geyser	No	7				
TOTAL CARRIED FORWARD							

TOTAL CARRIED FORWARD TO SUMMARY	
----------------------------------	--

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

Sect 5 : New Building Electrics

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	New Building Electrics						
5.1	Supply and installation of DBs as follows:						
	(a) DB-1						
	i) Surface in duct mounted enclosure with 20% spare space	No	1				
	ii) 60A DP MCB, 6kA	No	1				
	iii) 30A DP MCB, 6kA	No	8				
	iii) 43A TP E/L isolator, 6kA	No	3				
	iv) 20A DP MCB, 6kA	No	2				
	v) 20A SP MCB, 6kA	No	10				
	vi) 16A SP MCB, 6kA	No	3				
	vii) 6A	No	1				
	viii) Surge Arrestors	No	4				
	ix) Supply and installation of a Prepaid Meter	No	1				
5.2	Supply and installation of light fitting as follows:						
	i) Type A	No	16				
	ii) Type A1	No	6				
	iii) Type B	No	11				
	iv) Type C	No	2				
	vii) Type F	No	15				
	vii) Type S	No	5				
5.3	Supply and installation of light points complete with 2.5mm wiring, conduits, etc	No.	55				
	Supply and installation of light switches:						
	i) One way: 1 lever	No	9				
	2 lever	No	2				
	i) Two way: 1 lever	No	2				
	2 lever	No	3				
TOTAL CARRIED FORWARD							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
BROUGHT FORWARD							
	iii) Daylight switch	No	2				
	v) Intermediate switch	No	2				
5.4	Supply and installation of earth rods plus 35mm ² conductor from earth to Roof structure via 25mm Ø conduit and 100 x 100 flush inspection box.	No	2				
5.5	Supply and installation of telephone / data outlets include RJ-45 sockets						
	i) in trunking	No	10				
	16 Amp socket outlets including 4mm ² wiring, conduit etc.						
	i) 16A SSO - in trunking	No	10				
	ii) 16 A UPS SSO - in trunking	No	10				
	iii) 16A combination SSO (1x3pin plug, 1x2 pin round plug & 2x2USB) - flush	No	25				
5.6	iv) TV POINT including sleeves to television satellite dish	No	1				
5.7	Supply and installation of isolators as follows:						
	i) 6A DP isolator for fans	No	2				
	ii) 20A DP isolator complete including 4mm ² conductors and 4mm ² BCEW for reverse	No	1				
	iii) 30A DP isolator complete including 4mm ² conductors and 4mm ² BCEW for Aircon	No	7				
	iv) 20A DP isolator complete including 4mm ² conductors and 4mm ² BCEW for Hand Dryers	No	2				
5.8	Supply and installation of 2 compartment trunking as follows:						
	i) straight lengths	No	40				
	ii) end-caps	No	10				
	iii) internal 90° bends	No	5				
TOTAL CARRIED FORWARD							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

Sect 6 : Guard House Electrics

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	Guard House Electrics						
6.1	Supply and installation of DBs as follows:						
	(a) GDB						
	i) Surface in duct mounted enclosure with 20% spare space	No	1				
	ii) 32A dP E/L isolator, 6kA	No	1				
	iii) 20A DP MCB, 6kA	No	2				
	iii) 16A SP MCB, 6kA	No	2				
	iv) 6A	No	1				
	v) Surge Arrestors	No	2				
6.2	Supply and installation of light fitting as follows:						
	i) Type A	No	5				
	ii) Type F	No	10				
6.3	Supply and installation of light points complete with 2.5mm wiring, conduits, etc	No.	16				
	Supply and installation of light switches:						
6.4	i) Two way: 1 lever	No	2				
	ii) Daylight switch	No	1				
6.5	Supply and installation of earth rods plus 35mm ² conductor from earth to Roof structure via 25mm Ø conduit and 100 x 100 flush inspection box.	No	1				
6.6	Supply and installation of telephone / data outlets include RJ-45 sockets						
	i) in trunking	No	2				
6.7	16 Amp socket outlets including 4mm ² wiring, conduit etc.						
	i) 16A SSO - in trunking	No	5				
	ii) 16 A UPS SSO - in trunking	No	2				
	iii) 16A combination SSO (1x3pin plug, 1x2 pin round plug & 2x2USB) - flush	No	2				
TOTAL CARRIED FORWARD							

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

[illegible]

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

[illegible]

2518- Electrical Bill

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRICAL INSTALLATIONS

SUMMARY OF SECTIONS

[illegible]

2518- Electrical Bill



**TECHNICAL SPECIFICATION FOR CONSTRUCTION AND RENOVATION
OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK**

PROJECT NO: P2518

**SUPPLY, DELIVERY AND INSTALLATION OF THE ELECTRONIC
INSTALLATION WORKS**

Architect – Principal Agent

Marley Tjitjo Architects

Tel: (061) 220 604

PO Box 96088

WINDHOEK

Civil/Structural Engineers

Denchi Consulting Engineers

PO Box 80352

Tel: (061) 228 183

WINDHOEK

Quantity Surveyors

Dawid Nell Quantity Surveyors

Tel: (061) 244 779

PO Box 40113

WINDHOEK

Electrical/Mechanical Engineer

Denchi Consulting Engineers

Tel: (061) 228 183

PO Box 80352

WINDHOEK

BIDDER'S NAME :

BID AMOUNT :

DATE :

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOvation OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

PART 2 – Employer's Requirements

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS

Section II - Employer's Requirements

Section 1: General Technical Specification 2.2

Section 2: List of Electronics Drawings for the Execution of the Contract 2.4

Section 3: Detailed Technical Requirements for the Execution of the Contract 2.8

Section 4: Schedule of Rates for Material 2.35

Section 5: Schedule of Quantitites 2.48

SECTION I: GENERAL TECHNICAL SPECIFICATION

PART II: DETAILED TECHNICAL SPECIFICATION

1. SCOPE OF CONTRACT

This Contract covers in broad terms the supply, delivery, erection, commissioning, and maintenance guarantee for 12 months of the electronics installations specified below:

Telephone and Data structured cabling for the existing building and new building.
Supply and installation including programming, configuration and commissioning of access control and CCTV systems
Supply and installation of a TV screen/ smart board

All the Bidders shall provide authorization license by the manufacturer of the system they are offering.

2. STANDARDS

All material and equipment supplied and/or installed under this contract shall be new and as per the product specification in Part IV and shall comply with the requirements laid down in the latest editions of the relevant SANS or BS and their amendments (if any) and the requirements of this Specification.

The material specified is the preferred material. If alternative materials are offered, they shall be specified in Schedule E for approval of the engineer. Rates entered in the schedule of quantities shall be for the specified materials. Schedule E shall reflect the saving. In event of items bearing the SANS mark being available in respect of the materials and equipment required, only items bearing this mark will be acceptable. The workmanship under this contract shall be of a high standard and to the satisfaction of the Procurement Board.

3. RADIO AND TV INTERFERENCE

All equipment installed under this contract shall comply with the Government Notice No. R.2246 and any other applicable rules and regulations in respect of radio and TV interferences. Any equipment found producing interference after commissioning, shall be suppressed or replaced to the satisfaction of the Procurement Board without any additional cost.

The Electrician will make provision for conduits and wire ways. However, immediately upon appointment, the contractor will be expected to check all conduits so installed

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

and satisfy themselves of the adequacy and correctness thereof. Any additional requirements or change shall be immediately communicated in writing to the Engineer.

The Bidder shall allow in their bid price for all material, labour, supervision, transport, escalation tests and all other items necessary to complete the contract in its entirety. As this is a fixed price contract, it is expected that the successful Bidder will finalise all details for immediate ordering of materials.

In the event where the supply and/or installation of any item, material or equipment does not form part of this Contract, it will be specifically indicated as such in his specification and/or the accompanying drawings.

4. VAT, IMPORT TAXES AND DUTIES

Bidders shall allow in their Bid for all VAT, Import Taxes and Duties, to be paid in respect of all items of material, labour and equipment to be supplied in terms of this Contract where relevant. The successful Bidder will be liable and responsible for paying all VAT, Import Taxes and Duties.

5. REGULATIONS

The work shall be carried out strictly in accordance with and all material and equipment supplied shall comply with the following laws and regulations where applicable.

- a) The latest edition of the "Code of Practice for the Wiring of Premises", SABS 0142 (1993 as amended).
- b) The "Electricity Supply By-Laws and Regulations" of the Supply Authority.

The Contractor will be responsible for serving all notices and paying all fees due in terms of the above laws and regulations.

6. LOCAL SYSTEM AND OPERATING CONDITIONS

All materials and equipment supplied and/or installed under this Contract shall be suitable for satisfactory operation and shall have prescribed characteristics under the following conditions:

- a) Ambient Operating Conditions
 - Altitude : 1 100 metres above sea level
 - Minimum ambient temperature : -5 Degrees Celsius

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

Maximum ambient temperature: +40 Degrees Celsius

Humidity: Up to saturation point

b) Electrical System Particulars

LT System

420V, 3 phase, 4 wire, 50Hz AC with earthed neutral

7. DRAWINGS AND INFORMATION TO BE SUBMITTED

Drawings and information to be submitted on completion of the Works:

- i) Two sets of paper prints of all the drawings show all "as built" features of the installation.
- ii) One set of sepia prints for the drawings in (i) above.
- iii) Three complete sets of operating and maintenance manuals containing all drawings, test certificates, settings of equipment as commissioned, installation, commissioning and maintenance details, operating instructions, as well as a complete list of spare parts with reference numbers and technical description to enable the client's technical personnel to maintain service and repair the installation.

8. TEST CERTIFICATES AND TESTS

- 7.1 Where test certificates are required for individual pieces of equipment, these shall be submitted to the Engineer for approval immediately on receipt of such certificates.
- 7.2 Where witnessing tests are required by the Engineer, arrangements shall be made by the Contractor for the Engineer to witness such tests.

9. BUILDER'S WORK

The Electrician shall be responsible for the making good of all builder's work connected with conduits, outlet boxes, distribution boards, cable entry sleeves etc., i.e. Conduits installed in chases shall be covered by a layer of coarse sand and cement and backfilling around cable entry sleeves shall be compacted to 93% Mod AASHTO density.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

SECTION II: LIST OF DRAWINGS FOR THE EXECUTION OF THE PROJECT

2. DRAWINGS

Drawing No.	Title
2518-EL-01	Electronics Layout

**SECTION III: DETAIL TECHNICAL REQUIREMENT FOR THE EXECUTION OF THE
CONTRACT**

1. Telephone and Data Structured Cabling

This Section of the works covers in broad terms the supply, delivery, erection, commissioning, maintenance guarantee for 12 months of the structured (Telephone and data) cabling installation as specified below.

The installations shall cover the following:

- (a) Telecom and Data network cabling, Cat 6, patch panels and switches complete with RJ45 Jacks, Network Switches, Patch Panels, cabinets Etc.
- (b) Wi-Fi routers

<u>Floor</u>	<u>Telephone and Data Outlets</u>	<u>Switch</u>
Existing Building	38	1 x 48 Port Switch in Server
New Building	38	1 x 24 Port Switch wall mounted

2. STRUCTURED CABLING

2.1 Cables

All cables should be Molex Category 6 specification with a bandwidth of 250 MHz and a maximum data rate of 10 Gbps.

Patch Cables:

Cables must meet the requirements of TIA/EIA-568-C.2, CAT 6 specifications. Gold plated contacts must give an insertion / extraction life of 1000 cycles.

The cable must be Molex and feature four stranded pairs, 24 AWG stranded copper, insulation and a PVC jacket (4 pair UTP).

The cables must have an attenuation of 40.5 dB per 100 meters at 250 MHz.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

2.2 Permanent Connections:

All permanent connections are to be silver-plated 45° insulation displacement contacts.

2.3 Patch Panels:

Patch panels shall be 24-way or 48-way as specified in the Bills of Materials CAT 6 RJ patch panels suitable for 250 MHz. They shall utilize high performing km8 keystone jack. They shall allow inexpensive cable management, full fixing kit and twin labelling management.

The panels should meet the requirements of TIA/EIA-568-C.2, CAT 6 specifications.

Panels must be used for universal wiring, with labelling for T568-A or T568-B wiring.

Connectors should be RJ-45 female for straight through wiring.

Patch panels shall be type Molex.

2.4 RJ45 Jacks/Keystone – CAT 6

These should be suitable for CAT 6 solid and CAT 6 stranded data cable. Installers shall use only purpose-made jack termination tools. All materials shall be type Molex or Krone.

They should be TIA/EIA-568-C.2, CAT 6 standard.

They must incorporate a locking latch to hold the jack housing firmly and have snap-in installations feature.

Contacts should be phosphor bronze with tin plating (50µm gold plating over 100µm nickel under plating).

Contact resistance should be maximum 20 mili ohms.

DC resistance should be 0.1 ohms maximum.

Current rating should be 1.5 amps and insulation resistance should be 500 mili ohms minimum.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

2.5 POE Cisco Switches

Bidders are to provide 24-port and 48-port POE Cisco Switches as indicated elsewhere.

The switches shall feature 24 or 48 10/100/1000 Ethernet ports shall be RJ-45 connectors.

The switches shall support wireless or voice over IP use and have maximum power of 15.4W to an Ethernet port.

The switches shall come complete with AC power adapters, rack-mounting kits complete with sirens and all associated software / registration requirements.

2.6 Data Cabinets

The cabinets shall be of the size specified in the bills of quantities meeting the specifications as follows:

- (i) have an aluminium frame,
- (ii) size as detailed in the Bills of Quantities,
- (iii) fitted with four depth reducers,
- (iv) fitted with blank floor plates,
- (v) fitted with four high performance balls bearing low-noise fans at the top of the cabinet to expel air,
- (vi) fitted with tinted safety plexi-glass doors and lockable doors. Two keys with label tags to be supplied.

2.7 LABELLING

All labelling shall be printed with permanent ink PVC labels. All printed labels should be black on white with a font size of at least 8mm.

Labelling shall be as follows:

- (i) Patch Panels:
A, B, C etc. from top to bottom of the cabinet. The label will be on the left side of the patch panel.
- (ii) Wall outlets – BAC01 where:
B : Floor on which the cabinet is located
A : Cabinet number
C : Patch panel number

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

01 : Port on patch panel

The cable will be labelled with the same number at the back of the patch panel and at the back of the wall outlet not more than 5m from the termination.

(iii) Cabinets:

All cabinets shall be marked with a label with a unique number for that cabinet in the building.

Font size shall be 12mm minimum.

The label will be in the center of the top of the cabinet on the steel frame.

The labels will be as follows: - Cabinet A/B where:

A – Floor on which the cabinet is located, e.g. G, first, etc.

B – Cabinet number, which will be 1, 2, 3 etc. for more than one cabinet per floor.

Keys shall be supplied with numbers and labels indicating the cabinet number.

2.8 ACCEPTANCE AND TEST PROCEDURE FOR CABLING

The contractor shall inspect, complete and present a certificate to the Engineer, certifying that:

- (i) The only products of one supplier as offered were utilized,
- (ii) As-built drawings showing installed portions of all outlets,
- (iii) Outlets and patch panels are correctly labelled,
- (iv) That the installations are done in accordance with the manufacturer's specifications,
- (v) All points are tested and test results documented and a 5-year site warranty obtained,
- (vi) That all test equipment used is calibrated and that calibration certificates are available and valid on request,

Prior to final acceptance, the following documentation shall be required:

- a) Certificate certifying the aspects detailed in the acceptance are test procedure above,
- b) Manufacturers quality inspection form,
- c) Test results,
- d) Warranty certificate,
- e) As-built drawings,

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

2.9 SPLICE ENCLOSURES AND FIBRE TAILS FOR FIBRE OPTIC CABLES

All products shall be merged with the manufacturers' name and product code.

Splice enclosures shall be 24-way 19" rack mountable.

Mid-couplers installed shall be of the SC or SFF type. Polyper mid-couplers will not be accepted.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

Installation specifications:

Indoor backbone fiber optic cables shall have a minimum bend radius of 10 times the cable outside diameter when under no load and 15 times the cables outside diameter when being pulled.

a) Vertical optic fiber cables:

Where the rise of an option fiber cable exceeds 20m, use must be made of light buffer cables. Cables strain relief is to be installed at each vertical rise and thereafter at 1m intervals. Cable drums shall be supported with an axle on trestles. No twisting cables will be allowed. The optic fiber cable shall be terminated in the 19" rack mountable 24-way fiber splicing termination tray on mid-couplers or be spliced onto unjacketed pigtails connected to the mid-couplers. The splice tray shall house sufficient splice organizers. All splices shall be protected by splice protectors. All cores in a cable shall be terminated at both ends.

2.10 FIBRE OPTIC CABLE REQUIREMENTS

The fibre cable performance shall be multi-mode fibre graded 50/125.

Optic Properties shall be as follows.

- (i) Attenuation at 850nm _____ 2,504 dB/km
- (ii) Attenuation at 1300nm _____ 0,704 dB/km
- (iii) Bandwidth at 850nm _____ 400 MHz.km
- (iv) Bandwidth at 1300nm _____ 800 MHz.km

Geometric Properties shall be as follows:

Core diameter	:	50 ± 2mm
Numerical aperture	:	0,200 ± 0,015
Cladding diameter	:	125 ± 2mm
Core / Cladding Non-Circularity	:	3,0mm
Cladding non-circularity	:	2%
Coating diameter	:	245 ± 10mm
Coating concentricity	:	<15mm
Coating non-concentricity	:	<5mm

The optical fiber utilized shall be indoor type LAN cable as follows:

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

- (i) PVC / LSZH outer sheath
- (ii) Non-metallic strength number
- (iii) Gel fitted loose tubes
- (iv) Colour side fibers

All cables shall be marked with the manufacturer's name, type of cable length and data of manufactures at no more than 1 meter intervals.

2.11 FIBRE OPTIC LABELLING

- a) Labelling of fiber optic cables shall be by a carrier strip on method.

The cable shall be marked at each end of the cable as close as possible to a termination point. Identification will be typically 4FO/1A: 2B where:

- 4FO = the fiber count
 - 1A = the cabinet from
 - 2B = the cabinet to
- b) Fiber splice trays shall be labelled as follows: A, B, C etc. from the top of the cabinet. The label will be on the left side of the Patch Panel.
 - c) The mid-couplers will be labelled as follows: G/A/B/1-4 where
 - i) G - floor
 - ii) A - cabinet number
 - iii) B - fiber optic patch panel number
 - iv) 1-4 – mid-coupler numbers

All labelling shall be printed with permanent ink PVC labels, black on white, with a minimum font size of 8mm.

2.12 ACCEPTANCE AND TEST PROCEDURE

On completion of a fiber link an acceptance test, (light bounce / power meter shall be performed from both ends. The readings shall be recorded and the bi-directional event and average link loss calculated.

Test results shall be stored in hard and soft copies,

Maximum connector mated pair loss shall not exceed 0,75db

Maximum connections loss shall not exceed 0,5db

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

Maximum splice loss shall not exceed 0,3db

Prior to handover, the contractor shall complete an inspection certificate and certify that:

- a) The installed products are approved by the engineer and that a certificate of approval and delivery notes for the installed items are available on request
- b) The splice trays are installed in the correct positions in the cabinet.
- c) The splice trays are labelled correctly
- d) Fiber cables are labelled correctly
- e) All relevant documentation is complete and correct (test results, wiring schedule and inspection certificate)

3. Access Control

3.1 General

The access control system shall run off one central management system, with the software enabling system operators to configure, monitor and control the entire access control system. The hardware and system components shall include the following:

- i) Server for the operating system. This will be in the server room.
- ii) Workstation to be in an office to be identified later. The default location will be the server room.
- iii) Controllers to manage the field devices.
- iv) Proximity cards complete with Biometric reader and card encoder.
- v) Door hardware including bolt-action locks, complete with power suppliers and batteries, door loops and door closers.
- vi) All software and licences.
- vii) Training for at least five staff members over a period of at least 3 days.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

3.2 Access Control to Doors

3.2.1 General: Doors to be controlled are as follows:

A total of 8 doors are to be controlled. The doors shall be controlled by controllers that interface between the server, the door maglock, access finger print/card reader and the door controller.

3.2.2 Controller:

The controller shall communicate with the server using TCP/IP internet transmission protocol. The controller shall be able to support up to 500 events and 1000 cards for access control purposes.

The controller shall allow peer-to-peer communication for remote monitoring, back-up and control. The controller shall offer dial-up ability for off-site remote monitoring. Controllers shall be type Gallagher 6000 or equal. Controllers shall come complete with purpose made lockable cabinets. The cabinet shall be manufactured of steel and be able to house the controllers, 8 Amp power supply and four (4) 7Ah batteries. The cabinet shall come complete with mounting plate. Controllers shall control a maximum of eight (8) doors each.

3.2.3 Electronic Door Locks:

- a) Locks shall be fail-safe type, releasing upon loss of power or fire alarm activation.
- b) Minimum holding force: 300 kg per lock.
- c) Locks shall include **door position monitoring contacts** for integration with the management system.
- d) Installation shall comply with **local fire codes** and emergency egress requirements

4. **CCTV System Installations:**

4.1 General

The new IP Based CCTV Surveillance System shall be a state-of-the-art CCTV Video Surveillance system. The system shall be an IP network based fully distributed digital video system. The system shall provide full selection capability from the workstation at any point within the network of the system.

The CCTV system shall provide unlimited expansion capability for the addition or modification of video inputs. The system shall adhere to widely used CCTV standards and shall be compatible with components from various manufacturers. A proprietary system, which does not interface with components from 3rd party manufacturers (Cameras,

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOVAION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

Recording Hardware, Recording Software, Security Management software, DVR, NVR), complying with accepted standards, shall not be considered for this installation.

Equipment shall be selected and installed so that repairs may be accomplished on site by module replacement, utilizing spare components whenever possible.

All cameras mounted within and on the building will be linked to and powered by a star-topology distributed network of POE switches & Network Video Recorders (NVR's) installed in the building.

4.2 CCTV Cameras are to be installed as follows:

- a) Indoors : 15 indoor dome cameras
- b) Outdoors : 15 outdoor bullet cameras at entrances and Exits
- c) Server room : 2 indoor dome cameras

The Network Video Management Software (NVMS), Network Video Recorder (NVR) Hardware, Network Surveillance Cameras and related components shall be installed and commissioned by authorized integrators trained and certified by the manufacturer. **Proof of certification shall be included in the tender.**

4.3 Network Video Recorders (NVR)

The NVR is to be utilized to process and store video data from all the IP-based video cameras (specified elsewhere in this document) and is to be supplied and installed complete with a single processor and an effective 30 days of recording capacity.

4.4 The Network Video Recorder (NVR) shall:

- Have a 2U rack-mount chassis.
- Be scalable to operate seamlessly in an environment with multiple NVRs, as a single solution.
- Record up to 32 MB/s of image data from up to 128 camera channels running at 30 images per second per channel.
- Have enterprise-class reliability with a minimum RAID-10 hard drive configuration, and the hall have a redundant power supply.
- Have hard drives and power supplies which shall be hot-swappable for online maintenance and repairs.
- Have a minimum of 2 x 1Gbps Ethernet ports.
- Operating System Microsoft Windows 10 x64 Pro or Windows Server O/S or equal and approved.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

4.5 Network Video Management Software (NVMS)

- The Network Video Management Software (NVMS) shall:
- Be a secure distributed-network platform with enterprise class reliability for capturing, managing, and storing high-definition multi-megapixel surveillance video while efficiently managing bandwidth and storage for megapixel cameras.
- Have the capability to manage both audio and video from a broad range of multi-megapixel IP cameras. In addition, the system must have the capability to accommodate conventional and PTZ analogue cameras and both audio and video from a broad range of third-party IP cameras, and encoders from other reputable manufacturers.
- As it may be a requirement, integrate the NVMS into third party Access Control, Fire Detection and Intercom Control systems.
- CAT6 Ethernet cabling shall be used as standard to connect all CCTV cameras to switches.
- There shall be fibre uplinks between all switches and the core VMS cabinet.
- The viewing stations and network video recorders shall have CAT7 uplinks between them and the VMS cabinet.
- The video management system shall offer both video stream and video stream storage management. Further to this all camera, channels shall be individually configurable with respect to frame rate and resolution.
- The optimum frame rate shall be 20 frames per second, and system shall be designed in such a way, and be event (motion) triggered recording.
- Cameras should be ONVIF and H.264 compliant.
- System should be able to manage and guarantee bandwidth and provide frame rate control.
- System should support multiple IP video streams.
- System should be able to record 50 cameras simultaneously or more.

4.6 Cameras

The IP-based surveillance cameras supplied by the contractor are required to function in conjunction with the Network Video Management Software (NVMS) to provide a complete solution.

To reduce network bandwidth and processor loading each camera is to employ HDSM to operate seamlessly between the network video recorders and the remote monitoring

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

workstations. To achieve the required level of detail, all camera types supplied and installed should not provide less than 135 pixels/metre of digital image clarity.

All cameras must be able to cope adequately with variable lighting conditions and specifically in scenes where simultaneous low and high light exist concurrently. This will ensure facial identification in all scenes, and under all conditions, where such cameras are to be installed.

4.7 General Specifications for ALL IP-Cameras

The camera shall satisfy these minimum specifications requirements:

Smart:

- Must support a minimum of 4 behaviour analysis, line crossing, intrusion detection, unattended baggage detection, and object removal detection,
- Support Smart recording, edge recording,
- Support start encoding, low bit rate, low latency,

Image:

- HD 1920x1080@30fps,
- Support H.264+/H.264/MJPEG video compression, multi-level video quality configuration,
- Support defog, BLC/3D DNR/ROI/HLC,

Infrared:

- Smart IR, prevent over exposure in close distance,

Network:

- Must support network storage via micro-SD/SDHC/SDXC card (128G), local storage and NAS (NFS, SMB/CIFS), ANR,
- Shall support alarm trigger on: Motion detection, video tampering, network disconnected, IP address conflict, illegal login, HDD full, HDD error, Alarm input, Alarm output,

Interface:

- Support Audio I/O (-S) 1 Input (line in/mic in, 3.5 mm), 1 output (3.5 mm) support two-way audio communication,
- Support Communication Interface via 1 RJ45 10M/100M self-adaptive Ethernet port, RS485,

4.8 The camera shall have the following key features:

Indoor dome Camera:

- 1/2.8" Progressive Scan CMOS,
- 1920 × 1080 @60fps,

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

- High frame rate,
- Dark fighter or Light finder technology,
- H.265, H.265+,
- 120dB WDR,
- IP66, IK10,
- IR range: up to 40 m,
- BLC/3D DNR/ROI/HLC,
- Smart encoding: Support low bit rate, low latency,
- Colour: 0.005 Lux @ (F1.2, AGC ON), 0 Lux with IR,
- Colour: 0.0068 Lux @ (F1.4, AGC ON), 0 Lux with,

Outdoor dome Camera

- 1/2.8" Progressive Scan CMOS,
- 1920 × 1080 resolution,
- 2.8 to 12 mm focal length,
- Dark fighter/Light finder technology,
- H.265, H.265+, H.264+, H.264,
- 120dB Wide Dynamic Range,
- BLC/3D DNR/ROI/HLC,
- IP67, IK10,

4.9 Monitoring Workstation System

The CCTV room shall include remote monitoring capability for both CCTV and Access Control Systems as follows:

- A Remote Monitoring Workstation (RMWS) for the IP Based CCTV Surveillance System as well as for the Access Control System,
- 40" LED wall mounted display monitors, supplied complete with TV license, and mounting brackets,
- Workstation periphery equipment such as DVI splitter, Keyboard, Video, Mouse, (KVM) switch, etc.

The Remote Viewing stations shall:

- Consist of a professional enterprise quality Remote Monitoring Workstation (RMWS) specifically designed to achieve the highest performance for viewing within a multi-megapixel High Definition Surveillance System,
- Be supplied in a desktop form factor and must have the capacity to support up to four high resolution (full-HD) monitors displaying a total 144 channels of concurrent video,
- Be pre-loaded with Client Software and supplied with a keyboard and mouse,

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

4.10 Structured cabling for CCTV

General

All cameras and access control systems mounted within the building will be linked to and powered by a star-topology distributed network of cables, POE switches, patch panels, brush panels and in Cabinets.

Cables

All cables shall be Molex Category 6 specification with a bandwidth of 250 MHz and a maximum data rate of 10 Gbps. Cables must meet the requirements of TIA/EIA-568-C.2, CAT 6 specifications. Gold plated contacts must give an insertion / extraction life of 1000 cycles.

The cable must be Molex and feature four stranded pairs, 24 AWG stranded copper, insulation and a PVC jacket (4 pair UTP). The cables must have an attenuation of 40.5 dB per 100 meters at 250 MHz.

Permanent Connections:

All permanent connections are to be silver-plated 45° insulation displacement contacts.

Patch Panels:

Patch panels shall be 24-way or 48-way as specified in the Bills of Quantities CAT 6 RJ patch panels suitable for 250 MHz. They shall utilize high performing km8 keystone jack. They shall allow expansive cable management, full fixing kit and twin labelling management.

The panels should meet the requirements of TIA/EIA-568-C.2, CAT 6 specifications.

Panels must be used for universal wiring, with labelling for T568-A or T568-B wiring.

Connectors should be RJ-45 female for straight through wiring.

Patch panel shall be typing Molex.

4.11 POE Cisco Switches

Bidders are to provide 12-port, 24-port and 48-port POE Cisco Switches as indicated in the BoQ. The switches shall feature 24 or 48 10/100/1000 Ethernet ports shall be RJ-45 connectors. The switches shall support wireless or voice over IP use and have maximum power of 15.4W to an Ethernet port. The switches shall come complete with AC power adapter, rack mounting kits complete with fans and all associated software / registration requirements.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOvation OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

4.12 Data Cabinets

The 19" cabinets shall be as follows:

- have an aluminium frame, size as detailed in the Bills of Quantities,
- fitted with four depth reducers,
- fitted with blank floor plates,
- fitted with four high performance ball bearing low-noise fans at the top of the cabinet to
- fitted with tinted safety plexi-glass doors and lockable doors. Two keys with label tags to be supplied
- All labelling shall be printed with permanent ink PVC labels. All printed labels shall be black on white with a font size of at least 8mm.

1.1 Training Programme

Bidders shall allow for training of at least four (4) persons, as nominated by the user department.

1.2 Operating manuals

Three complete sets of the operating manuals, in English, shall be provided to be used by the user department.

1.3 Guarantees and Maintenance

With effect from the date of first delivery certificate, the contractor shall at his own expense undertake regular servicing of the installation during the maintenance period of 12 months and shall make all adjustments necessary for the correct operation thereof

SECTION IV: SCHEDULE OF RATES FOR MATERIAL

1. SCHEDULE OF QUANTITIES

The rates are to be used in the relevant sections of the Schedule of Quantity for pricing.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

SCHEDULE OF QUANTITIES

The quantities in these Bill of Quantities are provisional and shall be measured as executed and paid for according to prices in the Bill of Quantities and any unexpended amounts shall be deducted from the amount of the contract sum.

The quantities in these Bill of Quantities are not to be used for ordering materials.

The Bill of Quantities form part of and must be read in conjunction with the specification, which document contains the full description of the work to be done and material and equipment to be used and unless otherwise described in the Bill of Quantities, reference should be made to the specification for the full meaning or description of work to be done and materials and equipment to be used in this service.

The total tender price on the Tender Form shall constitute the contract price of the successful tenderer. Bidders are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.

No alteration, erasure or addition is to be made in the text of the Bill of Quantities. Should any alteration, or erasure be made, it will not be recognized but the original wording of the Bill of Quantities will be adhered to.

The priced Bill of Quantities of the successful tenderer will be checked and the Engineer reserves the right to call for adjustment to any individual price and to rectify the discrepancy.

Variations in the scope and extent of the work included in the Bill shall be allowed to meet the employer's requirements and shall be measured and costed at rates entered in the Bill, where appropriate, and shall form additions to or deductions from the total of the Bill.

Any items or variations for which rates have not been included in the Bill shall be agreed and priced as non-scheduled items in accordance with the provisions of the contract.

The rules covering the extent and costing of the variation shall be those provided for in the form of conditions of contract.

Unless a separate rate for the supply and for the installation of any item is specifically called for, the supply and installation cost of any item shall be fully included in the unit price.

The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, waste, patterns, models and templates, plant, temporary works, return of packing, establishment charges, profit and all other obligations arising out of the conditions of contract.

**BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY – BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RENOVATION OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS**

All fittings and accessories always include the connections thereto. All measurements are nett, unless otherwise stated, and Bidders must allow in their rates for wastage.

The quantities and rates included for day work shall form part of the tender price, but Bidders shall note that this item must be regarded as provisional and will only be payable to the contractor if and when a written order to this effect has been issued.

All provisional sums shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOvation OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS

PART 3 – Conditions of Contract and Contract Forms



PART IV: FORMS TO BE COMPLETED BY BIDDER

- A INFORMATION ABOUT THE BIDDER
- B AUTHORITY FOR SIGNATORY
- C SCHEDULE OF WORK EXECUTED BY THE BIDDER
- D SCHEDULE OF WORK TO BE SUB-LET

A. INFORMATION ABOUT THE BIDDER

1. IF THE BIDDER IS A COMPANY

1.1 Directors of the Company

List the Directors of the Company, their nationality together with the date on which each Director has been appointed:

<u>Name of Director</u>	<u>Date of Appointment</u>	<u>Nationality</u>
.....		
.....		
.....		
.....		
.....		
.....		

1.2 Shareholding

(a) List all the shareholders of the Company:

<u>Full names</u>	<u>Nationality</u>
.....	
.....	
.....	

(b) List all companies of which the Company is a shareholder:

.....

.....

.....

.....

.....

.....

.....

.....

2. IF THE BIDDER IS A CLOSED CORPORATION

List the members of the Closed Corporation, their nationality including, their date of appointment as well as their percentage interest in the C.C.

<u>Name of Member</u>	<u>Date of Appointment</u>	<u>% Interest in C.C.</u>	<u>Nationality</u>
.....			
.....			
.....			
.....			

.....
.....

3. IF THE BIDDER IS A PARTNERSHIP

List the partners in the Partnership, the date of accession as well as each one's profit/loss distribution ratio.

Name of Partner	Date of Accession	Profit/loss Distribution Ratio	<u>Nationality</u>
.....			
.....			
.....			
.....			
.....			
.....			
.....			
.....			

4. IF THE BIDDER IS AN INDIVIDUAL

Supply the full names, and I.D. number of the Bidder:

<u>Full names</u>	<u>I.D. Number</u>	<u>Nationality</u>
-------------------	--------------------	--------------------

.....		
.....		

.....		
.....		

.....		
.....		

SIGNED ON BEHALF OF BIDDER:

B. AUTHORITY FOR SIGNATORY

Signatories for Companies, Partnerships or Closed Corporations must establish their authority by attaching a copy of the relevant resolution of their Board of Directors, Members or Partners duly signed and dated. An example is shown below for a Company:

By resolution of the Board of Directors at a meeting on

.....2026.

at

Mr

whose signature appears below, has been duly authorized to sign all documents in connection with this

Bid Reference No.

on behalf of (block capitals)

SIGNED ON BEHALF OF COMPANY:

.....
.....

IN HIS CAPACITY AS:

.....
.....

DATE:

.....
.....

SIGNATURE OF SIGNATORY:

.....
.....

WITNESSES:

- 1.
- 2.

C. SCHEDULE OF WORK EXECUTED BY THE BIDDER

1. COMPLETED CONTRACTS

The Bidder must insert in the spaces provided below a list of work completed by him during the past five (5) years. Only work of a similar nature to this Contract must be listed.

[illegible]

2. CURRENT CONTRACTS

The Bidder must insert in the spaces provided below, a list of work at present under construction by his firm.

[illegible]

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY BID REFERENCE NO: W/ONB/00-00/00
CONSTRUCTION AND RONOvation OF THE BIPA PROPERTY ON ERF 8681 WINDHOEK:
ELECTRONIC INSTALLATIONS

SIGNED ON BEHALF OF BIDDER:

D. SCHEDULE OF WORK TO BE SUB-LET

The Bidder shall list below items of specialized work on this Contract which he intends to sub-let.

If the Bidder intends to carry out specialized work himself, he shall state this.

The acceptance of this Bid shall not be construed as approval of the work to be sub-let. Should any or all of the Sub-contractors not be approved subsequent to acceptance of Quotation, this shall in no way invalidate this Bid and the quoted rates and prices for the various items of work shall remain final and binding even in the event of a Subcontractor not listed below, being approved by the Engineer.

ITEM	DESCRIPTION OF WORK	NAME OF SUBCONTRACTOR

SIGNED ON BEHALF OF BIDDER:

PART V : SCHEDULE OF INFORMATION

- (a) The Tenderer shall state in the Schedule of Information the requested information.
- (b) Approval of equipment and materials will be subject to full submission of information specified in Part 4 and / or Part 5.
- (c) Full technical brochures with marked-up design points shall be submitted with this part.
- (d) Failure to complete this Schedule of Information will invalidate the Tender.



6.1 SCHEDULE OF MATERIAL

(i) POE Switches:

Manufacturer's Name:
.....
Country of Origin:
.....

(ii) Patch Panel:

Manufacturer's Name:
.....
Country of Origin:
.....

(iii) UTP Cable:

Manufacturer's Name:
.....
Country of Origin:
.....

(iv) RJ45 Outlets:

Manufacturer's Name:
.....
Country of Origin:
.....

(v) Fibre Patch Panel:

Manufacturer's Name:
.....
Country of Origin:
.....

(vi) Data Cabinets:

Manufacturer's Name:
.....
Country of Origin:
.....

(vii) Indoor Camera:

Manufacturer's Name:
.....

Country of Origin:
.....

(viii) Outdoor Camera:

Manufacturer's Name:
.....

Country of Origin:
.....

(ix) Display Screen:

Manufacturer's Name:
.....

Country of Origin:
.....

(x) Access control:

Manufacturer's Name:
.....

Country of Origin:
.....

(xi) Magnetic Locks:

Manufacturer's Name:
.....

Country of Origin:
.....

(xii) Card Readers:

Manufacturer's Name:
.....

Country of Origin:
.....

PART VII : SCHEDULE OF RATES FOR VARIATIONS

7.1 GENERAL

7.1.1 The rates entered in this schedule shall serve unaltered to calculate the

value of variation orders (additions or omissions) issued in terms of the Contract.

7.1.2 The rates entered shall exclude the Main/Principal Contractor's discount.

7.1.3 These rates shall include the following items necessary for the supply, delivery, handling and installation of all applicable equipment:

Nett cost of material.

- Profit, storing cost, handling charges, etc. for material.
- Nett costs of labour.
- Labour overheads and profit on labour.
- General sales tax and any other duties payable.
- Attributable overhead costs.

7.1.4 As the rates entered will only be used to calculate the value of variations, **the tenderer shall complete only those rates of items to be used under this contract.**

7.2 PROFIT ON MATERIAL FOR OMISSION AND ADDITIONS : (%)

The following percentage profit will be required on all materials for additions or omissions not covered by any other section of this schedule. This percentage shall include all direct overheads, handling charges, etc.

Nett percentage: -----%

7.3 RATES FOR ADDITIONAL LABOUR : (N\$/h)

These rates shall be applied to determine labour costs not covered by any of the other sections of this schedule.

<u>Supervisor/ Foremen</u>	<u>Qualified artisan</u>	<u>Appren- tice</u>	<u>Conduit installer</u>	<u>Labourer</u>
Normal rate	-----	-----	-----	-----
Overtime (week)	-----	-----	-----	-----
Saturday time	-----	-----	-----	-----
Sunday time	-----	-----	-----	-----

7.4 RATES FOR TRANSPORT : (N\$/km)

Rates shall include the cost of a licensed driver fuel, oil, maintenance, etc.

<u>Vehicle capacity</u>	<u>Rate per kilometer</u>
Up TO 1500 kg	-----
1600 to 3000 kg	-----
3100 to 7000 kg	-----

SIGNATURE OF TENDERER : _____ DATE:

NAME OF TENDERER

:

ELECTRONIC INSTALLATIONS

ADDRESS

:

:

:

TELEPHONE NUMBER

:

FACSIMILE NUMBER

:

[illegible]

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRONIC INSTALLATIONS

No 2: DATA AND STRUCTURED CABLING

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	<u>DATA AND STRUCTURED CABLING</u>						
2.1	Supply and installation of Molex CAT 6 UTP highwire grey cable, 500m drum	No	5				
2.2	Supply and installation of CAT 6 UTP 48 Port Patch Panel - Molex	No	1				
2.2	Supply and installation of CAT 6 UTP 24 Port Patch Panel - Molex	No	1				
2.3	Supply and installation of 48 port POE Cisco Switch - Catalyst 2960-S, 2 x SFP, Lan Base	No	1				
2.4	Supply and installation of 24 port POE Cisco Switch - Catalyst 2960-S, 2 x SFP, Lan Base	No	1				
2.4	Supply and installation of brush panels	No	4				
2.5	Supply and installation of single CAT 6 outlets Molex	No	49				
2.6	Supply and installation of a 27U Panel Cabinet, free standing	No	1				
2.7	Supply and installation of a 9U Panel Cabinet, free standing	Sum	1				
2.7	Supply and installation of power supply for both cabinate	Sum	1				
2.8	Supply and installation of all labels	Sum	1				
2.9	Supply and installation of fibre cable multimodem 8 Core, 50/125 MM	m	40				
2.10	Supply and installation of fibre patch cord multimode	No	4				
2.11	Supply and installation of fibre patch panel multi mode	No	4				
2.12	Supply and installation of Cisco Catalyst Fibre switch - 12 Port	No	1				
2.13	Supply and installation of SFP multimode 1000 base module	No	5				
2.14	Supply and installation of splice cassette multimode	No	1				
2.15	Supply and installation of splice enclosure multimode	No	1				
2.16	Supply and installation of entry gland multimode	No	2				
2.17	Supply and installation of tray for fibre	No	2				
TOTAL CARRIED FORWARD							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRONIC INSTALLATIONS

No 3: CCTV

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	<u>CCTV</u>						
3.1	Supply and installation of high definition internal IP cameras, day/night, 5MP, HD resolution with intergrated IR illuminators						
	I) Indoor dome cameras	No	12				
	I) Bullet cameras	No	15				
3.2	Supply and installation of NVR with 4TB HDD, main and back-up	No	1				
3.3	Supply and installation of NVR, server, storage for 28 days	Sum	+				
3.4	Supply and installation of 18 Port PoE switches	No	2				
3.5	Supply and installation of all network and related cables	Sum	1				
3.6	Supply and installation of HD 46" monitor	No	2				
3.7	Allow for all licences as follows:						
	(i) general software	Sum	1				
	(ii) camera licences	No	27				
3.8	Supply and installation of 19" industrial cabinets complete	No	1				
3.9	Allow for integration into system for designated workstations	Sum	1				
3.10	Allow for any items not detailed above but						
	(i)	Sum	1				
	(ii)	Sum	1				
	(iii)	Sum	1				
TOTAL CARRIED FORWARD TO SUMMARY							

BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY (BIPA)

PROCUREMENT REFERENCE NO:

PROPOSED NEW BUSINESS AND INTELLECTUAL PROPERTY AUTHORITY(BIPA): ELECTRONIC INSTALLATIONS

No 4 : ALARM SYSTEM

ITEM	DESCRIPTION	UNIT	QTY	LABOUR RATE	MATERIAL RATE	TOTAL RATE	AMOUNT N\$
	<u>ALARM SYSTEM</u>						
4.1	Supply and installation of PIR Sensors	No	25				
4.2	Supply and installation of door contacts	No	8				
4.3	Supply and installation of controller box complete with accessories	No	2				
4.4	Supply and installation of 15W siren including wiring, etc	No	2				
4.5	Supply and installation of 6 Core Cabling	Sum	1				
4.6	Supply and installation of red light above door including wiring, etc	Sum	8				
4.7	Allow for co-ordination and intergration of radio transit to armed response company	Sum	1				
4.9	Supply and installation of alarm keypad with accerssories	No	2				
4.10	Allow for any item not included above but necessary for the completion of the installations:						
	(i).....	Sum	1				
	(ii).....	Sum	1				
	(iii).....	Sum	1				
TOTAL CARRIED FORWARD TO SUMMARY							

[illegible]

TOTAL CARRIED FORWARD TO SUMMARY

[illegible]

2518 - Electronics Installations Bill

2518 - Electronics Installations Bil

**TECHNICAL SPECIFICATIONS, BILL OF
QUANTITIES AND DRAWINGS FOR AIR
CONDITIONING AND VENTILATION
INSTALLATIONS**

Contents

Section 1: Eligibility Criteria

Section 2: Technical Specifications

Section 3: Forms to be Completed by Bidder

Section 4: Bill of Quantities

Section 5: Schedule of Rates for Variations

Section 6: Evaluation Criteria for Bidder

Section 7: List of Drawings

SECTION 1: ELIGIBILITY CRITERIA

To be eligible to participate in this Restricted Bidding exercise, the Bidder should:

- (a) have a valid company Registration Certificate;
- (b) have an original valid good Standing Tax Certificate;
- (c) have an original valid good Standing Social Security Certificate;
- (d) have a valid certified copy of Affirmative Action Compliance Certificate, proof from Employment Equity Commissioner that bidder is not a relevant employer, or exemption issued in terms of Section 42 of the Affirmative Action Act, 1998;
- (e) have a written undertaking as contemplated in section 138(2) of the Labour Act, 2007
- (f) have a certificate indicating SME Status (for Bids reserved for SMEs);
- (g) be registered with the Procurement Policy Unit (for Bids reserved to categories of bidders and goods);
- (h) submit signed Bid-Securing Declaration.
- (i) in case of a Joint Venture, all parties must submit the above and a valid JV Agreement
- (j) have a detailed company profile showing a list of the HVAC works carried out to date and the value of those HVAC works.

SECTION 2: TECHNICAL SPECIFICATIONS

2.1 GENERAL

This specification is for the supply, delivery, installation, and testing, commissioning and free maintenance during the guarantee period of:

- Air Conditioning & Ventilation Equipment specified

At the new BIPA Office Development on Erf 8681, Windhoek.

The specification and drawings form part of, and shall be read in conjunction with all contract documents and drawings; bills of quantities and the project specifications dealt with in this section.

2.2 LOCATION OF THE SITE AND SITE CONDITIONS

The site is located on Erf 8681 in Windhoek, Khomas Region.

The average site altitude is 1,650m above sea level. The average minimum

and maximum temperatures are $\pm 4^{\circ}\text{C}$ and 38°C during the winter and summer months respectively.

No official site inspection will be conducted prior to bid closing date and bidders must ensure that they familiarise themselves with local conditions.

2.3 CONTRACTOR'S RESPONSIBILITIES

The Ventilation Contractor shall be responsible for the supply, installation, testing, commissioning and free maintenance during the guarantee period of the installation detailed in this specification and on the accompanying drawings.

The Ventilation Contractor shall provide all materials, equipment, labour and services necessary for the complete, safe and efficient operation of the electrical installation in accordance with the intention of this specification and drawings.

The work shall be carried out strictly in accordance with the following:

- The Machinery and Occupational Safety Act No. 6 of 1983 and the relevant regulations as amended.
- Manufacturers Installation manuals of the various equipment.
- SABS 400: National Building Regulations
- SABS 0147: Refrigerating systems including plants associated with air conditioning systems
- SABS 1238: Air-conditioning ductwork

Please note the following:

- As-built drawings to be submitted upon completion of the contract.
- Comprehensive operating and maintenance manuals shall be submitted upon the completion of the contract.

Conflicts between specification and drawing if any such conflict is discovered where upon

the Engineer shall be informed.

2.4 SUMMARY OF WORKS

The work, as detailed in the attached specifications and accompanying drawings, includes the, supplying / manufacturing, delivery, installation, testing, commissioning and free maintenance for 12 months during the guarantee period to provide the Employer with a fully functional and operable mechanical plant.

2.5 WORK INCLUDED & EXCLUDED FROM THIS CONTRACT

The installation excludes:

All work specified in this document form part of this contract unless specifically excluded. All building work will be done by others.

The following work does not form part of the contract:

- Building and finishing of the buildings and all other associated work;
- Electrical distribution outside of the buildings. Electrical points for the equipment will be contractor will do the final connections of all HVAC equipment.

2.5.1 The installation includes:

- Supply and installation of Air Conditioning and Ventilation equipment as outlined in the Engineer's Drawings.

The successful bidder shall provide all materials, tools, equipment, labour and services necessary for the complete, safe and efficient operation of the installation in accordance with the intent of this specification.

2.6 INTERPRETATION OF DOCUMENTS AND DRAWINGS

The bid document shall be read in conjunction with the relevant drawings and, in case of discrepancies, such discrepancies must be pointed out to the Engineer. Likewise, any obvious errors and/or omissions in the bid document or on drawings shall be pointed out to the Engineer and he shall rectify all such errors in writing.

The positions of equipment, service outlets, etc., as shown on the drawings are approximate, and in some cases diagrammatic. The successful Bidder must verify the actual positions on site before construction and/or installation thereof can commence as no extra's will be allowed for any alterations to work proceeded with before proper verification.

Before fixing equipment, the Ventilation Contractor shall check with the Main Contractor on his detail drawings for the exact positioning of outlets and/or equipment. Any discrepancies between the Main Contractor's detail drawings and the Mechanical Engineer's drawings must be pointed out to the Engineer. The Ventilation Contractor shall co-ordinate all work on site with the other Successful bidders as well as with drawings for other services.

Bid drawings must be handed in with the completed bid document, as bids without drawings will be regarded as incomplete. The Sub-Contractor shall sign these drawings and clearly

mark all proposed alterations, deviations and errors with a red ink pen.

2.7 WORK PROGRAMME

The preliminary programme for the execution of the works is as follows:

Hand-over of site to Main Contractor	-
Estimated Handover to Successful bidder	-
Practical Completion and Hand-over of Completed Works to Employer	-
End of Defects liability period	-

The Successful bidder shall co-ordinate his work programme with that of the Main Contractor and submit his programme to the Engineer for approval.

2.8 PROJECT TECHNICAL SPECIFICATIONS

2.8.1 General

2.8.1.1 Refrigerant Insulation

All refrigerant suction tubes shall be insulated with 10 mm TERMAFLEX Type 33SE peroxydically improved (crosslinked) polyethylene foam tube insulation with quick-zip fastener, which shall meet the following requirements:

Temperature range	- 80 to + 120°C.
Thermal conductivity:	
+ 30°C	0,038 °C W/m²K
0°C	0,038 °C W/m²K
- 30°C	0,031 °C W/m²K
Specific mass	35 kg/m³
Odour properties	Neutral
Cellular structure	Totally enclosed
Fire properties	Self-extinguished to DIN 4012-B1 and ASTMD-11692-59T.

Insulation exposed to weather, or where required for protection against mechanical damage, shall be protected with aluminum, galvanized steel stainless steel sheet.

2.8.1.2 Refrigerant Charge

The refrigerant shall be either R410a or R407. The Contractor shall charge the system free of cost to the Client for the first year of plant operation, i.e. any leak will be rectified and the system shall be charged by the Contractor during the defects liability period at no extra cost. The pipework shall include a refrigerant charge point in the plant room, where the system can be filled if required.

2.8.1.3 Refrigerant Piping

Please refer to standard specifications.

- Materials & Installation: Strictly as per Manufacturers specifications; the Contractor shall submit routing drawings / sketches to the Engineer for approval.
- Sizing of refrigerant: Strictly as per Manufacturers specifications lines.
- Factory charged systems shall first be pressure tested and thereafter be vacuum tested. Field charged systems shall only be pressure tested.
- Refrigerant pipes and equipment shall be tested under vacuum and indications of leaks shall not be permitted at a pressure of 0, 68 kPa absolute, maintained for a period of one hour with the vacuum pump uncoupled.
- Refrigerant pipes and equipment shall be tested with clean dry nitrogen with a small quantity of refrigerant for a period of 24 hours at a test pressure of 1.1 times the appropriate maximum working pressure in terms of SABS 0147 – 1978: code of Practice for Refrigeration and Air Conditioning Installations.
- All connections shall be inspected for leaks by mean of a sensitive leak detector and soap bubble test.
- Flexible metal vibration absorbers shall be fitted at the compressor discharge and suction connections.
- Refrigerant tubing shall be secured in fittings padded with at least 13 mm thick felt strip, to prevent transmission of vibration.

2.8.1.4 Condensate drain piping

Materials	Ceiling void: uPVC all piping exposed to mechanical damage : copper uPVC piping exposed to direct sunlight required a UV resistant paint coating
Sizing	Strict as per relevant drawing
Slope	preferably : 1:50 Min : 1:100
Accessories required	First 3 m of condensate line (if mounted in ceiling void) shall be Insulated P-Trap shall be installed if the condensate line terminates in the sewer Reticulation (To prevent the migration of unwanted odours).

All pipes, vessels etc. operating below ambient dew point shall be insulated and a vapour barrier provided.

2.8.1.5 Pipe supports

Piping and cables against outside walls shall be covered with adequately sized "Instruct" channels, which shall be painted after installation. Hangers and supports to allow adjustment of slope of piping and removal without dismantling pipes. Hangers and supports to be complete with all necessary structural steel, rods, bolts, nuts, turnbuckles and other components including clamps, rods, bolts, nuts etc. to be painted with two coats of zinc chromate primer and where exposed to view with two additional coats of approved oil paint.

2.8.2 Split Air conditioners

2.8.2.1 General requirements

- The units shall be completely protected against over pressure in the system and improper operation by the user.
- The temperature to be gradually adjustable and automatically controlled within 2°C by a thermostat.
- The indoor unit to have three selectable fan speeds.
- The indoor unit shall be quiet running with an average sound pressure level measured at a distance of 2m not exceeding 28 dB(A) at the low setting and 30 dB(A) at the high setting respectively, and the centrifugal fan shall be completely balanced.
- Air filters to be easily accessible for cleaning.
- The controller shall be mounted as indicated on the drawing.
- The electrical sub-contractor will provide a 100 x 100 outlet with a 25-mm conduit to above ceiling for the controls.
- The room temperature shall be sensed at the return air inlet of the indoor unit.
- Condensate water to be discharged as indicated on the drawing.
- The gas and liquid piping to be insulated to prevent moisture condensation. All piping to be installed on galvanised mild steel cable trays provided by the sub-contractor.
- The outdoor units shall be mounted on suitable heavy-duty angle iron wall mounted brackets painted same colour as wall and provided by the sub-contractor.
- Wired control panels are preferred for this type of unit.

All split units shall be of the inverter controlled compressor type.

2.8.2.2 High Wall mounted Split (HWS) Units

The following wall mounted split type (HWS) air-conditioners, complete as specified on the relevant drawings, shall be provided. The air-conditioner shall conform to the following detail requirements and shall be provided with a:

Make	: Samsung or Daikin
Type	: High wall split (HWS)
Locations & capacities	: As per drawing
Heating/cooling	: Cooling and Heating
Installation	: Strictly in accordance with Manufacturer's specifications; Aesthetics of the installation is of utmost importance
Electrical	: 230VAC/50Hz/1phase or

2.8.2.3 Installation Details for outdoor unit

Outdoor units for the high wall split air conditioners shall be bolted to an approved supporting structure manufactured from welded 40 x 40 x 4 angle iron sections. 3 mm fillet welds shall apply throughout. The framework shall be adequately bolted to the wall. The framework shall be thoroughly cleaned and neatly painted in a colour scheme to be approved by the Engineer.

The indoor units shall be installed according to manufacturer's instructions. Piping between the indoor and outdoor units shall be chased in walls or installed above the ceiling. Making

good afterwards will be done by the principle contractor.

The outdoor unit shall always be selected in such a manner that the connected indoor units require the full capacity of the outdoor unit. The outdoor units shall preferably be selected for the least total number of units.

All outdoor units must be installed on the roof slab on top of the line shops. The outdoor units shall be installed according to manufacturer's instructions.

2.8.2.4 Remote Control Panels (RCPs)

RCP's shall be installed next to the door of the room.

2.8.2.5 Cassette type air-conditioning unit

- Ceiling cassette type cooling cycle only air-conditioner shall be installed in position as indicated on the drawings.
- The units shall be completely protected against over pressure in the system and improper operation by the user.
- The temperature to be gradually adjustable and automatically controlled within 2°C by a thermostat.
- The indoor unit to have three selectable fan speeds.
- The indoor unit shall be quiet running with an average sound pressure level measured at a distance of 2m not exceeding 35 dB(A) at the low setting and 43 dB(A) at the high setting respectively, and the centrifugal fan shall be completely balanced.
- Air filters to be easily accessible for cleaning.
- The controller shall be mounted as indicated on the drawing. The electrical sub-contractor will provide a 100 x 100 outlet with a 25-mm conduit to above ceiling for the controls.
- The room temperature shall be sensed at the return air inlet of the indoor unit.
- Condensate water to be discharged as indicated on the drawing.
- The gas and liquid piping to be insulated to prevent moisture condensation. All piping to be installed on galvanised mild steel cable trays provided by the sub-contractor.
- The outdoor units shall be mounted on suitable heavy-duty angle iron wall mounted brackets painted same colour as wall and provided by the sub-contractor.
- Wired control panels are preferred for this type of unit.

2.8.2.6 Installation

Installation of the units shall be strictly in accordance with the manufacturer's specifications and requirements. Aesthetics are considered to be of the utmost importance.

2.8.2.7 Capacities

The capacities indicated in the tender drawings are the de-rated effective capacities at ambient temperature and pressure. Any equipment offered by the Tenderer shall meet or exceed the requirements as indicated.

2.8.3 Rooftop Packaged Air Conditioning Units

The following rooftop packaged air-conditioners, complete as specified on the relevant drawings, shall be provided. The air-conditioner shall conform to the following detail requirements and shall be provided with a:

Make	: Daikin
Model	: UATYQ550CY1
Cooling Capacity	: 55.59 kW
Type	: Rooftop Packaged Air Conditioning Unit
Locations & capacities	: As per drawing
Heating/cooling	: Cooling and Heating
Installation	: Strictly in accordance with Manufacturer's specifications; Aesthetics of the installation is of utmost importance
Electrical	: 400VAC/50Hz/3phase

2.8.4 VENTILATION Equipment

General

2.8.4.1 Ductwork Material

Ductwork shall be fabricated from prime quality galvanised sheet steel, except where otherwise called for.

2.8.4.2 Fabrication Standards

Ductwork shall be fabricated and installed in accordance with the following specification which shall be read in conjunction with the standards laid down by the Sheet Metal and Refrigeration Contractors National Association (of America) (SMACNA) which standards shall be adhered to in detail excepting only as hereinafter specified.

2.8.1.3 Rectangular Ductwork

Duct Size Long Side - mm	Up to 750 mm	751 to 1370	1371 to 2130	2131 upwards
Sheet Steel Thickness - mm				
0,6	0,8	1,0	1,2	
Cross Bracing Length - mm				
	2400	2400	2400	2400
Longitudinal Seams	Pittsburgh Lock for all Duct Sizes			
Cross Joints	At Maximum Centres of 2400mm / 1220mm			
Long Side S'Slip	25mm Slip	38mm Slip	38mm Bar Slip Reinforced or	
Short Side	Drive Slip	Drive Slip If under 450 mm otherwise 38mm Bar Slip L Flanges	38 x 2mm L. Reinforced Standing seam or 38 x 3 mm	
ALTERNATIVELY on all sides	Pocket Lock 25 mm	Pocket Lock 38 mm	Pocket Lock 38mm L.RFD	
Supports	Minimum			
Angles - mm	38 x 3	38 x 5	38 x 6	50 x 6
Rods. Dia. mm	6	10	12	12
Spacing, maximum - mm	3600	3000	2400	1800

NOTE: SHEET METAL STRAPS WILL NOT BE ACCEPTED FOR SUSPENSION OF DUCTWORK

Rectangular ductwork shall be regarded as low velocity ductwork suitable for pressures up to 50mm wg and velocities up to 10 meters per second. It shall accordingly be fabricated and installed in compliance with the above requirements and the "Low Velocity Duct Construction Standard" manual published by SMACNA.

2.8.1.4 Circular Ductwork

Circular ducting of approved size shall be installed in all exposed areas, i.e. Trading Areas.

2.8.5 Fans

2.8.5.1 General

Fans shall be statically and dynamically balanced and shall be free of any objectionable vibrations. Fan bearings shall be selected for a minimum of 200 000 hours average life.

Lubrication points for fan bearings shall be readily accessible and shall where necessary be extended to the outside of the fan casing. The shafts and bearings are to be properly protected from rust and corrosion by means of suitable wrapping and protective grease coatings prior to commissioning

Fan openings shall be provided with protective wire guards in accordance with the Manpower and Occupational Safety Act, 1983. The unit shall be supplied with a safety harness or weather cab complete with a back draught shutter

Fans shall be selected highest possible efficiency with lowest possible blade tip speed.

2.8.5.2 Axial Fans

Unless otherwise specified, axial flow fans shall be in-line, direct driven type, with motor mounted inside the fan housing. The fan rotor assembly shall be attached directly to the motor shaft.

The fan casings shall be spun from mild steel with integral pre-drilled and radiuses inlet flange, hot dipped galvanized after manufacture. Vibration isolators shall be installed if required.

Fans shall be provided with adjustable pitch blades. Fans installed under free intake conditions shall be fitted with an inlet cone supplied by the fan manufacturer.

Fan motors shall be totally enclosed, rated for continuous operations of the squirrel cage induction type suitable for vertical and horizontal installation and Class F insulation. Motor protection shall be to IP55 with a temperature range between –40°C to +50°C. DONKIN, AMS or WOODS fans will be preferred for this type of fan.

2.8.5.3 Capacities

The capacities indicated in the table below are the effective capacities. Any equipment offered by the Bidding Ventilation Contractor shall meet or exceed the requirements as set out below. Any alternative equipment offered, must be attached to the submitted bid.

Section II Table 1

Room/Area	Existing Building Boardroom
Category	Fresh Air Supply
Qty	1
Type	Axial Fan
Req. Capacity	40 L/s
Make and Model	S&P TD-350/125 SILENT or Equal
Req. Static Pressure	100 Pa or Greater
Max. Allowable Noise	40 dBA
Req. Accessories	1. Speed Controller

Section II Table 2

Room/Area	New Building Boardroom
Category	Fresh Air Supply
Qty	1
Type	Axial Fan
Req. Capacity	50 L/s
Make and Model	S&P TD 500/150 or Equal
Req. Static Pressure	100 Pa or Greater
Max. Allowable Noise	55 dBA
Req. Accessories	1. Speed Controller

2.8.5.4 Electrical Supply

Fan motors shall be totally enclosed, rated for continuous operation with sealed life bearings and with Class F insulation. Motor protection shall be to IP55 with a temperature range between -10°C to $+50^{\circ}\text{C}$. Electrical supply will be provided by the electrical sub-contractor.

2.8.5.5 SOUND ATTENUATORS

Sound attenuators shall be provided and installed where necessary and shall be selected to provide the Noise Criteria levels specified in Part Three hereof. Sound attenuators shall be the factory fabricated product of an accredited manufacturer of such equipment such as SOUND ATTENUATORS LIMITED or TROX, who publish selection data on their products which data shall be submitted to the Engineers for approval of each sound attenuator offered.

Metalwork on sound attenuators shall be galvanised steel or aluminium and acoustic insulation shall be non-combustible material, properly bonded and covered as so not to permit insulation particles being eroded by air movement over them.

Sound absorbing lining material of sound attenuators in low velocity ductwork shall have a density of not less than 24 kg/ms and a thickness of not less than 25 mm and in medium pressure ductwork the thickness shall not be less than 50 mm with a minimum density of 48 kg/ms. Material for cell type sound absorbers shall be of the rigid type. The sound absorbing efficiency at each frequency shall not be less than:-

Frequency-cycles per second	250	500	1000	2000
Percentage Absorption	45	65	70	80

Lining which is damaged in shipment or due to exposure or any other cause shall not be installed and any material, which may be damaged prior to the final acceptance, shall be replaced as directed by the Engineer.

Casings shall be manufactured of galvanized sheet steel not lighter than the thickness previously specified herein for ductwork of the same dimensions.

2.8.6 INFORMATION, DIAGRAMS, DRAWINGS AND MANUALS TO BE SUBMITTED

As part of his bid and subsequent contract, it will be required from the Bidder/Contractor to submit certain documents as per this section, in accordance with the following programme:

2.8.6.1 WITH THE BID (AT CLOSING DATE):

- Marked-up copies of all drawings indicating in red all required alterations to the concrete, brickwork or whatever other aspect falling outside the scope of his contract;
- Manufacturer's pamphlets and/or brochures illustrating all equipment offered;
- Any other information that the Bidder regards necessary to clarify his offer.

2.8.6.2 Within 40 days after Award of the Contract:

- Working drawings of all ducting and piping routes showing layouts, equipment used and dimensions.
- A work programme as specified herein.

2.8.6.3 On Completion:

- A complete set of "As-Built" drawings;
- A test & commissioning certificate
- Three sets of comprehensive maintenance/operating manuals prepared for the specific installation including AS BUILT drawings, diagrams and maintenance schedules etc.(Refer to the Standard specifications).

All manuals and certificates shall be completed in an orderly and logical manner, and shall be bound in booklet form with a protective cover. The text of instructions, diagrams and drawings shall be "English".

2.8.7 REJECTION OF INFERIOR WORK AND MATERIAL

All inferior work or work containing inferior material, shall be rejected by the Engineer at his discretion, where upon the HVAC Contractor shall immediately remove and rectify the works as required and bear all costs in connection therewith.

2.8.8 GENERAL STANDARD OF WORK

The specification and drawings are intended to show the type of plant required and the minimum standard of equipment acceptable. Should bidders consider that additional plant, fittings, etc be necessary to ensure a satisfactory and first class installation, these must be allowed for on a separate priced sheet, indicating the extend of additional plant, fitting, etc. In the absence of any such variations in the bid, it will be understood that bidders have included for everything to ensure a satisfactory installation which will comply with good Engineering Practice in all respects. All work shall be done by a competent person(s) who has served a recognized apprenticeship or who has had a minimum of five years' experience in this type of installation.

2.8.9 TESTING AND COMMISSIONING

Applicable to this Contract – refer to Standard Specifications

2.8.10 12-MONTH FREE MAINTENANCE GUARANTEE

Applicable to this Contract – refer to Standard Specifications

The maintenance and guarantee period shall be twelve (12) months from the date of successful first delivery acceptance and shall comply with the relevant clauses of the Standard Specification.

It is required that bidders allow for 12 months maintenance services of the installation, four visits, one every 3 months after successful practical conception.

SECTION 3: FORMS TO BE COMPLETED BY BIDDING VENTILATION CONTRACTOR

- A INFORMATION ABOUT THE BIDDER
- B AUTHORITY FOR SIGNATORY
- C SCHEDULE OF WORK EXECUTED BY THE BIDDER
- D SCHEDULE OF WORK TO BE SUB-LET

A. INFORMATION ABOUT THE BIDDER

1. IF THE BIDDER IS A COMPANY

1.1 Directors of the Company

List the Directors of the Company, their nationality together with the date on which each Director has been appointed:

<u>Name of Director</u>	<u>Date of Appointment</u>	<u>Nationality</u>
.....		
.....		
.....		

1.2 Shareholding

(a) List all the shareholders of the Company:

<u>Full names</u>	<u>Nationality</u>
.....	
.....	
.....	

(b) List all companies of which the Company is a shareholder:

.....

.....

.....

.....

2. IF THE BIDDER IS A CLOSED CORPORATION

List the members of the Closed Corporation, their nationality including, their date of appointment as well as their percentage interest in the C.C.

<u>Name of Member</u>	<u>Date of Appointment</u>	<u>% Interest in C.C.</u>	<u>Nationality</u>
.....			
.....			
.....			

3. IF THE BIDDER IS A PARTNERSHIP

List the partners in the Partnership, the date of accession as well as each one's profit/loss distribution ratio.

Name of Partner	Date of Accession	Profit/loss Distribution Ratio	<u>Nationality</u>
.....			
.....			
.....			

4. IF THE BIDDER IS AN INDIVIDUAL

Supply the full names, and I.D. number of the Bidder:

<u>Full names</u>	<u>I.D. Number</u>	<u>Nationality</u>
.....		
.....		
.....		

SIGNED ON BEHALF OF BIDDER:

B. AUTHORITY FOR SIGNATORY

Signatories for Companies, Partnerships or Closed Corporations must establish their authority by attaching a copy of the relevant resolution of their Board of Directors, Members or Partners duly signed and dated. An example is shown below for a Company:

By resolution of the Board of Directors at a meeting on
..... 2022.

at

Mr

whose signature appears below, has been duly authorized to sign all documents in connection with this

Bid Reference No.

on behalf of (block capitals)

SIGNED ON BEHALF OF COMPANY:

IN HIS CAPACITY AS:

DATE:

SIGNATURE OF SIGNATORY:

WITNESSES: 1.
 2.

C. SCHEDULE OF WORK EXECUTED BY THE BIDDER

1. COMPLETED CONTRACTS

The Bidder must insert in the spaces provided below, a list of work completed by him during the past five (5) years. Only work of a similar nature to this Contract must be listed.

EMPLOYER	CONSULTING ENGINEER NAME AND TEL.	NATURE OF WORK	YEAR COMPLETED

2. CURRENT CONTRACTS

The Bidder must insert in the spaces provided below, a list of work at present under construction by his firm.

EMPLOYER	CONSULTING ENGINEER NAME AND TEL.	NATURE OF WORK	VALUE OF WORK	EXPECTED COMPLETION DATE

SIGNED ON BEHALF OF BIDDER:

D. SCHEDULE OF WORK TO BE SUB-LET

The Bidder shall list below items of specialized work on this Contract which he intends to sub-let.

If the Bidder intends to carry out specialized work himself, he shall state this.

The acceptance of this Bid shall not be construed as approval of the work to be sub-let. Should any or all of the Sub-contractors not be approved subsequent to acceptance of Quotation, this shall in no way invalidate this Bid and the quoted rates and prices for the various items of work shall remain final and binding even in the event of a Subcontractor not listed below, being approved by the Engineer.

ITEM	DESCRIPTION OF WORK	NAME OF SUBCONTRACTOR

SIGNED ON BEHALF OF BIDDER:

E. ALTERNATIVE QUOTATIONS

In addition to my/our Tender without any qualifications and strictly on the basis of the Tender Documents, I/we wish to submit the following alternative quotations:

ALTERNATIVE NUMBER	DETAIL

Full details are submitted with this Document but bound separately.

SIGNED ON BEHALF OF TENDERER:

SECTION 4: BILL OF QUANTITIES

The quantities in these Bills of Quantities are not to be used for ordering materials.

The Bill of Quantities forms part of and must be read in conjunction with the specification, which contains the full description of the work described in the Bills of Quantities, reference should be made to the specification for the full meaning or description of work to be done and materials and equipment to be used in this service.

The total bid price on the Bid Form shall constitute the contract price of the successful tenderer. Bidders are advised to check their item extensions and total additions, as no claim for arithmetical errors will be considered.

No alteration, erasure or addition is to be made in the text of the Bill of Quantities. Should any alteration, or erasure be made, it will not be recognized but the original wording of the Bills of Quantities will be adhered to.

The priced Bill of Quantities of the successful bidder will be checked and the Engineer reserves the right to call for adjustments to any individual price and to rectify the discrepancy.

Variations in the scope and extent of the work included in the Bill shall be allowed to meet the Employer's requirements and shall be measured and costed at rates entered in the Bill, where appropriate, and shall form additions to or deduction from the total of the Bill.

Any items or variations for which rates have not been included in the Bill shall be agreed and priced as non-scheduled items in accordance with the provisions of the contract.

The rules covering the extent and costing of the variation shall be those provided for in the form of conditions of contract.

Unless a separate rate for the supply and for the installation of any item is specifically called for, the supply and installation costs of any item shall be fully included in the unit price.

The description of each item shall, unless otherwise stated herein, be held to include making, conveying and delivering, unloading, storing, unpacking, hoisting, setting, fitting and fixing in position, cutting and waste, patterns, models and templates, plant, temporary works, return of packing's, establishment charges, profit and all other obligations arising out of the conditions of contract.

All fittings and accessories always include the connections thereto.

All measurements are net, unless otherwise stated, and tenderers must allow in their rates of wastage.

The quantities and rates included for day work shall form part of the bid price, but bidders shall note that this item must be regarded as provisional and will only be payable to the contractor if and when a written order to this effect has been issued.

All provisional sums shall be expended as directed by the Engineer and any balance remaining shall be deducted from the amount of the contract sum.

All taxes, duties both import and/or customs, and any other surcharges, surtaxes and charges shall be included in all prices given in this priced Bill of Quantities.

VAT is to be added only in the price summary of the Bill of Quantities.

SECTION 5: SCHEDULE OF RATES FOR VARIATIONS

5.1 GENERAL

- 5.1.1 The rates entered in this schedule shall serve unaltered to calculate the value of variation orders (additions or omissions) issued in terms of the Contract.
- 5.1.2 The rates entered shall exclude the Main/Principal Contractor's discount.
- 5.1.3 These rates shall include the following items necessary for the supply, delivery, handling and installation of all applicable equipment:

Nett cost of material.

- Profit, storing cost, handling charges, etc. for material.
- Nett costs of labour.
- Labour overheads and profit on labour.
- General sales tax and any other duties payable.
- Attributable overhead costs.

- 5.1.4 As the rates entered will only be used to calculate the value of variations, **the Bidder shall complete only list those rates of items to be used under this contract.**

5.2 PROFIT ON MATERIAL FOR OMISSION AND ADDITIONS : (%)

The following percentage profit will be required on all materials for additions or omissions not covered by any other section of this schedule. This percentage shall include all direct overheads, handling charges, etc.

Nett percentage: -----%

5.3 RATES FOR ADDITIONAL LABOUR : (N\$/h)

These rates shall be applied to determine labour costs not covered by any of the other sections of this schedule.

<u>Supervisor/ Foremen</u>	<u>Qualified artisan</u>	<u>Appren- tice</u>	<u>Conduit installer</u>	<u>Labourer</u>
Normal rate	-----	-----	-----	-----
Overtime (week)	-----	-----	-----	-----
Saturday time	-----	-----	-----	-----
Sunday time	-----	-----	-----	-----

5.4 RATES FOR TRANSPORT : (N\$/km)

Rates shall include the cost of a licensed driver fuel, oil, maintenance, etc.

<u>Vehicle capacity</u>	<u>Rate per kilometer</u>
Up TO 1500 kg	-----
1600 to 3000 kg	-----
3100 to 7000 kg	-----

SIGNATURE OF BIDDER : _____ DATE: _____

NAME OF BIDDER : _____

ADDRESS : _____

: _____

: _____

TELEPHONE NUMBER : _____

FACSIMILE NUMBER : _____

SECTION 6: EVALUATION CRITERIA FOR BIDDING VENTILATION CONTRACTOR

This section contains supplementary criteria that the Employer shall use to evaluate bids.

1. Evaluation:

The following mandatory documents of the Bidding Ventilation Contractor must accompany the bid submission:

- I. A valid company Registration Certificate.
- II. An original or certified copy of a valid good standing Tax Certificate.
- III. An original or certified copy of a valid good standing Social Security Certificate.
- IV. A valid certified copy of an Affirmative Action Compliance Certificate, proof from Employment Equity Commissioner that bidder is not a relevant employer or exemption issued in terms of Section 42 of the Affirmative Action Act, 1998.
- V. A written undertaking as contemplated in Section 138 (2) of the Labour Act, 2007.
- VI. A valid certified copy of a certificate indicating SME Status (for bids reserved to SMEs).
- VII. A certified copy of a valid full Business Registration Certificate Trade Licence: (Bidders are required to tender in line with business principles of HVAC contracting /maintenance of HVAC systems).
- VIII. Proof of registration with the Procurement Policy Unit (for Bids reserved to categories of bidders and goods)
- IX. A signed Bid-Securing Declaration
- X. Company profile showing list of air conditioning and ventilation installations completed, with their value of work.
- XI. Letter from the Air Conditioning and Ventilation equipment suppliers indicating that the bidder is authorized to install the equipment offered in this bid submission.

	Description of Requirement	Yes/No
Item I	A valid company Registration Certificate submitted	
Item II	Original or certified copies of a valid good standing Tax Certificate submitted	
Item III	Original or certified copy of a valid good standing Social Security Certificate submitted	
Item IV	A valid certified copy of an Affirmative Action Compliance Certificate submitted	
Item V	A written undertaking as contemplated in Section 138 (2) of the Labour Act, 2007 submitted	
Item VI	A valid certified copy of a certificate indicating SME Status submitted	
Item VII	A certified copy of a valid full Business Registration Certificate Trade Licence as an HVAC Installer submitted	
Item VIII	Proof of registration with the Procurement Policy Unit (for Bids reserved to categories of bidders and goods) submitted	
Item IX	A signed Bid-Securing Declaration submitted	
Item X	I. Company profile showing list of air conditioning and ventilation installations completed, with their value of work.	
Item XI	Letter from the air conditioning and ventilation equipment suppliers indicating that the bidder is authorized to install the equipment offered in this bid submission.	
ITB 6.3(c)	proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment; <i>Transport truck ,lifting equipment, moving equipment, ladders or scaffolding, assorted hand tools, Electrical test equipment.</i>	
ITB 6.3(d)	a Contract Manager/Supervisor with five years' experience in works of an equivalent nature and volume, CV to be attached.	
ITB 6.3(e)	liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than the amount N\$ 600,000.00. Proof to be attached Note: Letter of Intent from any financial institution will not be considered valid credit facility.	

In addition to the criteria listed in ITB 6.3, ITB 13.1 and ITB 33 the following criteria shall apply:

(a) Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section I.

EQUIPMENT OFFERED (Maximum 20 points)

Equipment Offered - Ventilation Installations			
Item	Engineer's Specification	(To be completed by Bidder)	To be completed by client
		Bidder's Offer	Compliance (Yes/No)
			Yes - Acceptable Offer
			No - Unacceptable Offer
Split High Wall A/C Units	Split High Wall A/C Units shall be Samsung New Max Inverter AR4500 Series or Equal and Approved.		
Split Ceiling Cassette A/C Units	Split Ceiling Cassette A/C Units shall be Samsung Wind Free Four (R32) Series or Equal and Approved.		
Fresh Air Supply Fan	Fresh Air Supply Fans shall be S&P TD Silent Series or Equal and Approved, and with speed controller		

Item	Description	Max 20 Points		
		Fully completed (20 Points)	Partially completed (10 Points)	Not completed (0 Points)
1.3	Equipment Offered – Air Conditioning & Ventilation Installations			

CONTRACTOR'S DATA SHEET (Maximum 15 points)

Item	Description	Max 15 Points
2		
2.1	Key Personnel (Project Manager, Foremen, etc.) 1=5 points (Max)	
2.2	Technical Personnel (Technicians, Artisans, etc.) 1-2=3points : > 3=5points Max=5 points	
2.3	Support Staff (1-2 = 3 points : > 3 = 5 points Max=5 points)Max= 5points)	
	Sub Total Points	

SERVICE FACILITIES (Maximum 10 points)

Item	Description	Max 10 Points		
		In Namibia (10 Points)	In SADC (5 Points)	Other (0 Points)
3				

3.1	Service Staff, Workshop and Equipment available in Namibia			
-----	--	--	--	--

PLANT AND EQUIPMENTS (Maximum 15 points)

Item	Relevant Equipment	Points	Description/Type	Owned/Hired
4.1	Transport (Truck)	5		
4.2	Electrical test equipment for Neonatal Appliances	2		
4.3	Lifting equipment (lifts, cranes, hoist, etc.)	2		
4.4	Moving equipment (forklifts, hand trucks, floor dollies, etc.)	2		
4.5	Hand and machine tools (spanners, driver, drills, etc.)	2		
4.6	Climbing equipment (ladders, scaffolding, lifts, etc.)	2		
	Total Points			

COMPLETED PROJECTS OF SIMILAR NATURE (Maximum 20 points)

Project Name	Completed on Time (yes/no)	Project Value in Millions (Successfully completed minimum of 1 projects within 5 years)		
		(N\$0 to N\$1 000 000): 10 points	(N\$1 000 001 to N\$2 000 000): 15 points	(N\$2 000 001 and above): 20 points
Total points				

MECHANICAL VENTILATION EQUIPMENT MANUFACTURER CERTIFICATION (Maximum 10 points)

Item	Description	Max 10 points
		Provided (Yes = 10)

		No = 0)
6.1	Bidder certified / approved by Manufacturer	
6.2	Copy of proof to be attached	

MECHANICAL VENTILATION EQUIPMENT SPARE PARTS AND MAINTENANCE (Maximum 10 points)

Item	Description	Max 10 points
		Provided (Yes = 10 No = 0)
7.1	Spare parts for all equipment offered available ex-stock in SADC Countries	
7.2	Maintenance service for equipment offered available outside SADC Countries	

Range of Quotations

Only bids that obtain 70% or more of the technical scores and whose bid prices fall within the range of 15% below or 15% above the estimated Installation cost, including contingencies, escalation and VAT, will be further evaluated.

Formulae:
$$\text{Bidders \% Score} = \frac{\text{Total Bidders Points}}{\text{Maximum Points}} \times 100\%$$

SECTION 7: LIST OF DRAWINGS

<i>DRAWING CODE</i>	<i>DESCRIPTION</i>
2518-AC-01	HVAC INSTALLATIONS – EXISTING BUILDING
2518-AC-02	HVAC INSTALLATIONS – NEW BUILDING

ITEM NO	SECTION REFERS	DESCRIPTION	UNIT	QTY	LAB. RATE	MATER. RATE	TOTAL RATE	AMOUNT N\$
		SECTION A:						
		PRELIMINARY AND GENERAL						
A.1		THE SITE AND STORAGE						
A.1.1		Employer default	Item	1				
A.1.2		Damage to buildings or other services and making good	Item	1				
A.1.3		Packing and storage	Item	1				
A.1.4		Observation of site condition and co-ordination	Item	1				
A.1.5		Use of site	Item	1				
A.1.6		Fencing, lighting and guarding	Item	1				
A.1.7		Site Control	Item	1				
A.1.8		Allowance for collection and disposal of rubbish or excavation material	Item	1				
A.2		MANAGEMENT OF CONTRACT						
A.2.1		Construction programme	Item	1				
A.2.2		Provisional Sums	Item	1				
A.2.3		Forman and Contractor's agent	Item	1				
A.2.4		Workman	Item	1				
A.2.5		Procedures	Item	1				
A.2.6		Progress of works and site visit	Item	1				
A.2.7		Co-operation with other contractors	Item	1				
A.2.8		Responsibility for Works	Item	1				
A.3		MATERIALS AND WORKMANSHIP						
A.3.1		Quality of work	Item	1				
A.3.2		Quality control	Item	1				
A.3.3		Samples	Item	1				
A.3.4		Spare parts	Item	1				
A.4		TEMPORARY WORKS, PLANT AND SERVICES						
A.4.1		Temporary works and plant	Item	1				
A.4.2		Equipment	Item	1				
A.4.3		Testing equipment	Item	1				
A.4.4		Temporary services	Item	1				
A.5		FINANCIAL ASPECTS						
A.5.1		Penalties	Item	1				
A.5.2		Escalation	Item	1				
A.5.3		Security	Item	1				
A.5.4		Insurance	Item	1				
AMOUNT CARRIED FORWARD								

ITEM NO	SECTION REFERS	DESCRIPTION	UNIT	QTY	LAB. RATE	MATER. RATE	TOTAL RATE	AMOUNT N\$
AMOUNT BROUGHT FORWARD								
A.5.5		Reserved rights	Item	1				
A.5.6		Stamp Duties	Item	1				
A.5.7		Forward cover	Item	1				
A.5.8		Material off site	Item	1				
A.5.9		Government and local regulations	Item	1				
A.5.10		Fees	Item	1				
A.5.11		Placing of orders	Item	1				
A.5.12		Terms of payment	Item	1				
A.5.13		Variation orders	Item	1				
A.6		DOCUMENTATION AND MEASUREMENT						
A.6.1		Standard Measurement	Item	1				
A.6.2		Scale and Dimensions	Item	1				
A.6.3		Workshop drawings and "As-Built" workshop drawings	Item	1				
A.6.4		Operating and Maintenance Manuals	Item	1				
A.7		TRANSPORT						
A.7.1		Transport to site	Item	1				
A.8		TEST, COMMISSION AND HAND OVER						
A.8.1		Contractors inspection and commissioning tests	Item	1				
A.8.2		Contractors test and inspection reports	Item	1				
A.8.3		Preliminary and completion inspection	Item	1				
A.9		GUARANTEE AND MAINTENANCE						
A.9.1		Guarantee/maintenance period	Item	1				
A.9.2		Replacement	Item	1				
A.9.3		Rejection of equipment	Item	1				
AMOUNT CARRIED FORWARD TO SUMMARY PRELIMINARY AND GENERAL								

ITEM NO	SECTION REFERS	DESCRIPTION	UNIT	QTY	LAB. RATE	MATER. RATE	TOTAL RATE	AMOUNT N\$
B.1		SECTION B: AIR CONDITIONING AND VENTILATION INSTALLATIONS						
		Air Conditioning Installations						
B.1.1		Split in-ceiling four way cassette units; with wired remote controllers, the following nominal cooling capacities and reverse cycle heating, as Samsung Wind-Free 4 way (R32) or Equal and Approved, with fresh air intake kit, condensate drain pump and matching outdoor units.						
B.1.1.1		AC140RN4DKG/EU (13.4 kW)	set	2				
B.1.2		Split high wall air conditioning units; with remote controllers, the following nominal cooling capacities and reverse cycle heating, as Samsung New Max Inverter AR4500 Series or Equal and Approved						
B.1.2.1		AR12BSHGAWK/FA (3.05 kW)	set	1				
B.1.2.2		AR18BSHGAWK/FA (4.69 kW)	set	6				
B.1.2.3		AR24BSHGAWK/FA (7.03 kW)	set	6				
B.1.3		Complete refrigeration piping between indoor and outdoor units with sleeved insulation	L/Sum	1				
B.1.4		Complete A/c drain piping	L/Sum	1				
B.1.5		All pipe and cable trunking/sleeves	L/Sum	1				
B.1.6		All power and control cabling between outdoor and indoor units and power supply and units	L/Sum	1				
B.1.7		Outdoor mounting brackets	Set	15				
B.2		Ductwork A: Fresh Air Supply to Boardroom at the Existing Building						
B.2.1		Axial supply fan as S&P TD-Silent or Equal Axial Fan, with speed controller, filter box and SA Wall Terminal						
B.2.1.1		TD-350/125 Silent (40 l/s)	No	1				
B.2.2		Ducting to be fabricated from mild steel 2mm sheeting in accordance to SABS. Hangers(OLPC) and Supports(OL) shall be of Oline mechanical supports or equal.						
B.2.2.1		Rigid Ducting (Circular): Ø125	m	5				
B.2.2.2		Flexible Ducting (Circular): Ø125	m	0.5				
B.2.2.3		Elbow Ducting (Circular), 90° Ø125	No	1				
B.2.2.4		Weather louvres as Advantage Air or Equal, with Plenum Box 150x150	set	1				
B.3		Ductwork B: Fresh Air Supply to Boardroom at the New Building						
B.3.1		Axial supply fan as S&P TD-Silent or Equal Axial Fan, with speed controller, filter box and SA Wall Terminal						
B.3.1.1		TD-500/150 Silent (50 l/s)	No	1				
AMOUNT CARRIED FORWARD								

ITEM NO	SECTION REFERS	DESCRIPTION	UNIT	QTY	LAB. RATE	MATER. RATE	TOTAL RATE	AMOUNT N\$
B.3.2		Ducting to be fabricated from mild steel 2mm sheeting in accordance to SABS. Hangers(OLPC) and Supports(OL) shall be of Oline mechanical supports or equal.						
B.3.2.1		Rigid Ducting (Circular): Ø150	m	10				
B.3.2.2		Flexible Ducting (Circular): Ø150	m	0.5				
B.2.2.3		Elbow Ducting (Circular), 90° Ø150	No	1				
B.3.2.3		Weather louvres as Advantage Air or Equal, with Plenum Box 200x200	set	1				
AMOUNT CARRIED FORWARD TO SUMMARY								
B.	AIR CONDITIONING AND VENTILATION INSTALLATIONS							

ITEM NO	SECTION REFERS	DESCRIPTION	UNIT	QTY	LAB. RATE	MATER. RATE	TOTAL RATE	AMOUNT N\$
C.1		SECTION C: LUMP SUMS						
		All other material and everything to provide						
		Listed items of above:						
		a)	L/sum	1				
		b)	L/sum	1				
		c)	L/sum	1				
		d)	L/sum	1				
		e)	L/sum	1				
		f)	L/sum	1				
		g)	L/sum	1				
C.2		any further items required to provide complete safe, reliable and well functioning installation						
		Listed items of above:						
		a)	L/sum	1				
		b)	L/sum	1				
		c)	L/sum	1				
		d)	L/sum	1				
		e)	L/sum	1				
		f)	L/sum	1				
		g)	L/sum	1				
		AMOUNT CARRIED FORWARD TO SUMMARY						
C.		LUMP SUMS						

