

**BILL OF QUANTITIES (BOQ) AND TECHNICAL SPECIFICATION FOR THE REFURBISHMENT OF
METEOROLOGICAL OFFICE AT LUNGI AIRPORT, LUNGI.**

LOT 2

BILLS OF QUANTITIES

FOR

**PROPOSED REHABILITATION OF METEOROLOGICAL
APARTMENT BUILDING**

SITUATED AT LUNGI AIRPORT

CLIENT

UNDP

AUGUST

2017

LUNGI AIRPORT BUILDING

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	<u>GROUND FLOOR</u>				
	<u>DEMOLITION</u>				
A	Allow provisional sum for all demolition works within the floor and clear away all debris off site	ump sum			
DEMOLITION WORK Carried to SUMMARY					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	<u>BLOCK WORK</u>				
	<u>BLOCKWORK IN SUPERSTRUCTURE</u>				
	<u>Precast sandcrete blockwalling bedded and jointed in cement and sand mortar 1:6 mix:</u>				
A	150mm thick block wall(close AC hole & toilet walls)	23	m ²		
B	100mm thick ventilation block wall(toilet walls)	12	m ²		
BLOCK WORK Carried to SUMMARY Le					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	<u>ROOFING</u>				
A	Allow provisional sum for checking roof for leakages and change all damage roof coverings and members that are effected due to the leakages complete with preservatives (approximately 124m ²)	100	m ²		
	<u>TOILET ROOFING</u>				
B	28 guage corrugated iron roofing sheet covering to the toilet area	20	m ²		
	<u>WOOD WORK</u>				
	<u>HARD WOOD TREATED WITH WOOD PRESERVATIVE</u>				
F	50mm x 150mm ceiling joist/bearer	50	m		
G	50mm x 150mm wallplate	44	m		
H	50mm x 100mm rafter	31	m		
I	50mm x 75mm purlin	62	m		
J	50mm x 100mm strut and braces	45	m		
K	Fascia board	25	m		
ROOFING CARRIED TO SUMMARY					

Lungi Building(first floor) at Lungi Airport.

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	WOOD WORK				
	<u>Timber Doors</u>				
A	Change plywood flush door to timber panel doors complete with frames,locks and hinges overall size				
B	0.95m wide x 2.1m high	8	No		
	<u>Toilet doors complete with frame and locks</u>				
C	0.75m wide x 2.1m high	2	No		
	<u>IRONMONGERY</u>				
D	Change faulty timber door locks	10	No		
WOODWORK Carried to SUMMARY Le					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	METAL WORK				
	<u>Steel Door</u>				
A	Generally allow provisional sum for greasing ,repair and maintenace good steel flush door to fullest function .		Sum		
B	Replace all damage steel door locks	1	No		
	<u>Aluminum sliding window</u>				
	<u>Remove all steelcasement windows and replaced with aluminum sliding window in bronze/anidised frame, mesh and tinted glazing,complete with lock and stay to fit overall size:</u>				
C	0.6m wide x 0.6m high	2	No		
D	2m wide x 1.5m high	1	No		
E	2m wide x 1.8m high	2	No		
F	2.5m wide x 1.8m high	5	No		
	<u>GUARD BARS</u>				
	<u>Steel guard bars (as Architect Design)constructed with 25mm x 50mm RHS as main bar and 25mm x 25mm SHS as horizontal bard,150mm centres fabricated off site by welding and fixe to.</u>				
G	0.6m wide x 0.6m high	2	No		
H	2m wide x 1.5m high	1	No		
I	2m wide x 1.8m high	2	No		
J	2.5m wide x 1.8m high	5	No		
METAL WORK Carried to SUMMARY					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	<u>PLUMBING INSTALLATION</u>				
	<u>PIPE INSTALLATION</u>				
A	Allow provisional for checking all plumbing service lines connected to the systems, make good or replaced were necessary.		Sum		
	<u>SANITARY APPLIANCES</u>				
B	Low level WC suite with cistern comprising of flush fbend, syphone, ball valve, operating handles, rubber cone connector, plastic seat and cover, bowl fixed to concrete floor and cistern to wall on bracket	2	No		
C	White Vitreous China Wash Hand Basin, with two tap holes, overflow and chainhole complete withl 2no 12mm diameter chromium plated taps, chain, stay and 306mm waste fittings and fixed to wall. on bracket.	2	No		
	<u>BATHROOM FURNITURE</u>				
	<u>Provide and replaced damage or mising the below listed plumbing fittings.</u>				
D	Toilet roll holder	2	No		
E	Bathroom mirror complete with fittings	2	No		
F	Chromium plated towel rail 600mm long fixed to wall with screws.	2	No		
G	Soap dish tray in fire clay	2	No		
PLUMBING INSTALLATION Carried FORWARD Le					

Item	Description	Qty	Unit	Rate (Le)	Amount (Le)
	<u>ELECTRICAL INSTALLATION</u>				
	<u>LIGHTING INSTALLATION</u>				
	<u>Pvc cables and conduits</u> <u>Supply and install approved 1.5m² copper twin and earth PVC insulated and PVC sheathed cables in concealed 20mm diameter PVC conduit to the respective light points including all necessary fixed accessories</u>				
A	1 gang 1 way switch point	6	Nr		
B	1 gang 2 way switch point	2	Nr		
C	Intermediate switch point	1	Nr		
D	Light points	10	Nr		
	<u>SWITCHES</u> <u>Supply and fix the following light control switches by Approved manufacturer including all necessary assembling, fixing, accessories etc.</u>				
E	10Amp, 1 gang 1 way switch	6	Nr		
F	10Amp, 1 gang 2 way switch	2	Nr		
G	Intermediate switch	1	Nr		
	<u>LIGHTING FITTINGS</u> <u>Supply and install the following fittings and accessories including all necessary assembling, fixing, conduits, lamps, control gears etc.</u>				
H	4ft, 2 x 36W single filament fluorescent light fitting complete with tube	8	Nr		
J	60W bulb fitting (Ceiling light)	2	Nr		
	<u>SMALL POWER INSTALLATION</u> <u>Supply and install 2.5mm² PVC insulated and PVC sheathed cables twin & earth in concealed plastic mini trunking equipped with earthing contact and accessories where appropriate</u>				
K	13Amp single switched socket point	4	Nr		
L	13Amp Twin socket point	8	Nr		
M	13Amp single socket point -Ups point	6	Nr		
N	Telephone point	8	Nr		
O	Data socket point	8	Nr		
P	TV/Satellite point	4	Nr		
C/F					

Item	Description	Qty	Unit	Rate (Le)	Amount (Le)
	<u>Supply and install 4,0/6,0mm² PVC insulated and PVC sheathed twin & earth cables in concealed plastic mini trunking</u>			B/F	
A	20Amp DP switch point	8	Nr		
	<u>Supply and connect the following small power fittings and accessories white finished by approved manufacturer including all necessary fixing accessories etc</u>				
B	13Amp single switched socket outlet	4	Nr		
C	13Amp twin switch socket outlet	8	Nr		
D	13Amp UPS switched socket outlet (Red Colour)	6	Nr		
E	Telephone outlet RJ11	8	Nr		
F	RJ45 data socket outlet	8	Nr		
G	TV/Satellite socket outlet	4	Nr		
H	20A DP, Ac switch with neon indicator	6	Nr		
I	20Amp DP, AHD switch with neon indicator	6	Nr		
	<u>EQUIPMENT</u>				
	<u>Supply and install complete including wiring and all necessary assembling, plugging and accessories</u>				
	B Type TPN MCB distribution board with 100A TP switch disconnector fitted with all outgoing MCB's . All distribution boards to be of approved standard and quality: MEMSHIELD 3 or similar approved				
J	12 way.	1	Nr		
	B Type SPN MCB consumer unit with 45Amp TP switch disconnector fitted with all outgoing MCB's . Consumer unit to be of approved standard and quality: AS Legrand or similar approved for UPS				
K	6 way.	1	Nr		
	<u>Supply and install complete</u>				
L	200Amp, 4 pole Busbar Chamber	1	Nr		
M	200Amp, 4 pole switch disconnector fuse	1	Nr		
N	200Amp, 4 pole changer-over switch	1	Nr		
O	63Amp, 4 pole switch disconnector	1	Nr		
				C/F	

Lungi Building(first floor) at Lungi Airport.

Item	Description	Qty	Unit	Rate (Le)	Amount (Le)
	<u>LIGHTING PROTECTION</u>			B/F	
	<u>Supply and install complete the following earth cables</u>				
A	Air Terminal	1	Nr		
B	Air terminal base	1	Nr		
C	Test clamp	1	Nr		
	<u>SUPPLEMENTARY EARTHING AND BONDING</u>				
	<u>Supply and install complete</u>				
D	25mm ² single core pvc insulated yellow/green copper conductor, c.p.c	34	m		
E	16mm ² ditto	45	m		
F	6mm ² ditto	56	m		
G	1200mm, 20mm diameter copper bonded steel core earth rod	1	Nr		
H	Main Earth bar 50mm x 6mm high conductivity copper mounted on shock resisting insulators	1	Nr		
I	Earth rod concrete inspection pit with cover. Pit to be treated with manure, charcoal, common salt compacted in layers as required	1	Nr		
	<u>DISTRIBUTION CABLES Cu/PVC/swa/pvc</u>				
	<u>Supply,install and terminate the following cables with cable gland, locknut,earth tag and PVC shroud, including compression lug and connected to equipment.</u>				
J	4 core x 35mm ²	36	m		
K	4 core x 10mm ²	36	m		
L	3 core x 10mm ² PVCPVC (for UPS Line)	36	m		
	<u>AUTOMATIC FIRE DETECTION AND ALARM SYSTEM</u>				
M	Suply,install,test and commision the complete automatic fire detection and alarm system including all assembling,fixing and accessories As MEMVIER or similar approved				
N	Smoke detector,ionisation type	1	Nr		
O	150mm fire alarm bell	1	Nr		
P	Manuel break glass call point	1	Nr		
Lungi Building(first floor) at Lungi Airport.				C/F	

Item	Description	Qty	Unit	Rate (Le)	Amount (Le)
				B/F	
A	2 core with earth x1.5mm2 FP200 cables,coated Red	1	Roll		
B	2 core with earth x2.5mm2 FP200 cables,coated Red	1	Roll		
C	8W maintained exit directional sign light with back up battery	1	No		
	<u>BUILDER'S WORK</u>				
D	Allow a sum for all builder's work such as chases or mortice, making holes and for making good after		item		
	<u>TESTING AND COMMISSIONING</u>				
E	Allow a sum for testing and commissioning of the complete, electrical services installation including all fuel and oil for generating set		item		
ELECTRICAL INSTALLATION Carried to SUMMARY Le					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(Le)
	FLOOR, WALLS & CEILING FINISHES				
	<u>INSITU FINISHES</u>				
	<u>Cement and sand screeded bed in 1:6 mix</u>				
A	50mm thick floor bedding	20	m ²		
	<u>Walls</u>				
	<u>Cracks</u>				
B	Allow for making good existing cracks on walls(internally /Externally) by chipping off and refilling with mortar		item		
	<u>12mm thick cement and sand plastering in 1:4 mix on:</u>				
	<u>Block walling</u>				
C	Internally/Externally	46	m ²		
	<u>TILING</u>				
	<u>200mm x 150mm x8mm thick ceramic wall tiles, butt jointed straight on both sides, laid level on cement and sand bedding</u>				
	<u>toilet walls</u>				
D	Prepared wall over 300mm wide, internally	17	m ²		
	<u>300mm x300mm x8mm thick</u>				
	<u>ceramic floor tiles, butt jointed straight on both sides, laid level on cement and sand bedding(measured seperately)</u>				
E	Prepared floors over 300mm wide, internally(Toilet and corridor)	20	m ²		
	<u>Skirting tile</u>				
F	75mm x300mm ceramic skirting tiles, Internally	44	m		
G	Replace all carpets in the offices	138	m ²		
	<u>CEILING</u>				
	<u>Cracks</u>				
H	Allow for making good existing cracks on concrete soffit by chipping off and refilling with mortar(aproximately 35m ²)		item		
	<u>HARDBOARD CEILING(Toilet area)</u>				
I	Hardboard ceiling nailed to ceiling timber joist with nails.	12	m ²		
J	Replace ceilings(plywood & hardboard)to Hardboard ceiling nailed to ceiling timber joist with nails.	69	m ²		
	<u>Hardwood treated with preservative</u>				
K	50mm x 75mm ceiling joists and bearers	85	m		
L	50mm x 50mm ceiling bearers	158	m		
M	Cover strips	643	m		
FLOOR WALLS AND CEILING FINISHES					
Carried to SUMMARY Le					

ITEM	DESCRIPTION	QTY	UNIT	RATE (LE)	AMOUNT (LE)
	<u>PAINING AND DECORATION</u>				
	<u>Prepare and apply three coats quality weather sheild emulsion paint on</u>				
A	Internally	321	m ²		
B	Externally	142	m ²		
C	Concrete soffit	89	m ²		
D	Hardboard	81	m ²		
	<u>Prepare and apply three coats of quality enamel paint on:</u>				
E	guard bars	67	m ²		
F	Steel doors	2	m ²		
	<u>Prepare and apply three coat quality vernish on:</u>				
G	Timber door	38	m ²		
PAINING AND DECORATION Carried to SUMMARY Le					

ITEM	DESCRIPTION	AMOUNT (LE)
	<u>LUNGI BUILDING(First Floor) S U M M A R Y</u>	
A	DEMOLITION WORK AND CLEARING	..
B	BLOCKWORK	..
C	ROOF WORK	..
D	WOOD WORK	..
E	METAL WORK	..
F	PLUMBING INSTALLATION	..
G	ELECTRICAL INSTALLATION	..
H	FLOOR WALL AND CEILING FINISHES	..
I	PAINTING AND DECORATION	..
	LUNGI BUILDING(Floor) TOTAL Carried to GENERAL SUMMARY Le	

ITEM	DESCRIPTION	QTY	UNIT	RATES	AMOUNT (Le)
A	<u>SITE CLEARING</u> Allow provisional sum for clearing of debris off site after rehabilitation works		sum		
B	<u>SCAFFOLDING</u> Allow provisional sum for the use of scaffold during rehabilitation of the building		sum		
C	<u>WEATHER STATION</u> Generally allow provisional sum for protection of weather station with galvanised poles surrounded with chain links(2.1m high) on foundation block walling(0.6m high) pastered and paint to finish		item		
D	<u>SIGN POST</u> Generally allow provisional sum to provide and install electronic sign board(Undp)		sum		
EXTERNAL WORKS Carried to SUMMARY Le					

ITEM	DESCRIPTION	AMOUNT (LE)
	<u>PROPOSED REHABILITATION OF METEOROLOGICAL APARTMENT BUILDING AT LUNGI AIRPORT</u>	
	<u>GENERAL SUMMARY</u>	
A	BUILDING FLOOR	..
B	EXTERNAL WORKS	..
	TOTAL AMOUNT	
	ADD: PRELIMINARIES 3%	
	ADD: CONTIGENCIES 10%	
	GRAND TOTAL AMOUNT (LE)	

TECHNICAL SPECIFICATIONS

MATERIALS & WORKMANSHIP

RESPONSIBILITY

- A. No approval by the S.O. shall in any way relieve the Contractor of his contractual responsibilities for the quality of the materials and standard of workmanship in the finished works.

VARIATIONS

- A. No variations to these preambles may be made unless approved by the S.O. in writing.

EXCAVATION AND EARTHWORK

Nature of the ground

- A. The Contractor is deemed to have visited the site and ascertained the nature of the ground to be excavated and works to be done and must accept all responsibility for the cost of excavation (see clause for excavation in rock).

Site Levels

- B. Before commencing any excavation, the contractor shall satisfy himself that any site levels, whether spot or contour, shown on the drawings are correct. If he is not satisfied with the accuracy of these levels, he shall at once give written notice to the S.C; otherwise no claims will be entertained in respect of the inaccuracy of these levels.
- C. The Excavation and disposal have been measured net and the contractor must allow for all increase in bulk for volume occupied by earthwork support etc., additional backfilling and making good any lips.
- D. The rates for excavation are to include for grubbing up any roots that may be encountered and for sealing off any drains and land drains as directed by the S.O.
- E. The Contractor shall notify the S.O. when the excavations are ready to receive the foundations and must receive his approval before depositing any concrete.

CONCRETEWORK

- A. The concretework shall be in accordance with the recommendations of British Standard G.P.114.
- B. The cement shall be ordinary Portland cement to comply with B.S. 12 part 1, delivered to the site in the manufacturer's sealed bags unless authority is given for bulk handling, stored in a proper and suitable dry shed and used in strict rotation of delivery, cement which has been allowed to deteriorate shall not be used.

CONCRETEWORK (Contd.)

- C. The aggregates shall comply with B.S. 882 part 2 and shall be stored and handled so as to remain clean and well graded and shall be kept separate from each other until mixing.
- D. The coarse aggregate shall be approved clean well graded broken synite stone or gravel.
- E. The fine aggregate shall be clean, sharp, washed sea or pit sand of such a size that it will pass through 4.75mm square mesh, not more than 3% by weight to pass a No. 100 B.S. sieve and well graded between these limits.
- F. The water used for mixing concrete shall be perfectly clean and fresh.
- G. Concrete described as (1:3:6) shall be composed of 50kg of cement, 0.12 cubic yard of sand, and 0.24 cubic yard of coarse aggregate of maximum size stated and shall have a strength of 2000 lbs per square inch at 28 days.
- H. Concrete described as (1:2:4) shall be composed of 50kg cement to 0.9 cubic yard of sand 0.18 cubic yard of coarse aggregate of maximum size stated and shall have a strength of 3048 Lbs per square inch at 28 days.
- J. Gauge boxes of suitable sizes shall be employed to give the exact quantities of aggregate and sand. In all cases the amount of cement employed in a given mix shall be such that it is not necessary to divide a full bag of cement.
- K. The water/cement ratio shall not exceed 0.50.
- L. No concrete shall be used or remixed that shows any indications of initial setting.
- M. In no circumstances shall the concrete be thrown or dropped from a height or deposited under any conditions that would cause separation of materials.
- N. The reinforcement shall be rolled high tensile steel bars to comply with B.S. 4449 and steel fabric to comply with B.S.4483.
- O. All steel shall be entirely free from rust or loose scale at the time of placing in position. It shall not be oiled or painted.
- P. All reinforcement shall have the exact concrete cover as shown on drawings and be adequately supported and stayed so as not to be disturbed during the placing of the concrete.

- Q. Formwork shall be coated with oil or other approved preparation before the concrete is placed to prevent the adhesion of the concrete and before the reinforcement is assembled, care being taken to ensure that the steel reinforcement is perfectly clean prior to commencing concreting operations.

CONCRETEWORK (Contd.)

- R. Concrete described as fairface shall present a smooth finish appearance free from board marks, voids, holes etc. The Contractor must include for any rubbing down, etc. necessary to give this appearance.
- S. After removal of formwork or moulds, no touching up is to be attempted until the work has been inspected by the S.O.
- T. The rates for precast concrete shall include for formwork and steel bar reinforcement as described, cranked and hooked at all ends, hoisting to required levels, bedding and pointing in mortar.

BLOCKWORK

- A. The whole of the blockwork shall be in accordance with the recommendations of British Standard CP 112.
- B. The cement shall be as described in "Concrete works."
- C. The sand shall be sea or river sand as before described.
- D. The sandcrete blocks shall be composed of one part cement to six parts sand by volume and shall have a minimum compressive strength of 375 lbs and an average of 500 lbs per square inch of gross area at twenty-eight days.
- E. All blocks shall be sound, hard, square, well made, uniform in size, free from embedded stones, "free" lime, excess of salts and all other defects and shall be from an approved block making machine with pallets true to shape and having square edges to all edges.
- F. All blocks shall be fully cured before delivery and be laid in cement mortar (1:6) carefully leveled through every second course with all corners, cross wall junctions and reveals properly bonded.
- G. Blockwork shall be allowed to dry out thoroughly before rendering or plastering.
- H. All blocks are to be unloaded and stacked by hand, no blocks shall be used which has not been matured for at least twenty-two days.
- J. The blocks are to be built in stretcher bond and to be pointed internally and externally with

a neat flush joint as the work proceeds.

- K. The cement mortar for blockwork shall be composed of one part of cement to six parts of sand by volume.

BLOCKWORK (Contd)

- L. The ingredients for mortar shall be measured in bins and well mixed on a close-boarded platform. Only sufficient mortar for immediate use is to be mixed at a time and no mortar shall be used which has commenced to set.
- M. All internal and external wells shall be left with key to receive plaster, rendering etc., and the Contractor shall price accordingly. To claim for the cost of making out joints or hacking for the purpose will be admitted.
- N. All walls shall be protected during inclement weather or rain to the approval of the S.O. Any joints damaged by rain shall be deeply raked out and reappointed as the work proceeds.
- O. The Contractor shall include for building samples in each type of block for the approval of the S.O., each consisting of approximately one square yard of blockwork, the selected sample remaining for the purpose of comparison and as a standard for all block laying.

ROOFING

- A. Roof sheeting shall be laid strictly in accordance with the Manufacturer's instructions and in accordance with the BS code of practice 243, part 1, 1958.
- B. Where sheets are fixed to timber, fixing accessories as specified or as recommended by the manufacturer, shall be used. All timber surfaces, which contact the sheeting or flashing, shall be preserved with an approved wood preservative or in severe conditions overlaid with inodorous roofing felt. All exposed nail heads in timber shall be punched well below the surface of the timber.
- C. Sheets are to be nailed to purlins as follows:
- (i) eaves and ends laps every corrugation
 - (ii) elsewhere every other corrugation
- D. Sheets shall, where possible, be laid from the end of the building away from the prevailing wind so that exposed edges face down wind.
- E. Where sheets are to be bent parallel to the run of the corrugations, a generous radius should be maintained in order to avoid kinking. Bends are to be carefully marked off using a

pencil, not a sharp tool, to ensure that rebinding does not become necessary. Cuts across the corrugations can be made with a fine-toothed tool.

- F. Sheets are to be stored in a dry place in their delivery container contact with materials such as lime and cement must not occur. In positions where contact with materials containing alkalis (e.g. concrete, cement and lime mortar) occurs, the exposed surface shall be painted with two coats of a good quality bituminous paint.

ROOFING (Contd.)

- G. Laps are to be in accordance with the Manufacturer's recommendations but not less than the following: -
- (i) End laps 9" (225mm)
 - (ii) Side laps 2 corrugations
- H. Ridges shall be patent ridge pieces, suitable for the type of sheet used.
- J. The whole of the roofing shall be finished to the entire satisfaction of the S.O.
- K. Aluminum sheets where abutting walls and up stands, to be weltd (single or double welt) to a flashing or apron aluminum strip. The flashing or apron strips shall be folded and tucked into blockwork joints to a minimum dept of 1" secured by folded aluminum sheet wedges and pointed. All vertical joints in aprons and flashings shall be weltd.

WOODWORK

Timber

- A. Use only West African hardwood (except otherwise specified) of approved quality, straight cut, sound, free from sap, twists, shakes, loose or decayed knots, waned edges, borers, termites or other harmful defects, properly seasoned and generally in accordance with BS 1186: part 1, "Quantity of timber."

Hardboard

- B. Hardboard shall be treated during manufacture against attack by termites, suitable for position where used and comply with the requirements of BS 1142: part 2.

Nails

- C. Nails shall comply with the requirements of BS 1202 "Wire nails and cut nails" for building purposes.

Screws

- D. Screws shall comply with the requirements of Bs 1210 "Wood screws."

Dimensions

- E. Sawn timber shall be “left from the saw” and shall be full to the dimensions stated, except that an occasional slight variation in sawing is permissible.

WOODWORK (Contd.)

Setting out

- F. Set out and construct all work to dimensions given and as described on the drawings.

Plywood

- G. Plywood shall be treated during manufacture against attack by termites, suitable for the position where used and comply with the requirements of BS 1455. Plywood for joinery fittings shall be of the thickness specified in the Bills of Quantities.

Preservatives

- H. All structural timber shall be treated with a suitable approved preservative to resist the attack of termites or other insects and fungicidal decay.

METALWORK AND STRUCTURAL STEELWORK

- A. Steel

The steel generally shall comply with BS 4360 weldable structural steels.

Rolled mild steel sections shall comply with BS 4; part 1: Hot rolled sections and Bs 2994; cold rolled section.

Angles shall comply with BS 4848 part 4: equal and unequal angles.

Hollow sections shall comply with BS 4848 part 2: Hollow sections.

Galvanised plain sheets shall comply with BS 2989.

- B. Sundries

Black bolts, screws and nuts shall comply with BS 4190.

Close tolerance precision bolts; nuts, screws and plain washers shall comply with BS 3692.

Black taper washers shall comply with BS 4395.

High strength friction grip bolts shall comply with BS 4395

Electrodes shall be grade 'A' best heavy coated quality and comply with BS 5639.

METALWORK AND STRUCTURAL STEELWORK (Contd)

C. Casement windows and door

The steel casement windows and doors are to generally to BS 990 and subject to the approval of the S.O. The contractor shall submit samples of windows, doors, and all ironmongery for approval and once approval has been given the manufacture and quality of the samples must be strictly adhered to.

D. Fabrication

Work off-site shall conform to the appropriate clause of BS 449: The use of structural steel in buildings.

All surfaces in contact and all surfaces inaccessible after assembly shall be treated according to these specifications before assembly.

E. Welding

Welding procedure shall comply with BS 1856, BS 938 and BS 2642 as appropriate.

The equipment to be used shall be of a type, which produces proper current so that the welder can produce, a satisfactory weld. Only experienced and well-qualified welders shall carry out welding in shop and on site.

Surface preparation and assembly shall be carried out strictly in accordance with BS 1856 and BS 449 and BS 2642 as appropriate.

F. Work on site

All handling at works during transport and on the site shall be planned and carried out by the contractor to proceed in manner designed to protect the painted surfaces from damage.

The position of all points of support for structural steel-work shall be set so that the distances between any two points joined by a shop fabricated component of structural steel are within 1/8" of the required dimension. Individual fabricated members shall conform to a degree of accuracy compatible with tolerances laid down by this clause.

The position of any column or support wall shall be set out with a tolerance of 1" in 100ft, but no point shall be more than 1" away from the position shown on the drawings.

The contractor shall erect temporary bracing as necessary to maintain all structural

steelwork in the correct position until the structure is complete.

G. Site connections and fixings

The site bolting of permanent connections shall conform to clause 62 of BS 449.

METALWORK AND STRUCTURAL STEELWORK (Contd)

H. Washers shall be provided under all nuts and all bolts shall show after tightening at least two clear threads beyond the nut. During the tightening operation, the bolt head shall be prevented from rotating.

J. Fix casement windows and doors in accordance with crittal windows Ltd., recommendation or equal approved in position shown on the drawings so as to be perfectly plumb and true. Provide all necessary supports and fixings such as screws, straps, lugs, and dowels. On completion leave casement windows and doors in perfect working order to the satisfaction of the S.O.

Protection against corrosion

K. All mill scale and rust is to be removed by hand in accordance with clause 505 F CP 2008: 1966. Two coats red lead primer are to be applied to all structural steelwork before delivery to site. Any damage plain surfaces must be made good on site prior to application of succeeding coat of paint.

L. Any surfaces, which will be inaccessible after erection, are to be painted before erection.

PLUMBING INSTALLATION

A. On completion of the installation and immediately prior to testing the whole of the installation shall be thoroughly flushed through the remove all dirty water, debris, etc.

B. All pipework is to be subject to hydraulic test for water pressure in the presence of the S.O. Such tests are to be applied by test pump and are to comprise a test pressure of 161 lbs per square inch carried for thirty minutes. Leaks or other defects are to be repaired at the Contractor's own expense and the same test repeated until the whole of the pipework is proved to be completely free from defects to the satisfaction of the S.O.

C. The Contractor shall include for marking positions of all holes, mortises, chases etc., in the structure for the installation in this section. Holes through concrete work blockwork may be formed during construction and the contractor shall include for all necessary setting out.

FLOOR, WALL AND CEILING FINISHINGS

A. The cement shall be as described in the "concretework".

- B. The sand shall be sea or pit sand as before described.
- C. Rendering shall be in accordance with the recommendations of BS 5492.
- D. The in-situ floor furnishings shall be in accordance with the recommendations of BS OP 204.

FLOOR, WALL AND CEILING FINISHINGS (Contd.)

- E. Walls shall be thoroughly brushed down and well wetted before rendering.
- F. The in-situ materials shall be mixed on a clean wooden platform or in mechanical mixers. No mix shall be retempered once it has commenced to set and no batch shall be mixed with another batch.
- G. Notwithstanding the minimum thickness stated the rendering must be worked to the grounds fixed (generally ½" thick) and rates shall include for all necessary dubbing out to give a straight, true and plum surface trowelled perfectly hard and smooth.
- H. Where dubbing out is necessary, it is essential that this dubbing out should consist of a succession of thin coats and each coat must be allowed to dry out thoroughly before the application of the following coats.

Cement and sand beds and backings

- J. The cement and sand shall be mixed in the proportions specified. Immediately before laying, the surface shall be brushed over with a grout of one part of cement to one part of fine sand by volume.
- K. The paving shall be placed, leveled with float and thoroughly compacted with a screeding board. Surfaces shall be furnished as described appropriate for the finishing materials to be laid or fixed.
- L. Beds shall be kept damp for at least seven days after laying to allow for proper curing.

Tiling

- M. Glazed ceramic wall tiles shall be fixed to rendered surfaces with an approved adhesive in accordance with Manufacturer's instruction and finish true and plumb.
- N. Lay ceramic floor tiles in accordance with Manufacturer's instruction and finish true and plumb.

GLAZING

- A. The glazing shall be in accordance with the recommendation of CP 152.

- B. The whole of the glass shall be of approved manufacturer of the best quality of its respective kind and shall be picked clear off all specks, bubbles, smoke waves, air holes and other defects and shall comply with BS 952.
- C. The putty for glazing to metal frames to be approved manufacture.
- D. All glass shall be delivered to the site in cut sizes.

GLAZING (Contd.)

- E. All rebates shall be painted two coats of paint before glazing and the rates shall include for this.
- F. The rates for glazing shall include for bedding in putty, back puttying, front puttying and cleaning off.
- G. Clean all glass inside and outside on completion to the satisfaction of the S. O. Replace with new all cracked, scratched, damaged or defective glass.

PAINTING AND DECORATING

- A. All paints shall be obtained from an approved Manufacturer.
- B. The primer for steelwork shall be red lead paint to comply with BS 2523 Type B
- C. All paints shall be delivered in sealed containers, used as received from the Manufacturers and used strictly in accordance with their recommendations.
- D. The painting and decorating shall be in accordance with CP 231.
- E. Only interior quality finishes shall be used internally and exterior quality finishes used externally and any work executed in the wrong materials shall be re-executed at the Contractor's own expense.
- F. All work shall be executed by brush application unless otherwise described.
- G. On exterior work each undercoating must be completed all round the building before the succeeding coat is commenced.
- H. The rates shall include for neatly cutting into all edges and glass.
- J. The rates shall include for all necessary scaffolding, cradles, towers, planks, lines, dust sheets, etc.
- K. Exposed surfaces must be painted in suitable weather; exterior work except in covered and protected places must be suspended during rain, mist or when the atmosphere is laden with laterite or other dust and no surface painted whilst wet.
- L.
- M. The Contractor is to allow in his rates for executing all paint in colour schemes specified

by the S.O.

- N. The tints of the undercoats are to be approximately to the finishing colour. In order to indicate the number of coats applied a difference is to be made in the tint of each succeeding coat.