



अड्ड. एस. ओ. प्रमाणित एयरपोर्ट
ISO CERTIFIED AIRPORT

भारतीय विमानपत्तन प्राधिकरण
AIRPORTS AUTHORITY OF INDIA

No.AAI/ENGG(E)/AMED-1/09/2020-21/ 586

Oct 5, 2020

M/s Sterling & Wilson Private Limited,
1st Floor Krishna Towers,
Oppo., Thrikkakara Temple
Thrikkakara, Kochi 682 021

Sub : **General Maintenance Contract for E & M Installations at Trivandrum Airport during the year 2020-21 & 2021-22. SH : Domestic Terminal Building, ANS Buildings & Other Ancillary Buildings (Re-call).**

Ref : Your E-tender ID : 2020_AAI_50951 along with Financial Bid opened on 11.09.2020

Dear Sir(s),

1. Your E-tender for the work mentioned above is hereby accepted on behalf of the Chairman, Airports Authority of India, at the item rates quoted by you totaling to **Rs.5,33,29,803/- (Rupees Five Crore Thirty Three Lakh Twenty Nine Thousand Eight Hundred and Three Only)** excluding GST which is 11.25 % below the estimated cost put to tender of Rs. 6,00,92,152/- (excl. GST). You are requested to commence the work as per the 'Schedule of Work' enclosed herewith and the Terms and Conditions given below.
2. Jt.General Manager Engg.(E)-II, Airports Authority of India, Trivandrum International Airport, Thiruvananthapuram-695 008 shall be the Engineer-in-Charge of the work. Asst. General Manager Engg.(E), EMD - I will be the authorized representative. You are requested to attend the office of the Jt. General Manager Engg(E)-II, Airports Authority of India, Trivandrum International Airport, Thiruvananthapuram by 20.10.2020 to sign and complete the contract agreement. The contract agreement shall be executed on a non-judicial stamp paper of value Rs.200/- (Rupees Two Hundred only) and the cost of the stamp paper shall be borne by you.
3. The earnest money amount of **Rs. 12,01,843/-** (Rupees Twelve Lakh One Thousand Eight Hundred and Forty Three Only) received along with your tender vide BG No. OGT0005200045335 dt: 05.08.2020 from IndusInd Bank will be treated and converted as part of security deposit as per clause No.1A on page 16 of contract document. Please deposit Rs.14,64,647/- (Rupees Fourteen Lakh Sixty Four Thousand Six Hundred and Forty Seven Only) towards security deposit within 10 days from the date of issue of this letter failing which, the same will be deducted as per condition of Clause No 1A on page 16 of the General Conditions of Contract (GCC) of tender document.
4. Within 30 days from the date of issue of this letter, you shall submit to AAI a Performance Guarantee for an amount of Rs. 26,66,490/- (Rupees Twenty Six Lakh Sixty Six Thousand Four Hundred and Ninety only) in the form of Bank Guarantee as per Clause 1 on page No 15 of GCC of tender document in the proforma appended at Appendix - XI & XIA on page 108 to 110 of GCC of tender document.

..2/-

5. You are requested to obtain a valid license under the Contract Labour (Regulation and Abolition) Act, 1970 and the Contract Labour (Regulation and Abolition) Central Rules, 1971, before the commencement of the work, and continue to have a valid license until the completion of the work and comply with the provision of Contract Labour (Regulation and Abolition) Act 1970 and Contract Labour (Regulation and Abolition) Central rules 1971, Child Labour (Prohibition & Regulation) Act 1986, Construction Workers (Regulation of Employment and Condition of Service) Act 1996, Building and other construction Workers Welfare Cess Act 1996 as specified in Clause 19 on page No 49 of GCC of tender document and rules of Central and State Governments.
6. You are also directed to contact the Assistant General Manager Engg (Elect), EMD-I, AAI, Trivandrum Airport immediately who will arrange to handover the site to you.
7. Please note that the time allowed for carrying out the work shall be **24(Twenty Four) Months** and same shall be reckoned from **16.10.2020**.
8. As per clause 42 of special conditions of contract on page No 150 of tender document, obligation relating to Transfer of rights during Novation is applicable.
9. You have to submit **Contractor All Risk (CAR) Policy** in joint name of AAI and Contractor for the full tendered value along with third party liability (max of 10% of tendered value OR as applicable as per Insurance Regulatory Authority of India) and **Workmen Compensation policy (WC)** for the above subject work as per clause 46 on page 72 of GCC of Tender Document before commencement of the work.
10. You are requested to submit a **Time and Progress Chart** for each mile stone and get it approved by the Engineer-in-charge as per clause No 5 on page 21 of GCC of Tender Document with in 15 (fifteen) days of issue of this letter.
11. You are requested to submit valid GST invoice as per GST act mentioning the GSTIN, indicating the GST rates applicable and input tax credit details if any, for processing the bills. AAI Trivandrum GST No. 32AAACA6412D1ZH.
12. The agency is responsible for arranging Airport Entry Permit (AEP) for their staff and submit all relevant documents/undergo training as per prevailing rules of BCAS and Airport Security Division for obtaining AEP.
13. Any further correspondence in connection with the contract should normally be addressed to the Engineer-in-Charge.

14. Please acknowledge the receipt and return the duplicate copy of this letter enclosed herewith after signing it to the undersigned as a token of acceptance.

All other terms and conditions shall be as per NIT and Special Conditions of Contract of Tender Document .

Yours faithfully,

Sreekumari
5.10.2020

(SREEKUMARI J)
Jt.General Manager (Engg – Electrical)-II
for and on behalf of the Chairman,
Airports Authority of India

Encl: 1. Schedule of work
2. Special Conditions of Contract

AIRPORTS AUTHORITY OF INDIA
TRIVANDRUM INTERNATIONAL AIRPORT
THIRUVANANTHAPURAM

SCHEDULE OF WORK

Name of work: General Maintenance Contract for E & M Installations at Trivandrum Airport during the year 2020-21 & 2021-22. SH : Domestic Terminal Building, ANS Buildings & Other Ancillary Buildings (Re-call)

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
SH: I - OPERATION & MAINTENANCE CONTRACTS					
1.1	Operation and maintenance of 66KV Substation by deploying required qualified manpower for operation, monitoring, recording hourly reading of all major equipments of the system, preventive and routine maintenance so as to ensure serviceability of complete system at all times including Sundays and Holidays on round the clock basis complete as per special conditions of contract etc. as required.	24.00	Months	3,60,906.00	86,61,744.00
1.2	Operation and maintenance of Power Supply & standby DG Sets by deploying required qualified manpower for operation, monitoring, recording hourly reading of all major equipments of the system, preventive and routine maintenance so as to ensure serviceability of complete system at all times including Sundays and Holidays on round the clock basis complete as per special conditions of contract etc. as required.	24.00	Months	4,39,786.00	105,54,864.00
1.3	Operation & Maintenance of GLF electrical installations by deploying required qualified manpower for attending breakdowns, preventive and routine maintenance so as to ensure serviceability of GLF & Runway lighting system at all times including Sundays and Holidays on round the clock basis complete as per special conditions of contract etc. as required.	24.00	Months	1,34,803.00	32,35,272.00
1.4	Maintenance of Internal & External electrical installations by deploying required qualified manpower for attending breakdowns, preventive and routine maintenance so as to ensure serviceability of complete system at all times including Sundays and Holidays on round the clock basis complete as per special conditions of contract etc. as required.	24.00	Months	4,85,999.00	116,63,976.00
1.5	Operation & Maintenance of Mechanical Installations by deploying required qualified manpower for operation, monitoring, recording hourly reading of all major equipments of the system, preventive and routine maintenance so as to ensure serviceability of complete system at all times including Sundays and Holidays on round the clock basis complete as per special conditions of contract etc. as required.	24.00	Months	2,88,517.00	69,24,408.00
SH II : INTERNAL & EXTERNAL ELECTRIFICATION WORKS					
2.1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required. (GROUP C)	50.00	Point	505.00	25,250.00
2.2	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed MS conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required. (GROUP C)	10.00	Point	506.00	5,060.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.3	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed GI conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc as required. (GROUP C)	20.00	Point	516.00	10,320.00
2.4	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 amps modular socket outlets and 2 nos 5/6 amps modular switches, connection etc. as required.	40.00	Each	809.00	32,360.00
2.5	Supplying and fixing suitable size of GI box (recessed) / PVC box (surface) with modular plate and cover in front on surface or in recess including providing and fixing 3 pin 15/16 amps modular socket outlet and 15/16 amps modular switch, connection etc..as reqd.	20.00	Each	465.00	9,300.00
2.6	Wiring for circuit/submain/plug point wiring alongwith earth wire with the following sizes of FRLS PVC insulated Copper conductor single core cable in surface/recessed GI conduit including painting the surface to original finish etc.. as reqd.				
2.6.1	2 x 1.5 sq.mm + 1 x 1.5 sq.mm (earth wire)	100.00	Meter	38.00	3,800.00
2.6.2	2 x 2.5 sq.mm + 1 x 2.5 sq.mm (earth wire)	100.00	Meter	48.00	4,800.00
2.6.3	2 x 4 sq.mm + 1 x 4 sq.mm (earth wire)	100.00	Meter	69.00	6,900.00
2.6.4	2 x 6 sq.mm + 1 x 6 sq.mm (earth wire)	100.00	Meter	99.00	9,900.00
2.6.5	2 x 10 sq.mm + 1 x 6 sq.mm (earth wire)	100.00	Meter	145.00	14,500.00
2.7	Wiring for circuit/submain/plug point wiring along with earth wire with the following sizes of FRLS PVC insulated Copper conductor single core cable in surface/recessed PVC conduit / casing and capping etc.. as reqd.				
2.7.1	2 x 1.5 sq.mm + 1 x 1.5 sq.mm (earth wire)	100.00	Meter	5.00	500.00
2.7.2	2 x 2.5 sq.mm + 1 x 2.5 sq.mm (earth wire)	100.00	Meter	5.00	500.00
2.7.3	2 x 4 sq.mm + 1 x 4 sq.mm (earth wire)	100.00	Meter	5.00	500.00
2.7.4	2 x 6 sq.mm + 1 x 6 sq.mm (earth wire)	100.00	Meter	5.00	500.00
2.7.5	2 x 10 sq.mm + 1 x 6 sq.mm (earth wire)	100.00	Meter	8.00	800.00
2.8	Supply & fixing of following size of GI conduit along with accessories in surface/ recess including painting in case of surface conduit or cutting the wall and making good the same in case of recessed conduit as reqd.				
2.8.1	20mm dia GI Conduit	50.00	Meter	80.00	4,000.00
2.8.2	25mm dia GI Conduit	50.00	Meter	105.00	5,250.00
2.9	Supply & fixing of following size of PVC conduit alongwith accessories in surface / recess including painting in case of surface conduit or cutting the wall and making good the same in case of recessed conduit as reqd.				
2.9.1	20mm dia PVC Conduit	250.00	Meter	26.00	6,500.00
2.9.2	25mm dia PVC Conduit	250.00	Meter	31.00	7,750.00
2.9.3	32mm dia PVC Conduit	250.00	Meter	46.00	11,500.00
2.10	Supply and fixing of following sizes of PVC casing and capping along with accessories in surface as reqd.				
2.10.1	20mm x 10mm	50.00	Meter	23.00	1,150.00
2.10.2	25mm x 10mm	50.00	Meter	29.00	1,450.00
2.10.3	32mm x 10mm	50.00	Meter	36.00	1,800.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.11	Supply & drawing following size of FRLS PVC insulated copper conductor single core cable in the existing surface/recessed steel/PVC conduit / Casing & Capping etc as reqd.				
2.11.1	1 x 1.5 Sq mm	200.00	Meter	14.00	2,800.00
2.11.2	2 x 1.5 Sq mm	200.00	Meter	23.00	4,600.00
2.11.3	2 x 2.5 Sq mm	100.00	Meter	32.00	3,200.00
2.11.4	1 x 4 Sq mm	50.00	Meter	26.00	1,300.00
2.11.5	2 x 4 Sq mm	50.00	Meter	48.00	2,400.00
2.11.6	1 x 6 Sq mm	50.00	Meter	36.00	1,800.00
2.11.7	2 x 6 Sq mm	50.00	Meter	68.00	3,400.00
2.11.8	1 x 10 Sq mm	50.00	Meter	51.00	2,550.00
2.11.9	2 x 10 Sq mm	50.00	Meter	99.00	4,950.00
2.12	Supplying and fixing following size/ modules, GI box along with modular base & cover plate for modular switches in recess etc as required.				
2.12.1	2 Module	10.00	Each	183.00	1,830.00
2.12.2	3 Module	10.00	Each	193.00	1,930.00
2.12.3	4 Module	10.00	Each	243.00	2,430.00
2.12.4	6 Module	10.00	Each	303.00	3,030.00
2.12.5	8 Module	10.00	Each	372.00	3,720.00
2.12.6	12 Module	10.00	Each	501.00	5,010.00
2.13	Supplying and fixing following Modular base & cover plate on existing modular metal boxes / partition wall but excluding switch box etc. as required.				
2.13.1	2 Module	5.00	Each	91.00	455.00
2.13.2	3 Module	5.00	Each	91.00	455.00
2.13.3	4 Module	5.00	Each	111.00	555.00
2.13.4	6 Module	5.00	Each	126.00	630.00
2.13.5	8 Module	5.00	Each	177.00	885.00
2.13.6	12 Module	5.00	Each	222.00	1,110.00
2.14	Supplying and fixing following size modules / PVC box along with modular base & cover plate for modular switches in recess etc as required.				
2.14.1	2 Module	10.00	Each	165.00	1,650.00
2.14.2	3 Module	10.00	Each	209.00	2,090.00
2.14.3	4 Module	10.00	Each	233.00	2,330.00
2.14.4	6 Module	10.00	Each	287.00	2,870.00
2.14.5	8 Module	10.00	Each	368.00	3,680.00
2.14.6	12 Module	10.00	Each	459.00	4,590.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.15	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required				
2.15.1	5/6 amps switch	300.00	Each	81.00	24,300.00
2.15.2	15/16 amp switch	175.00	Each	142.00	24,850.00
2.15.3	3 pin 5/6 amp socket outlet	100.00	Each	149.00	14,900.00
2.15.4	6 pin 15/16 amp socket outlet	100.00	Each	182.00	18,200.00
2.16	Supplying and fixing DP sheet steel enclosure on surface/ recess complete with connections, testing and commissioning etc. as required.	10.00	Each	383.00	3,830.00
2.17	Supplying and fixing FP sheet steel enclosure on surface/ recess along with complete with connections, testing and commissioning etc. as required.	5.00	Each	403.00	2,015.00
2.18	Laying of departmentally supplied HDPE/DWC pipe of dia not exceeding 125 mm complete with cutting, jointing etc. direct in ground (80 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required as per specifications.	1000.00	Meter	152.00	1,52,000.00
2.19	Laying of 63mm HDPE / DWC pipe with accessories like couplers, in ground including laying the pipe below ground (for road crossing) road cutting, kerf cutting, chiselling, excavation and refilling trench and finishing road with 1:2:4 cement concrete of minimum 150mm thick (1cement: 2coarse sand : 4graded stone aggregate 40 mm nominal size)etc. to level the road etc., complete as required.	250.00	Meter	516.00	1,29,000.00
2.20	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe/ HDPE/DWC Pipe as reqd.				
2.20.1	Upto 35 sq. mm	1000.00	Meter	35.00	35,000.00
2.20.2	above 35 sq.m Upto 95 sq. mm	200.00	Meter	66.00	13,200.00
2.20.3	above 95 sq.m Upto 185 sq. mm	300.00	Meter	76.00	22,800.00
2.20.4	above 185 sq.m Upto 400 sq. mm	400.00	Meter	86.00	34,400.00
2.21	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as reqd.				
2.21.1	above 35 sq.m Upto 95 sq. mm	200.00	Meter	46.00	9,200.00
2.21.2	above 95 sq.m Upto 185 sq. mm	200.00	Meter	76.00	15,200.00
2.21.3	above 185 sq.m Upto 400 sq. mm	200.00	Meter	86.00	17,200.00
2.22	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as reqd.				
2.22.1	Upto 35 sq. mm (clamped with 1mm thick saddle)	2000.00	Meter	50.00	1,00,000.00
2.22.2	above 35 sq.m Upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	200.00	Meter	88.00	17,600.00
2.22.3	above 95 sq.m Upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	100.00	Meter	101.00	10,100.00
2.23	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/ HUME/ METAL pipe/ HDPE Pipe as reqd.				
2.23.1	Above 120 sq. mm and upto 400 sq. mm	1200.00	Meter	101.00	1,21,200.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.24	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as reqd.				
2.24.1	Above 120 sq. mm and upto 400 sq. mm	100.00	Meter	116.00	11,600.00
2.25	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
2.25.1	Upto 35 sq. mm (clamped with 1mm thick saddle)	400.00	Meter	55.00	22,000.00
2.25.2	above 35 sq.m Upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	300.00	Meter	93.00	27,900.00
2.25.3	above 95 sq.m Upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	200.00	Meter	106.00	21,200.00
2.26	Installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required.				
2.26.1	200 mm width x 50 mm depth x 1.6 mm thickness	250.00	Meter	161.00	40,250.00
2.26.2	300 mm width x 50 mm depth x 1.6 mm thickness	250.00	Meter	181.00	45,250.00
2.27	Retreiving of one number PVC/XLPE insulated and PVC sheathed aluminium conductor cable of grade not exceeding 1.1KV of following size of cable from ground including excavation of soil, removing of cable (if any) from trench,checking physical damage of cable and bricks if any etc. as reqd.				
2.27.1	Size not exceeding 35 sq.mm	50.00	Meter	121.00	6,050.00
2.27.2	Size exceeding 35 sq.mm but not exceeding 120 Sq.mm	50.00	Meter	121.00	6,050.00
2.28	Re-laying of one number PVC/XLPE insulated and PVC sheathed aluminium conductor cable of 1.1KV grade of following size direct in the existing trench including sand cushioning with existing sand available at site, protective covering with retrieved bricks and refilling the trench etc. as reqd.				
2.28.1	Size not exceeding 35 sq.mm	50.00	Meter	91.00	4,550.00
2.28.2	Size exceeding 35 sq.mm but not exceeding 95 Sq.mm	50.00	Meter	101.00	5,050.00
2.28.3	Size exceeding 95 sq.mm but not exceeding 185Sq.mm	50.00	Meter	111.00	5,550.00
2.28.4	Size exceeding 185 sq.mm but not exceeding 400 Sq.mm	50.00	Meter	127.00	6,350.00
2.29	Providing and laying earth connection from earth electrode with 4.00 mm dia copper wire in 15 mm dia G.I. pipe from earth electrode including connection with copper thimble excavation and re-filling as required.	100.00	Meter	263.00	26,300.00
2.30	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	1000.00	Meter	15.00	15,000.00
2.31	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	500.00	Meter	76.00	38,000.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.32	Supply & making end termination with brass compression gland for PVC insulated PVC sheathed armoured aluminium conductor power cable of 1.1 KV grade and of following sizes				
2.32.1	2 x 16 Sq mm	15.00	Set	98.00	1,470.00
2.32.2	2 x 25 Sq mm	15.00	Set	97.00	1,455.00
2.32.3	4 x 10 Sq mm	15.00	Set	97.00	1,455.00
2.32.4	4 x 25 Sq mm	25.00	Set	151.00	3,775.00
2.32.5	3.5 x 35 Sq mm	15.00	Set	155.00	2,325.00
2.32.6	3.5 x 50 Sq mm	10.00	Set	183.00	1,830.00
2.32.7	3.5 x 70 Sq mm	15.00	Set	218.00	3,270.00
2.32.8	3.5 x 95 Sq mm	15.00	Set	248.00	3,720.00
2.32.9	3.5 x 120 Sq mm	7.00	Set	299.00	2,093.00
2.32.10	3.5 x 150 Sq mm	5.00	Set	366.00	1,830.00
2.32.11	3.5 x 185 Sq mm	5.00	Set	413.00	2,065.00
2.32.12	3.5 x 240 Sq mm	2.00	Set	589.00	1,178.00
2.32.13	3.5 x 300 Sq mm	5.00	Set	771.00	3,855.00
2.33	Supplying and making straight through joint with heat shrinkable kit including ferrules and other jointing materials for following size of PVC insulated and PVC sheathed XLPE aluminium conductor cable of 1.1 kV grade as required.				
2.33.1	2 x 16 Sq mm	15.00	Set	1,192.00	17,880.00
2.33.2	2 x 25 Sq mm	15.00	Set	1,358.00	20,370.00
2.33.3	4 x 16 Sq mm	15.00	Set	1,358.00	20,370.00
2.33.4	4 x 25 Sq mm	25.00	Set	1,409.00	35,225.00
2.33.5	3.5 x 35 Sq mm	15.00	Set	1,459.00	21,885.00
2.33.6	3.5 X 50 Sq mm	10.00	Set	1,577.00	15,770.00
2.33.7	3.5 X 70 Sq mm	15.00	Set	1,860.00	27,900.00
2.33.8	3.5 X 95 Sq mm	15.00	Set	1,860.00	27,900.00
2.33.9	3.5 X 120 Sq mm	7.00	Set	2,143.00	15,001.00
2.33.10	3.5 X 150 Sq mm	5.00	Set	2,427.00	12,135.00
2.33.11	3.5 X 185 Sq mm	5.00	Set	2,427.00	12,135.00
2.33.12	3.5 X 240 Sq mm	2.00	Set	3,510.00	7,020.00
2.33.13	3.5 X 300 Sq mm	5.00	Set	3,959.00	19,795.00
2.33.14	3.5 X 400 Sq mm	2.00	Set	4,526.00	9,052.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.34	Supplying and making straight through cable jointing with heat shrinkable jointing kit complete with all accessories including ferrules suitable for cable of size 3 x 300 Sq mm PVC sheathed, XLPE aluminium conductor cable of 11 KV grade as required.	6.00	Set	8,450.00	50,700.00
2.35	supplying of indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for cable of size 3 x 300 Sq mm PVC sheathed, XLPE,aluminium conductor cable of 11 KV grade as required.	4.00	Set	5,414.00	21,656.00
2.36	Supplying of outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for of size 3 x 300 Sq mm PVC sheathed, XLPE aluminium conductor cable of 11 KV grade as required.	4.00	Set	4,807.00	19,228.00
2.37	Installation testing and commissioning of fittings including connections with PVC insulated FRLS copper conductor cable as required.				
2.37.1	Exhaust fan upto 450mm sweep in the existing opening including making the hole to suit the size of the above fan making good the damage connection etc..as reqd.	2.00	Each	304.00	608.00
2.37.2	Exhaust fan upto 300mm sweep in the existing opening including making the hole to suit the size of the above fan making good the damage connection etc..as reqd.	10.00	Each	304.00	3,040.00
2.38	Dismantling of defective winding and bearing,rewinding with super enamelled copper wire,providing new bearings, baking,Varnishing, providing new capacitors of required ratings, overhauling, greasing,refitting of motor and reinstallation of fan/motor etc. as reqd				
2.38.1	600mm. Sweep aircirculators/exhaust fans	10.00	Job	792.00	7,920.00
2.38.2	450mm. Sweep aircirculators/exhaust fans	10.00	Job	720.00	7,200.00
2.38.3	300/380mm. Sweep Exhaust fan 900rpm heavy duty	25.00	Job	720.00	18,000.00
2.38.4	300mm. Sweep Exhaust fan 1400 rpm light duty	10.00	Job	720.00	7,200.00
2.38.5	1200mm. Sweep ceiling fan	500.00	Job	577.00	2,88,500.00
2.38.6	400 mm. sweep wall mounting/pedestal fan	50.00	Job	586.00	29,300.00
2.39	Dismantling , overhauling,greasing, servicing of borewell pumps & self priming motor driven pumpset with 1.5HP 3 Phase motor including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	10.00	Job	2,570.00	25,700.00
2.40	Dismantling , overhauling,greasing, servicing of sewage pumps & self priming motor driven pumpset with 7.5HP 3 Phase motor including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	2,056.00	16,448.00
2.41	Dismantling , overhauling,greasing, servicing of water pumps & self priming motor driven pumpset with 12.5HP 3 Phase motor including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	2,570.00	20,560.00
2.42	Dismantling , overhauling,greasing, servicing of water pumps & self priming motor driven pumpset with 5 HP 3 Phase motor including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	2,056.00	16,448.00
2.43	Rewinding of motors of ratings 1.5HP motors/conveyor systems/ Fire Jockey pumps etc including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	10.00	Job	2,313.00	23,130.00
2.44	Rewinding of motors of ratings upto 5 HP motors etc including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	6,168.00	49,344.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.45	Rewinding of motors of ratings upto 7.5HP motors etc including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	7,710.00	61,680.00
2.46	Rewinding of motors of ratings upto 12.5HP motors etc including replacement of bearing, gaskets, re-assembling , reinstalling the same testing & commissioning etc complete as required.	8.00	Job	12,337.00	98,696.00
2.47	Supplying and fixing the following MCB DBS , pre-wired sheet steel, on surface/recess/angle iron frame complete with loose wire box, terminal blocks, duly pre-wired with suitable size FRLS PVC insulated copper conductor upto terminal blocks, tinned copper bus bar, neutral link, earth bar, din bar, detachable gland plate, inter connections, phosphatised and powder painted including making necessary wall openings, applying putty, and repainting the surface with suitable colour , earthing etc..as reqd.(but without MCCB/MCB/RCCB/isolator/Fuses)				
2.47.1	SPN 4 WAY , Double door, horizontal, 240V	15.00	Job	452.00	6,780.00
2.47.2	SPN 8 WAY , Double door ,horizontal, 240V	15.00	Job	548.00	8,220.00
2.47.3	TPN 4 WAY , Double door, horizontal, 440V	30.00	Job	2,333.00	69,990.00
2.47.4	TPN 8 WAY , Double door, horizontal, 440V	20.00	Job	3,338.00	66,760.00
2.47.5	TPN 8 WAY , Double door, vertical, 440V	10.00	Job	6,165.00	61,650.00
2.48	Supplying and fixing 20 amps, 240 volts, SPN industrial type, socket outlet, with 2 pole and earth, metal enclosed plug top alongwith 20 amps "C" curve, SP, MCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	1.00	Job	1,945.00	1,945.00
2.49	Fixing of following ratings Switch gears in the existing panel board/wall/metal frame, making connections, testing and commissioning etc. as reqd.				
2.49.1	63-200 A FP MCCB/SFU/Change Over Switch	10.00	Each	202.00	2,020.00
2.49.2	250-400A FP MCCB/SFU/Change Over Switch	10.00	Each	253.00	2,530.00
2.49.3	TPN 8 Way MCB DB	10.00	Each	455.00	4,550.00
2.49.4	TPN 4 Way MCB DB	10.00	Each	455.00	4,550.00
2.49.5	SPN 4/6/8/12 way	10.00	Each	253.00	2,530.00
2.49.6	6-63 A 'B'/C' series SPMCB	75.00	Each	25.00	1,875.00
2.49.7	16-32A/40/63 Amps DP MCB B/C Curve	50.00	Each	25.00	1,250.00
2.49.8	40/63 Amps TP/4P MCB B/C Curve	50.00	Each	35.00	1,750.00
2.50	Supply and Laying following sizes of B ' class G.I pipe in soil including bituminous road cutting upto an average depth of 150mm and required width , excavation of soil upto 750mm (approx.) from pavement level, refilling the trench with excavated soil in bottom and filling pavement cutting with cement concrete of 1:2:4 (1cement :2 sand:4 graded stone 20mm aggregate), finishing the surface etc..as reqd.				
2.50.1	50 mm, dia.	20.00	Meter	901.00	18,020.00
2.50.2	100mm dia	20.00	Meter	1,417.00	28,340.00
2.50.3	150mm dia	20.00	Meter	2,085.00	41,700.00
2.51	Supply and fixing 2.5mm thick hot press moulded SMC junction box of inner dimension 240mm x 130mm x95mm (Sintex Cat No.GSJB 2817) with hinged door fitted with dinrail mounted 02 No's of 6A SP, C Curve MCB, 4Way Power connector, 02 no's Porcelain Connector including loop in-loop out cable terminations (upto 25 sqmm) , earth connections etc complete as required	500.00	Each	875.00	4,37,500.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
2.52	Supply, installation, testing, commissioning of feeder pillar box made out of 3mm thick hot pressmoulded SMC (GS - JB - 3750 type or equivalent) with inner dimensions 345mm(H) x 480 mm(W) x 210 mm(D) complete with rubber gasket, including making termination for 2 x 25 sq.mm/1x16 sq.mm/1x6sq.mm PVC sheathed & PVC insulated armoured/unarmoured cable and cable connection provision, earthing terminals, providing 02 nos of 100 A Kitkat type Porcelain Fuse on 12mm thick hylam sheet, providing legs of 2 Nos, 50mm dia 'B' Class GI pipe of required height, flanges, foundation bolts, cement concrete foundation of 300mm x 300mm x 600mm depth for mounting legs and cement concrete hard stand of 1m x 1m x 100mm thick around the feeder pillar, including providing red & white vinyl sticker for the Sintex box etc as required.	30.00	Each	5,242.00	1,57,260.00
2.53	Earthing with Copper earth plate 600mm x 600mm x 3 mm thick including accessories and providing masonry enclosures with cover plate having locking arrangement & watering pipe etc with charcoal / cock and salt as reqd.	2.00	Each	14,816.00	29,632.00
2.54	Earthing with G.I. earth pipe 2.5 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc with charcoal/ coke and salt as required.	20.00	Each	4,958.00	99,160.00
2.55	Supply , Installation, Testing of Maintenance Free Earthing System.The material consist of Copper Bonded Steel Rod of dia 17.2mm and length not less than 3m -1 No.(Conforming to IEC62305-3 standard) Treatment using Ground Enhancement Material(GEM) (sealed bag having 10Kg each- 3 Bags) with resistivity not less than 0.12 ohm. (confirming safety standard IEC62561-7). The earth pit cover shall be made of polyplastic. Connection to main equipment shall be made by 8mm dia copper clad steel conductor.The connections shall be made using exothermic welding technique. The work include excavation of suitable hole, treating the earth pit using (GEM) Ground enhancement material and backfilling the soil.	3.00	Each	8,539.00	25,617.00
2.56	Dismantling of 10/12 Meter long steel tubular poles including dismantling of 1:3:6 concrete foundation and transportation to AAI Stores, stacking etc. as reqd.	5.00	Each	3,896.00	19,480.00
2.57	Providing and fixing 25 x 5 mm. G.I. strip in 40 mm dia b class G.I pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	200.00	Meter	150.00	30,000.00
2.58	Providing and fixing 25mm x 5mm G.I strip on surface or in recess for earth connections etc.. as reqd.	200.00	Meter	145.00	29,000.00
2.59	Providing and fixing 25 x 5 mm. Copper strip in 40 mm dia b class G.I pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	100.00	Meter	800.00	80,000.00
2.60	Providing and fixing 25mm x 5mm Copper strip on surface or in recess for earth connections etc.. as reqd.	100.00	Meter	785.00	78,500.00
2.61	Providing and laying earth connection from earth electrode with 6 SWG dia G.I. Wire in 15 mm dia G.I. pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required.	100.00	Meter	25.00	2,500.00
2.62	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing as required.	100.00	Meter	61.00	6,100.00
2.63	Construction of inspection chamber along the cable route at various places in brick masonry with bricks of class designation 75 in cement mortar 1:4(1cement:4fine/coarse sand) of size 120 cm (L) x 60 cm width x 120 cm height in which 30 cm above ground ,providing and laying in position cement concrete in 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 20mm nominal size)on bottomof size 120cm (L) x 60cm (W) x 10cm thick and RCC slab above the chamber in 1:3:6 (1 cement: 3coarse sand: 6 gradedstone aggregate 20mm nominal size) with two nos hook for lifting, plastering all sides of open area in12mm cement plaster1:6 (1 cement: 6 fine/coarse sand) including excavation of soil plastering all sides of open area in12mm cement plaster1:6 (1 cement: 6 fine/coarse sand) including excavation of soil complete etc..as reqd.	5.00	Job	2,126.00	10,630.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.) ⁴
2.64	Supplying and making cable route marker with cement concrete 1:2:4 (1 cement:2sand:4 graded stone aggregate 20mm nominal size) of size 60 cm x 60 cm at the bottom and 50 cm x 50 cm at the top with a thickness of 10 cm including inscription duly engraved as reqd.	5.00	Each	658.00	3,290.00
2.65	Supplying and making cable route marker with 10cm x 10 cm x 5 mm thick G.I plate with inscription thereon bolted/ welded to 35 mm x 35 mm x 6 mm angle iron, 60 cm long fixed on a concrete block 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) of size 200mm(w) x 200mm(w) x 150 mm(H)	25.00	Each	577.00	14,425.00
2.66	Installation, testing and commissioning of 3 to 6.0 Mtrs. long departmentally supplied dismantled tubular pole erecting in cement concrete in 1:2:3 pedestal of size 500mm x 500mm x 1000mm (H) plastering and painting the concrete pedestal i/c connections etc..as reqd.	10.00	Job	2,783.00	27,830.00
2.67	Hiring of JCB for excavation including arranging vehicle permit, passes etc complete as required	250.00	Hours	911.00	2,27,750.00
2.68	Hiring charges of scaffolding including Transportation & shifting to with in building upto a height of 12m assembling & disassembling charges,Labour charges for shifting the scaffolding from one position to another,Loading & unloading charges for One days.(08 Hrs /day)	5.00	Day	3,744.00	18,720.00
2.69	Hiring charges for providing coloured LED serial lighting (01 set shall consist of 50 Nos LED lamps) & RGB LED Lights for decorating Domestic Terminal Facia and City side area, Ancillary Buildings, Garden Area etc including laying of serial lights, supervision & labour charges etc complete for days of National importance and other festival days as per direction of Engineer-In-Charge.				
2.69.1	For Two Days (3000 Set)	4.00	Job	7,590.00	30,360.00
2.69.2	For each additional Days (3000 Set)	34.00	Days	2,024.00	68,816.00
2.70	Modification/Repairing of existing earth pit including providing and fixing of Heavy Duty PVC/FRP cover of size not less than 30cm height & dia not exceeding 30cm , watering funnel, including excavation , refilling & providing 10cm thick PCC at bottom & concrete(1:2:4) around the PVC Earth pit cover of Size (1mx 1mx 0.1m thick.), Painting with water proof paint (Red & White) etc complete as required.	50.00	Job	1,255.00	62,750.00
SH III: PAINTING OF ELECTRICAL & MECHANICAL INSTALLATIONS					
3.1	Painting of following DG Sets along with fuel tank, radiator with two coats of synthetic enamel paint of approved shade, quality and brand including painting of radiator and silencer pipes with anti-corrosive thermal paint, painting of exhaust cladding with Aluminium paint, cleaning the surface, painting with primer and providing putty wherever required etc. as required.				
3.1.1	500 KVA DG Set at DTB Power House (without AMF Panel)	4.00	Job	2,075.00	8,300.00
3.1.2	160 KVA DG Set at RADAR Power House (without AMF Panel)	4.00	Job	1,796.00	7,184.00
3.1.3	125 KVA DG Set at WT Power House (without AMF Panel)	4.00	Job	1,670.00	6,680.00
3.2	Painting of following trolley mounted mobile DG set /Diesel Hydrant Pumps/mobile Light mast along with fuel tank, control panel with two coats of synthetic enamel paint of approved shade, quality and brand including painting of silencer pipes with anti corrosive thermal paint, cleaning the surface, painting with primer and providing putty wherever required, marking of oil level etc. as required.				
3.2.1	50 KVA DG set at CCR hall Power house.	4.00	Job	1,215.00	4,860.00
3.2.2	5 KVA DG set at CCR hall Power house.	2.00	Job	1,214.00	2,428.00
3.2.3	Mobile flood Light Mast	2.00	Job	2,125.00	4,250.00
3.2.4	DG Fire Hydrant Pump (84 BHP) DTB Pumphouse	2.00	Job	2,758.00	5,516.00
3.2.5	DG Fire Hydrant Pump (30 KW/40 Hp) 66 KV substation	2.00	Job	1,675.00	3,350.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
3.3	Painting of following power transformers at following locations with two coats of synthetic enamel paint of approved shade, quality and brand i/c scrapping and cleaning, painting with primer and providing putty wherever required, marking of oil level etc. as required.				
3.3.1	10 MVA Transformer (66 KV Substation)	4.00	Job	2,277.00	9,108.00
3.3.2	160 KVA Transformer including fuse panel (66 KV Substation)	2.00	Job	2,580.00	5,160.00
3.3.3	200 KVA Transformer (RADAR Power House)	4.00	Job	1,973.00	7,892.00
3.3.4	500 KVA transformer (CCR Power House & Main Power House)	6.00	Job	1,776.00	10,656.00
3.3.5	630 KVA Transformer.(Main Power House)	4.00	Job	2,277.00	9,108.00
3.3.6	1000 KVA Transformer (Main Power House & DTB AC Plant)	6.00	Job	1,984.00	11,904.00
3.4	Painting of following pumpsets at following locations with two coats of polyurethane paint of approved shade, quality and brand including scrapping and cleaning, painting with primer providing putty wherever required etc. as required.				
3.4.1	Chiller water pumpset of 30/40 HP (DTB AC Plant)	6.00	Job	977.00	5,862.00
3.4.2	Condensor water pumpset of 25/30 HP (DTB AC Plant)	6.00	Job	977.00	5,862.00
3.4.3	Booster/Cooling Tower/makeup tank pumpset of various capacities upto 20 HP (DTB AC Plant, Technical Block & Airside Area)	10.00	Job	910.00	9,100.00
3.4.4	Cooling Tower (DTB AC Plant)	6.00	Job	1,289.00	7,734.00
3.5	Painting of following AHU motors/pumpsets etc at following locations with two coats of synthetic enamel paint of approved shade, quality and brand i/c scrapping and cleaning, painting with primer providing putty wherever required, marking of oil level etc. as required.				
3.5.1	AHU motors of various capacities (Domestic Terminal & Admin Block)	42.00	Job	900.00	37,800.00
3.5.2	Jockey Pumpset of 12.5HP (66 KV Substation & Main pump house)	4.00	Job	1,579.00	6,316.00
3.5.3	Main Hydrant pumpset of 40 HP (66 KV Substation)	2.00	Job	1,771.00	3,542.00
3.5.4	Water Supply pumpset of 10 HP (Main Pump House)	10.00	Job	1,123.00	11,230.00
3.6	Lettering with synthetic enamel paint of approved quality and brand with stencil of suitable letter size and spacing as per the direction of Engineer-in-charge at various panels / equipments etc as reqd. (Lettering of a single Alphabet/Number/Symbol is considered as 1 Job)	4000.00	Job	4.00	16,000.00
3.7	Painting of Condenser water pipes at different locations with two coats of polyurethane paint of approved shade, quality and brand including scrapping, cleaning and providing putty wherever required on the surface etc. as required.	860.00	Sq.m	122.00	1,04,920.00
3.8	Painting of various HT/LT Panels, cement plastered Chilled water pipes, MS/GI Fire pipes, other pipes/equipments etc at different locations with two coats of synthetic enamel paint of approved shade, quality and brand including scrapping, cleaning and providing putty wherever required on the surface etc. as required.	5200.00	Sq.m	91.00	4,73,200.00
3.9	Painting with one coat of synthetic enamel paint of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.	2000.00	Sq.m	91.00	1,82,000.00
3.10	Applying one coat of ready mixed red oxide zinc chromate primer of approved brand and manufacture including scrapping and cleaning of surface, providing putty wherever required etc complete as required.	2000.00	Sq.m	50.00	1,00,000.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.) ¹
3.11	Painting of following fittings in installed position with one or more coats of spray painting with synthetic enamel paint of approved brand and color to give an even shade including Cleaning the surface, scrapping the rust, removal of dirt/grease with thinner/detergent etc.,as reqd.				
3.11.1	Celing fan 1200 mm.	100.00	Each	142.00	14,200.00
3.11.2	Exhaust fan 300/380 mm. Sweep	60.00	Each	202.00	12,120.00
3.11.3	Exhaust fan 600 mm. Sweep	10.00	Each	254.00	2,540.00
3.11.4	Wall mounting/pedestal fan 400 mm. Sweep	20.00	Each	323.00	6,460.00
3.11.5	Aircirculators 450 mm.	20.00	Each	243.00	4,860.00
3.11.6	Aircirculators 600 mm.	15.00	Each	253.00	3,795.00
3.12	Painting of "T" type Perimeter Light Bracket with Synthethic enamel (Aluminium) including replacing rusted nuts & bolts with SS nuts & Bolts etc complete as required.	400.00	Each	37.00	14,800.00
3.13	Stickering of DB's/panels with vinyl sticker of approved shade includng labelling with alphabets cut out from vinyl sheets (5 letters)	20.00	Sqmtr	303.00	6,060.00
	SH IV : SUPPLY OF SPARES				
4.1	Supply of 20w / 18W, 6500 K , 4 feet LED tube (T8) Ultra bright, glass shell, glare free complete with all accessories etc as required.	100.00	Each	283.00	28,300.00
4.2	Supply of 18W Ultra bright LED PLL having output of 1850 Lumen,suited for installation in existing 2G11 lamp holders to give glare free light complete with all accessories etc as required.	200.00	Each	455.00	91,000.00
4.3	Supply of 10W, 2 feet, Led Batten Type light fixtures, with integral constant LED current driver complete with all accessories etc as required.	100.00	Each	253.00	25,300.00
4.4	Supply of 18W,LED bulb, B22 Pin Type (Warm white/Cool White) complete with all accessories etc as required.	50.00	Each	455.00	22,750.00
4.5	Supply of 25 W (5W/Meter) 5m LED Flexi Strip with driver of , IP 65 Protection (Colours - Red/Green/Blue/ warm white/cool white)	10.00	Each	860.00	8,600.00
4.6	Supply and fixing the following LED indication lamps 230/440 V, 22.5 mm dia in the existing MV panel boards, feeder pillars etc as reqd.				
4.6.1	Red, Yellow, Green	225.00	Each	152.00	34,200.00
4.6.2	Blue	75.00	Each	111.00	8,325.00
4.7	Supply and fixing the following LED indication lamps 110V, 22.5 mm dia in the existing MV panel boards, feeder pillars etc as reqd.				
4.7.1	Red, Yellow, Green	150.00	Each	36.00	5,400.00
4.8	Supply and fixing the following LED indication lamps 24 V, 22.5 mm dia in the existing MV panel boards, feeder pillars etc as reqd.				
4.8.1	Red, Yellow, Green	50.00	Each	40.00	2,000.00
4.8.2	Blue	15.00	Each	40.00	600.00
4.9	Supply of battery operated call bell with remote including battery, Tune Selector & Volume Controller Button etc as reqd.	10.00	Each	1,012.00	10,120.00
4.10	Supply of 240v,50Hz Electronic calling bell with ample loudness.	20.00	Each	1,012.00	20,240.00
4.11	Supply of 2 Core x 1.5 Sq.mm PVC insulated and PVC Sheathed, Copper Conductor (flexible) cable of 1.1KV grade (100 metres)	15.00	Coil	2,378.00	35,670.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
4.12	Supply of 3 Core x 2.5 Sq.mm PVC insulated and PVC Sheathed,multi stranded Copper Conductor (flexible) cable of 1.1KV grade (100 metres/Coil)	20.00	Coil	5,263.00	1,05,260.00
4.13	Supply of 3 Core x 1.5 Sq.mm PVC insulated and PVC Sheathed,multi stranded Copper Conductor (flexible) cable of 1.1KV grade (100 metres/Coil)	20.00	Coil	3,289.00	65,780.00
4.14	Supply of following sizes of FRLS PVC insulated (unsheathed) multi stranded single core copper conductor flexible cable of 1100 Volts grade.				
4.14.1	1.5 Sq.mm (180 Mtrs./Coil)	15.00	Coil	1,560.00	23,400.00
4.14.2	2.5 Sq.mm (180 Mtrs./Coil)	12.00	Coil	2,524.00	30,288.00
4.14.3	4 Sq.mm (180 Mtrs./Coil)	10.00	Coil	3,853.00	38,530.00
4.14.4	6 Sq.mm (180 Mtrs./Coil)	6.00	Coil	5,681.00	34,086.00
4.14.5	10 Sq.mm (180 Mtrs./Coil)	2.00	Coil	10,552.00	21,104.00
4.15	Supply of following sizes of XLPE insulated and PVC Sheathed Armoured Aluminium conductor cable of 1.1 KV grade as per IS 7098 (Part 1) with upto date amendments				
4.15.1	2C x 10 sqmm Al cable	500.00	Meter	55.00	27,500.00
4.15.2	2C x 25 sqmm Al cable	750.00	Meter	70.00	52,500.00
4.15.3	4C x 10 sqmm Al cable	750.00	Meter	71.00	53,250.00
4.15.4	4C x 16 sqmm Al cable	500.00	Meter	81.00	40,500.00
4.15.5	4C x 25 sqmm Al cable	750.00	Meter	111.00	83,250.00
4.16	Supply of 4C x 2.5 Sqmm XLPE insulated and PVC Sheathed Armoured Copper conductor cable of 1.1 KV grade as per IS 7098 (Part 1) with upto date amendments	800.00	Meter	83.00	66,400.00
4.17	Supply of SP, 10kA, 'C' Curve MCB's of following ratings				
4.17.1	6A MCB	100.00	Each	129.00	12,900.00
4.17.2	10 A MCB	100.00	Each	129.00	12,900.00
4.17.3	16 A MCB	100.00	Each	129.00	12,900.00
4.17.4	20 A MCB	100.00	Each	129.00	12,900.00
4.17.5	32 A MCB	50.00	Each	129.00	6,450.00
4.18	Supply of DP Isolator 40A, 10KA, C Curve	30.00	Each	239.00	7,170.00
4.19	Supply of DP Isolator 63A, 10KA, C Curve	30.00	Each	315.00	9,450.00
4.20	Supply of FP Isolator 40A, 10KA 'C' Series	80.00	Each	529.00	42,320.00
4.21	Supply of FP Isolator 63A, 10KA 'C' Series	100.00	Each	579.00	57,900.00
4.22	RCCB DP-25A 30mA	24.00	Each	1,409.00	33,816.00
4.23	RCCB DP-40A 100mA	12.00	Each	1,762.00	21,144.00
4.24	RCCB DP-40A 30mA	12.00	Each	1,649.00	19,788.00
4.25	RCCB DP- 40 A 300mA	6.00	Each	1,800.00	10,800.00
4.26	RCCB 4P-40A 300mA	6.00	Each	3,026.00	18,156.00
4.27	RCCB 4P-63A 300mA	10.00	Each	3,161.00	31,610.00
4.28	MCCB 3P - 63A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	24.00	Each	2,801.00	67,224.00
4.29	MCCB 3P - 80A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	24.00	Each	2,801.00	67,224.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
4.30	MCCB 3P - 100A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	24.00	Each	2,801.00	67,224.00
4.31	MCCB 3P - 125A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	24.00	Each	4,053.00	97,272.00
4.32	MCCB 4P - 63A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	20.00	Each	3,894.00	77,880.00
4.33	MCCB 4P - 80A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	20.00	Each	3,894.00	77,880.00
4.34	MCCB 4P - 100A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	16.00	Each	3,894.00	62,304.00
4.35	MCCB 4P - 125A 25kA with Thermal magnetic release having adjustable O/L & S/C protection	16.00	Each	4,918.00	78,688.00
4.36	MCCB 4P - 250A 35kA with Thermal magnetic release having adjustable O/L & S/C protection	6.00	Each	11,992.00	71,952.00
4.37	Supply of following size of ISI marked, medium duty. PVC conduit along with accessories like bend, coupling, junction box, saddles etc complete as as reqd.				
4.37.1	20mm dia PVC Conduit	500.00	Meter	19.00	9,500.00
4.37.2	25mm dia PVC Conduit	500.00	Meter	25.00	12,500.00
4.38	Supply of following sizes of ISI Marked PVC casing and capping				
4.38.1	20mm x10mm	500.00	Meter	14.00	7,000.00
4.38.2	25mm x10mm	500.00	Meter	20.00	10,000.00
4.39	Supplying of following PVC Surface box ,Modular base & cover plate including all accessories etc. complete as required.				
4.39.1	2 Module	25.00	Each	112.00	2,800.00
4.39.2	3 Module	25.00	Each	145.00	3,625.00
4.39.3	4 Module	25.00	Each	172.00	4,300.00
4.39.4	6 Module	25.00	Each	223.00	5,575.00
4.39.5	8 Module	25.00	Each	319.00	7,975.00
4.39.6	12 Module	25.00	Each	383.00	9,575.00
4.40	Supplying of following modular switch/ socket on the existing modular plate & switch box etc. as required				
4.40.1	5/6 amps switch	200.00	Each	66.00	13,200.00
4.40.2	15/16 amp switch	150.00	Each	127.00	19,050.00
4.40.3	3 pin 5/6 amp socket outlet	75.00	Each	134.00	10,050.00
4.40.4	6 pin 15/16 amp socket outlet	50.00	Each	167.00	8,350.00
4.40.5	Fan Regulator (2module)	30.00	Each	325.00	9,750.00
4.40.6	Fan Regulator (1 module)	30.00	Each	244.00	7,320.00
4.41	Supply of 63A, 4P, 415V On load Changeover switch confirming to IS:13947 including Spreader terminals, nuts, bolts of suitable size and rotary handle etc complete as required.	4.00	Each	3,719.00	14,876.00
4.42	Supply of 100A, 4P, 415V On load Changeover switch confirming to IS:13947 including Spreader terminals , nuts, bolts of suitable size and rotary handle etc complete as required.	4.00	Each	4,498.00	17,992.00
4.43	Supply of 3Ø Digital Multi Function Meter (V, A, F, PF, kW, kVA, KWh) with inbuilt selector switch, Class 1.0 accuracy	50.00	Each	2,747.00	1,37,350.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
4.44	Supply of 3Ø Digital Voltmeter with inbuilt selector switch, Class 1.0 accuracy	50.00	Each	740.00	37,000.00
4.45	Supply of 3Ø Digital Ammeter with inbuilt selector switch, Class 1.0 accuracy	50.00	Each	740.00	37,000.00
4.46	Supply of Din rail mountable type 4 Pole 40A Contactor with Integrated auxiliary contacts	10.00	Each	2,817.00	28,170.00
4.47	Supply of 240 VAC DIN Mounting type Analog Timer with battery backup	15.00	Each	1,632.00	24,480.00
4.48	Supply of 24V DC 1 C/O Base /Din 16 Pulse digital timers	5.00	Each	2,392.00	11,960.00
4.49	Supply of 20W Twin Type Red LED Aviation Obstruction Light with aluminium Alloy base, suitable for operation at 240Vac, 50Hz.	25.00	Each	5,020.00	1,25,500.00
4.50	Supply of Phase failure relays suitable for 415 V, 50Hz supply (Make: Minilec HLS-D2 or equivalent)	20.00	Each	1,838.00	36,760.00
4.51	Supply of 32A breaker control Switch with n operating voltage of 660V AC suitable for 11kV Megawin make HT Panel (Make : Switron : Model : SBC 32P 6124/244LM/X31 1MYN533020-003	25.00	Each	1,569.00	39,225.00
4.52	Tube end holder (FL008) mirror optic type for 18W/20W LED Tube Light fittings (T8)	200.00	Each	71.00	14,200.00
4.53	Starter for flourescent tube 230/240 V, 20/36/40/60 w	10.00	Each	127.00	1,270.00
4.54	2.5µ Fd Capacitor	200.00	Each	25.00	5,000.00
4.55	Power Wrap Tape 25mm x 3metre (Stanvac Model #Z942 or equivalent)	300.00	Each	354.00	1,06,200.00
4.56	Safety Solvent #8060 700ml Can	2.00	Each	354.00	708.00
4.57	Easy Clean (NF) #Z901, 500ml Can	2.00	Each	1,533.00	3,066.00
4.58	Moisture Displacing Di Electric Cleaner , ALL - 4CO2 # 7340 700ml	4.00	Each	460.00	1,840.00
4.59	Pen Oil #6030 500ml Can	4.00	Each	1,402.00	5,608.00
4.60	Weicon TFT/LCD Screen Cleaner 200ml Can	4.00	Each	2,328.00	9,312.00
4.61	One Minute Putty #Z814, 24ml Syringe	5.00	Each	1,366.00	6,830.00
4.62	AC90 CO2 - 500ml Can	4.00	Each	425.00	1,700.00
4.63	STEELOX #Z925, 500ml Can	5.00	Each	1,366.00	6,830.00
4.64	SILICOSEAL SILIRUB 2 (TRANSPARENT) , #Z219, 310ml	10.00	Each	607.00	6,070.00
4.65	Supply of following spares for L&T make ACBs (C-Power/U-Power) at various power houses :-				
4.65.1	Front facia for L&T C-Power MDO (Cat No SL932010000)	5.00	Each	2,829.00	14,145.00
4.65.2	Front facia for L&T C-Power EDO (Cat No SL932020000)	5.00	Each	3,062.00	15,310.00
4.65.3	Front box Mould (Spare Cradle Facia) for L&T C-Power (Cat No SL952600000)	5.00	Each	1,475.00	7,375.00
4.65.4	800A-1600 A Fixed arcing contact for L&T C-Power (Cat No SL938910000)	5.00	Each	3,220.00	16,100.00
4.65.5	800A-1600A Moving arcing contact for L&T C-Power (Cat No SL938920000)	5.00	Each	3,220.00	16,100.00
4.65.6	415V AC U/V release for L&T C-Power (Cat No SL927200000)	5.00	Each	2,723.00	13,615.00
4.65.7	Lockable Trip Pushbutton for L&T C-Power (Cat No SL93148000B)	5.00	Each	1,851.00	9,255.00
4.65.8	Door Bezel for L&T C-Power (Cat No SL916010000)	5.00	Each	2,144.00	10,720.00
4.65.9	Front box Mould (Cradle Facia) for L&T U-Power (Omega) (Cat No CL906570000)	5.00	Each	1,475.00	7,375.00
4.65.10	220V AC U/V release for L&T U-Power (Omega) (Cat No CL90818B000)	5.00	Each	5,101.00	25,505.00
4.66	Supply of 100W , 6.6A. with PK30D base Halogen lamp (Make : Osram Model : 64342 HLX-C 100-15 / Make : 6116LL 100W PK30D or its equivalent)	200.00	Each	607.00	1,21,400.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
4.67	Supply of 105W , 6.6A., Reflector type Halogen lamp suitable for Safegate make Inset Light Fittings (Make : Osram Model : 64339A / Make : Narwa Model : 6105 or its equivalent)	300.00	Each	810.00	2,43,000.00
4.68	Supply of 200W , 6.6A with PK30D base, Halogen lamp (Make : Osram Model : 64382 HLX-C 200-15 / Make : Narwa Model : 6117 LL or its equivalent)	200.00	Each	1,316.00	2,63,200.00
4.69	Supply of 9kV Lightning Arrester of 10kA class 1, complete with 03 no's of 50mm insulator,accessories etc for fixing on four pole sructure etc as required.	6.00	Each	6,605.00	39,630.00
4.70	Supply of 60kV Lightning Arrester of 10kA class 1, complete with 03 no's of 50mm insulator,accessories etc for fixing on four pole sructure etc as required.	5.00	Each	26,318.00	1,31,590.00
4.71	Supply of Nickle plated single compression type brass cable gland of approved make for following sizes				
4.71.1	Brass compression gland (22 mm)	20.00	Each	39.00	780.00
4.71.2	Brass compression gland (25 mm)	20.00	Each	73.00	1,460.00
4.71.3	Brass compression gland (28 mm)	20.00	Each	73.00	1,460.00
4.71.4	Brass compression gland (32 mm)	20.00	Each	87.00	1,740.00
4.72	Supply of Aluminium lugs of approved make of all types for following sizes				
4.72.1	Aluminium lugs (6 Sqmm)	100.00	Each	3.00	300.00
4.72.2	Aluminium lugs(10 Sqmm)	100.00	Each	3.00	300.00
4.72.3	Aluminium lugs(16 Sqmm)	100.00	Each	2.00	200.00
4.72.4	Aluminium lugs (25 Sqmm)	100.00	Each	4.00	400.00
4.72.5	Aluminium lugs (35 Sqmm)	50.00	Each	5.00	250.00
4.72.6	Aluminium lugs (50 Sqmm)	50.00	Each	7.00	350.00
4.73	Supply of PVC Cable Management System of 100mm width having minimum depth of 38mm with base and lid along with complete accessories like couplers etc as required.	100.00	Each	607.00	60,700.00
	SH V:- FILTRATION OF TRANSFORMER OIL AND ASSOCIATED WORKS				
5.1	Filtration of transformer oil at various power houses of Trivandrum Airport with not less than two circulation of oil and testing of oil after filtration so as to achieve a break down value of not less than 60 KV for a minute as per IS:1866/IS:6792-1972 with upto date amendrnents i/c hiring and transporting charges for filtration equipment, test kit etc. as required.	39426.00	Litre	6.00	2,36,556.00
5.2	Supply of blue colour silica gel for breather units of all transformers as required	75.00	Kg	354.00	26,550.00
5.3	Supply of Transformer Oil in Barrel (1 Barrel = 210 Ltrs) conforming to IS:335/1983 for toping up of oil for transformer during filtration of oil.	2.00	Barrel	23,378.00	46,756.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
	SH VI:- SERVICING OF HT PANELS AND LT ACB'S OF POWER SUPPLY INSTALLATIONS				
6.1	Overhauling and Servicing of 11KV, HT breakers on quarterly basis for following makes of various capacities by deploying authorized service personnel of Manufacturer / Service dealer / Specialized service engineers experienced in similar nature of work, provided at various power houses/substations including drawing out of the OCM/VCB, opening the same, inspection, servicing, cleaning of contact surfaces, overhauling of operating mechanism, lubrication of moving parts, cleaning of CTs and measuring of contact resistance, meggering, testing of ON-OFF time, Testing and Commissioning etc. as required. (Servicing of One Breaker is considered as one Job)				
6.1.1	11KV, VCB of Biecco Lawrie make (11 Nos)	88.00	Job	1,619.00	1,42,472.00
6.1.2	11KV, VCB of Megawin make (12 No's)	96.00	Job	1,619.00	1,55,424.00
6.1.3	11KV, VCB of ABB make (05 No's)	40.00	Job	1,619.00	64,760.00
6.1.4	11KV, VCB of Schneider make (12No's)	48.00	Job	1,619.00	77,712.00
6.1.5	11KV, VCB of Schneider make (7 No's)	28.00	Job	1,619.00	45,332.00
6.1.6	11kv SF6 RMU (Make : Schneider)	8.00	Job	15,180.00	1,21,440.00
6.1.7	11kv SF6 RMU(Make : ERL)	16.00	Job	18,216.00	2,91,456.00
6.2	Annual servicing and cleaning of following 11kV HT Panels including checking of busbars and buslinks, insulators, metering and control wirings, meters, space heaters and replacement of gaskets, measuring the Insulation resistance of Busbar, MOCB/VCB spouts etc. and applying one coat of 11kV epoxy bus insulation over the busbars, checking the earth bus and connections etc. as required and as per the direction of the Engineer-in-charge.				
6.2.1	11KV, VCB of Biecco Lawrie make (10 Nos)	2.00	Job	60,721.00	1,21,442.00
6.2.2	11KV, VCB of Megawin make (10 No's)	2.00	Job	60,721.00	1,21,442.00
6.2.3	11KV, VCB of ABB make (05 No's)	2.00	Job	30,361.00	60,722.00
6.2.4	11KV, VCB of Schneider make (12 No's)	1.00	Job	72,865.00	72,865.00
6.2.5	11KV, VCB of Schneider make (7 No's)	1.00	Job	56,673.00	56,673.00
6.2.6	11kv SF6 RMU (Make : Schneider)	2.00	Job	55,661.00	1,11,322.00
6.2.7	11kv SF6 RMU(Make : ERL)	4.00	Job	30,361.00	1,21,444.00
6.3	Annual servicing and cleaning of 11kV/110V PTs of 11KV HT panels i/c. draining of transformer oil, checking and resealing of all joints, checking the windings, wirings, replacement of transformer oil, PT fuses etc. complete as required and as per the direction of the Engineer-in-charge.	20.00	Job	4,554.00	91,080.00
6.4	Annual Servicing and cleaning of busducts of 1000KVA Transformer which includes tightening and checking of all busbar joints, replacement of gaskets, screws of the doors etc. as required	60.00	Meter	405.00	24,300.00

Sl.No	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
6.5	Annual inspection /Overhauling/Serviceing of ACBs of L&T/GE/ABB Make of various capacities provided in the various LT panels at various Powerhouses/Substations by deploying Authorised Service Personnel of manufacturer/Service Dealer/Specialised Agencies experienced in servicing of ACBs including cleaning of ACBs, opening the same, inspection, servicing, cleaning of contact surfaces, arc chutes, overhauling of operating mechanism, lubrication of moving parts, checking of UV coils, Trip circuits, checking of control circuits, replacement of defective components and spares supplied by AAI, testing and commissioning etc as required	80.00	Each	3,036.00	2,42,880.00
6.6	Supply and fixing 2.5 mm (nominal $\pm$ 10%) thick and 1 mtr wide synthetic insulation mat suitable for upto 11 KV grade as per IS: 15652:2006 with upto date amendments along with suitable adhesive / sealing material i/c sealing of all joints and corners etc. as required.	750.00	Sq. Mtr.	546.00	4,09,500.00
6.7	Supply and fixing 2.0 mm (nominal $\pm$ 10%) thick and 1 mtr wide synthetic insulation mat suitable for upto 3.3 KV grade as per IS: 15652:2006 with upto date amendments along with suitable adhesive / sealing material i/c sealing of all joints and corners etc. as required.	1000.00	Sq. Mtr.	670.00	6,70,000.00
TOTAL OF SH I + SH II + SH III+ SH IV + SH V + SH VI					5,33,29,803.00
Total (Excluding GST)					5,33,29,803.00

(Rupees Five Crore Thirty Three Lakh Twenty Nine Thousand Eight Hundred and Three Only)

Sreekumar
5.10.2020
(SREEKUMARI, J)

JT.GEN.MANAGER ENGG (E)-II

SPECIAL CONDITION OF CONTRACT FOR GENERAL MAINTENANCE CONTRACTS OF ELECTRICAL & MECHANICAL INSTALLATIONS

These special conditions of contract shall be read in conjunction with Airports Authority of India General conditions of contract, if there are any provisions in the special conditions of contract which are at variance with the provisions of general conditions of contract, the provision in these special conditions shall take precedence.

1. General Scope of Work:- The Scope of work covers the following items:-

- I a) Operation and maintenance of 66KV Substation by deploying required qualified manpower recording hourly reading of all major equipment's of the system, preventive and routine maintenance so as to ensure serviceability of complete system.
- b) Operation and maintenance of Power Supply & standby DG Sets by deploying required qualified manpower for operation, monitoring, recording hourly reading of all major equipment's of the system, preventive and routine maintenance so as to ensure serviceability of complete system.
- c) Operation & Maintenance of GLF electrical installations by deploying qualified manpower along with departmental staff for attending breakdowns, preventive and routine maintenance so as to ensure serviceability of GLF & Runway lighting system.
- d) Maintenance of Internal & External electrical installations by deploying required qualified manpower at Domestic terminal building, old domestic terminal building, technical block and other ancillary buildings for attending breakdowns Providing day to day maintenance services, general cleaning of various Installations as per maintenance schedule as specified as per the inventory details.
- e) Operation & Maintenance of Mechanical Installations by deploying required qualified manpower for operation, monitoring, recording hourly reading of all major equipment's of the system, preventive and routine maintenance so as to ensure serviceability of complete system as per the inventory details.
- II) Internal & external electrification works.
- III) Painting of electrical & mechanical installations.
- IV) Supply of spares.
- V) Filtration of transformer oil and associated works.
- VI) Servicing of HT panels and LT ACB's of power supply installations.

2. **Period of Contract:-** The service contract shall be for a period of **24 Months** from the date of handing over of site. The contract period can be extended for further period of 06 months on the same terms and conditions of the agreement. AAI reserves the right to terminate the contract fully or partially by giving 30 days' notice in writing to the contractor. If in the opinion of the Engineer-in-Charge, it is observed that the contractor is not doing the works satisfactorily as per the terms and conditions of contract, then the contract can be terminated with immediate effect without giving any reasons thereof.

3. **Security clearance for the company and the Entry pass for staffs:-** The work site lies in restricted area. BCAS (Bureau of Civil Aviation Security) is in the process of commissioning of Biometric Access Control System at 43 Airports including Trivandrum Airport on priority. The contractor shall obtain company's Security Clearance from BCAS through e-sahaj portal. E-sahaj portal will facilitate applicant to submit application online and also to view its status from time to time. Initially for applying pass, the uploaded documents from e-sahaj are to be submitted along with the application. The contractor shall apply in advance for issue of necessary entry passes of workmen engaged by him. The office/airport premises is an essential service covered under the maintenance of essential service Act and hence disruption of services rendered will be a statutory offence. The necessary police verification, security clearance issued by BCAS, Authorization Letter, Appointment letter, AVSEC training etc. as required for entry passes will be the responsibility of the contractor. All expenditure/fees towards arranging security passes shall be borne by the Agency.

4. **Security:-** The contractor and his employees shall abide by security regulation framed by AAI/ BCAS or Police Authorities. Any worker of the contractor, whose presence is found undesirable in AAI premises, shall not be allowed to work. The Contractor shall be fully responsible for the satisfactorily working of his staff.

"If Contractor or his authorized representative or his employed workers are found violating any of security regulations, suitable action shall be taken by AAI as per prevailing rules".

All men and vehicles shall be permitted to enter the restricted / office area only on possession of the security passes. The contractor shall apply in advance before commencement of work for issue of security passes and shall submit a list of personnel concerned with their addresses. The contractor shall ensure that his men are deployed only in those area where the security passes issued is valid for. Passes shall be deposited back with Engineer-In-Charge on demand and in any case immediately after completion of work. The contractor or his staff/workmen shall observe all the rules promulgated from time to time by the concerned authorities. Any person found violating the security rules laid down by the authority will be expelled from the area without assigning any reason whatsoever and contractor shall have no claim on this account.

5. **Statutory & Regulatory Clauses: -**

The contractor has to discharge all the obligations as provided under various statutory enactment including the EPF/ ESI/ Contract Labour (Regulation and abolition)/ Minimum Wages / Payment of Wages / Payment of Bonus /Payment of Gratuity / Workmen's compensation / Works Contract and other relevant Acts, Rules and Regulations in force and as amended from time to time in the State, as applicable.

The engagement and employment of workers and payment of wages to them as per existing provisions of various labour laws and regulations is the sole responsibility of the contractor and any breach of such laws or regulations shall be deemed to be violation of this contract. AAI may ask the contractor to produce documents to verify that these provisions/laws are complied by the contractor.

The contractor has to follow the local security/safety rules & regulations and such instructions on restricted hours of work as may be imposed on him by the department / local authorities, while working in security restricted zones and no claim whatsoever on account of this, will be entertained. The contractor has to deploy their staff to run the system on all days (365 days) including Sundays and Gazetted holidays in shift as per BOQ for which nothing extra shall be paid. The contractor shall submit duty roster to EIC for each section every month. NO interchange of duties is allowed without prior written permission of EIC.

Contractor has to submit the details of staff such as, qualification documents and experience letters of the staff, the CV and passport size coloured photograph along with copy of police verification (not older than six months on the date of start of work) before engaging them on work. All the documents should be self-attested by each worker and signed and stamped by contractor/ agency. The decision of Engineer-in-charge, to accept or reject any candidate on the basis of lack of experience, qualification, lack of skills required for job, will be final and binding on the Agency.

6. **Uniform & ID Cards:-** The contractor/ agency has to provide every year during the currency of the contract, 2 sets of uniform (pant and shirt), 1 pair of safety shoes & 3 pair of socks to his staff of approved colour during the contract period, (within one month from the date of award) failing which, AAI recover an amount of **Rs 200/- per person per week** till the compliance of the same from the contractor's running/final bill. In the event of non-compliance of wearing uniform & shoes by workers on daily basis a recovery of **Rs. 50/-per day** per person shall be made from running bills. The workers should wear a badge on the left pocket of the shirt mentioning company's name. The Contractor shall issue Photo ID cards to all the staffs containing all relevant information such as Name, designation, area of work, Mobile Number, Permanent address, Blood Group etc.
7. No accommodation shall be arranged by the AAI for the staff / workers of the contractor. It is the responsibility of contractor to make his own arrangements for the facilities.
8. **Rates :-** The prices quoted shall be Exclusive of GST , PF/ ESI & Bonus. PF & ESI amount paid to the statutory authorities by the contractor shall be reimbursed on actual basis of minimum statutory eligible amount throughout the contract period on submission of the documentary evidence in next bill or after the final bill. Bonus amount as per latest Govt. rules will be paid to the deployed manpower by the contractor and the same shall be reimbursed on actual basis throughout the contract period on submission of the documentary evidence in next bill or after the final bill. In case of nonpayment of bonus necessary recovery/withheld against bonus from their RA Bill / Final bill shall be made as decided by EIC and appropriate action will be initiated by AAI against the contractor. The decision of EIC in this regard will be final and binding on the Agency.

9. PF & ESIC Contribution:-

- (i) The contractor shall register himself with Labour Licensing Authority and obtain Labour License Number in this regard.
- (ii) The contractor shall have to register with PF & ESIC (where ever applicable) for workmen engaged for the work & challans / deposit receipts of PF & ESI contribution shall be submitted in AAI office for verification/ reimbursement, at the time of submission of bill.
- (iii) **The PF dues (including EDLI and administrative charges) in respect of workers engaged by the contractor for AAI works to be deposited by the contractor every month by a challan and the documentary evidence in support of such payments along-with employee wise details of the PF contribution (both Employee's share and the employer's contribution) needs to be submitted to the Engineer in charge for the work/ contract.**
- (iv) **ESI (where ever applicable) & EPF amount (contractor's contribution & administrative charges) paid to the statutory authorities by the contractor shall be reimbursed on actual basis on submission of documentary evidence.**
- (v) **If ESI not applicable, the agency shall provide Rs. 2.0 lacs Mediclaim policy from nationalized insurance agencies to each person engaged at the site.**
- (vi) **The contractor has to deposit PF & ESI as applicable, failing which recovery/ with-held @ 26 % and 6 % against PF and ESI respectively from their R.A bills/ Final Bill shall be made.**

10. Labour Wages:

- (i) The contractor has to pay the prevailing minimum wages issued by the office of Regional Labour Commissioner/ Chief Labour Commissioner (whichever is higher), from time to time. However, the difference in minimum wages based on actual payment made to the labour and wages applicable at the time of submission of tender will be reimbursed including difference in EPF and ESI payment to the contractor on revision of minimum wages and no additional amount such as contractor's overhead & profit will be paid on this account. In this regard the successful bidder shall submit an affidavit on non-judicial stamp paper of Rs.200 as per Annexure before award of the work.
- (ii) For the purpose of admitting the claim for reimbursement of statutory increase in wages paid by him, the contractor has to produce the required documentary evidence to the satisfaction of Engineer-In-Charge.
- (iii) **The payment to the workmen's engaged by the contractor is to be paid through NEFT/ RTGS/ Cheque on or before 7th of every month irrespective of Saturday, Sunday and bank holidays. If any violation with respect to payment of wages for any two months in a contract period, necessary action for cancellation of contract, debarring of the agency for participating in future contracts in AAI shall be initiated. The agency will not be allowed to**

participate in any of the tendering process in AAI till finalization of the decision.

11. **During** the contract period if any new installations are added / replaced or modified the existing ones in these areas, which do not warrant any additional manpower, the maintenance services for these installations are also to be provided by the contractor without any extra cost.
12. **Qualification & Wages of Staff:-** The contractor should depute the persons as per the qualification given below for maintenance works. Each shift should be covered with highly skilled, skilled, Semi-skilled, Un- skilled persons as required as per Annexure 'A'.
- (i) **Graduate Engineer (Station Engineer & Shift Engineer)** - shall be Graduate holders with 03 year experience or Diploma with min. 05 yrs or retired Assistant Engineers of state EBs of similar experience in 66KV or higher KV substations for overall supervision and administration of the contract and shall be paid wages equivalent to contract wage policy of Kerala State EB and the current minimum wage is **Rs. 1,025/day**.
 - (ii) **Highly skilled manpower /Supervisor** - shall be Diploma holders with 04 year experience (Preferable) or Graduate engineer with min. 02 yrs of similar experience for overall supervision and administration of the contract and shall be paid extra allowance of **Rs. 4,000/- per month** in addition to the minimum wages of State/Central whichever is higher. The current minimum wage is **Rs. 733/day**.
 - (iii) **Highly skilled manpower** - shall be Diploma holders with 02 years experience /Graduate with 01year experience (Preferable) or ITI Holder in Electrician /wireman/refrigeration/fitter trade with 10 years' experience for supervision of manpower & works. The current minimum wage is **Rs. 733/day**.
 - (iv) **Skilled manpower** - shall be I.T.I. holder in Electrician/ Wireman with minimum 2 years experience in similar works and wireman trade license (preferable) and shall be paid as per minimum wages of State/Central whichever is higher. The current minimum wage is **Rs. 666/day**.
 - (v) **Semi-Skilled manpower** - shall have ITI holder in Electrician/ Wireman with minimum 1 year experience in similar work (preferable) or 10th pass with five year experience of similar works and shall be paid as per minimum wages of State/Central whichever is higher. The current minimum wage is **Rs. 569/day**.
 - (vi) **Unskilled manpower**- Shall be min. 10th Class pass with good physique & shall have basic knowledge of similar electrical works and shall be paid as per minimum wages of State/Central whichever is higher. The current minimum wage is **Rs. 503/day**.
 - (vii) **Highly skilled manpower (Documentation Assistant)**- shall have Graduation with min. 2 years of work experience with sound computer skills in MS Office preferably in SAP ERP Platform to AAI, shall be paid extra allowance of **Rs. 2,000/- per month** in addition to the minimum wages. The current minimum wage is **Rs. 733/day**.

However, EIC reserve the rights to relax above mentioned educational requirement and experience criteria for any specialized skilled person suitable to site requirements only after taking approval in writing from one rank higher than TS authority.

13. In case of absence of staff from duty recovery will be made by the department at the following rates, which shall be binding on the contractor.

i. Highly Skilled	:	As per daily wages
ii. Skilled	:	As per daily wages
iii. Semi- Skilled	:	As per daily wages
iv. Un-Skilled	:	As per daily wages

But apart from daily wages, an amount of Rs. 200/- will be recovered from the agency per person per shift for absenteeism of any worker as a penalty.

The EIC has full rights to instruct the agency of expel/ replace the person with the regular habit of taking unauthorized leaves frequently or continuously absent without proper justification, which may impact the morale of co-workers.

14. The complete details of the installations under the scope of work are attached in **Annexure "B"** at page no. 153 to 161 and Preventive Maintenance Schedule are attached in **Annexure "C"** as per page no. 162 to 180 of Special conditions.
15. It is the responsibility of the contractor to maintain and ensure 100% serviceability of the equipment's / installations under this contract, except for the reasons beyond the control of the contractor. The decision of engineer-in-charge is final and binding on the contractor in respect of establishment & "the reason beyond the control of the contractor". If the failure to maintain the serviceability of installations attributed to the contractors / agency, penalty to be imposed on the contractor as deemed fit by the Engineer in Charge.
16. In case the agency is not able to attend/ rectify fault in the system within the stipulated time period, AAI reserves the rights to engage outside agency to check / inspect the faulty system. If the system is rectified by the outside agency or third party, the amount of checking, rectification along with suitable penalty towards delay in attending breakdown shall be recovered from the agency. Who otherwise is responsible for the up keeping of this equipments.
17. There shall be **no liability on the part of the AAI to pay any compensation arising out of the labour dispute, accident etc. at site.** The contractor will be fully responsible for safety, security and coordination of the workers deployed at AAI site. Nothing will be paid extra to the Agency on this account.
18. Contractor or his authorized representative shall visit the site at least once in a month and as and when called by the Engineer-in-Charge or his representative and will report about satisfactory working of all equipment.
19. Any material taken out for the purpose of repair/ rectification/ replacement from the building or work premises shall have necessary permission from the EIC and security personnel/ competent authority in the form of a Gate pass.

20. The timings of operation & maintenance/ upkeep work etc. shall be as decided by Engineer-in-charge from time to time depending upon operational & technical requirement.

21. If agency is doing any maintenance work as per schedule then they have to take prior approval for the same from EIC and also have coordination with other entities/ wings (ATC/CNS/Ops Dept/Airlines etc.) as required.

22. Handing/ Taking over of the Equipment/ Machines after contract:-

i) For AMC Contract

All the equipment's / installations/ systems with accessories complete in all respect shall be checked by agency before taking over the site and the same has to be handed over AAI contractor in good running condition at the end of the contract. List of defects, If any notified during contract period shall be rectified by the agency before the closure of the contract. If the agency failed to rectify the defects, notified to him (during contract period) the EIC shall rectify the defects at the contractors risk & cost. The decision of EIC in this regard will be final & binding on the agency.

23. For delay in attending maintenance schedules:- All the preventive maintenance works shall be done as per schedule and complete records in those regards has to be prepared and submitted to AAI engineers, failing which recovery of Rs. 5,000/- for monthly checks, Rs. 10,000/- for quarterly maintenance, Rs. 15,000/- for half yearly maintenance and Rs. 20,000/- for yearly maintenance shall be made from the bills for each set/system of installations, subject to the shut down provided by AAI, which shall be Co- ordinate by the agency.

24. The contractor has to deploy their staff to run the system on all days as per BOQ. If there are some labour under a court case that need to be deployed by the agency as directed by E-I-C.

25. The work shall be carried out as per specifications and relevant applicable standard including ISI/CPWD specification.

26. Safety & availability of Material: -

(i) The firm/agency shall submit test certificates, wherever applicable as per CPWD/IS/ manufacturers practice and the department reserves the right to get them independently checked for the material supplied by contractor as required.

(ii) All debris due to works shall be removed and site shall be cleared by the contractor as soon as the task is completed. Non-removal of debris from site will attract a penalty of Rs. 500/- per day from the running bill/final bill.

(iii) Issue of materials stipulated in the tender will be regulated to the actual needs from time to time. Unused materials shall be returned to the department failing which the recovery will be made at the penal rate i.e. double the market rate. Any damage caused to the materials during transit or under storage will be to the contractor's account.

- (iv) If there is any requirement of material at site which is not available in AAI store then contractor has to procure from market as per approved makes with EIC permission and close the complaint as soon as possible. Contractor will provide the tax invoice/ bill for the same and the payment for such material will be given along with 15% OH & CP in running / final bill as an extra item.

27. Guarantee: - In case of supply of any material, the tenderer shall guarantee the equipment/ material against all defects as per manufacturer. Any defects arising during the guarantee period shall be rectified by the Tenderer at his own expenses to the satisfaction of the E-I-C.

28. Water, Electricity and Enquiry Room: -The AAI will provide an enquiry room, water & electricity for maintenance purpose, free of cost.

29. Make of Items: - The contractor shall use / supply the material as per approved make of AAI or as per schedule of quantities or exact replacement of existing material suitable to site after taking permission from EIC/authorized representative in writing in case makes are not defined for particular material and the department reserves the right to accept or reject any other makes offered by the contractor.

The contractor has to supply the materials as and when reqd. /ordered by the Engineer-in-charge or his representative during the currency of the contract.

30. Terms of payment:-

The Running payments for the work done shall be released **Monthly** by AAI only after salary payments to all workers & submitting the proof of disbursement and deducting the applicable taxes. **The contractor shall also submit to the department separately his computerized measurements, Abstract of Cost, GST invoice, and the bill based on measurements, duly bound, and its pages machine numbered along with two spare copies of the bill.** The Security Deposit @ 10% shall be deducted from the running bills, which shall be released after successful completion of Defects Liability Period.

The following documents as applicable shall be produced and self-attested photo copy shall be submitted by the contractor during each running bills:-

- (i) Delivery challan / copy of invoice of all the material supplied.
- (ii) Test Certificate to confirm that the materials meet the contract specification and relevant standard in all respects.
- (iii) Monthly Challans of E.P.F. and E.S.I. deposits upto previous month.
- (iv) Wages register signed by workers of each month.
- (v) Bonus details received and signed by workers.
- (vi) Log books & attendance register.

Final Bill Payment: -The total amount of final bill worked out at the accepted tender rates, if found to be more than the amount worked out at the quoted rate of second lowest, the contractor shall be paid lower of the two.

The agency shall submit final bill along with all the documents related with PF, ESIC & Bonus to AAI in addition to all maintenance schedule registers, documents etc. related to the work. The agency also formally hand over the list

of equipments in good working condition, without any damage as handed over to them by AAI.

31. The contractor shall be responsible for any damage caused to any equipment's /building of AAI due to the negligence of the staff. The same shall be made good by the contractor at his cost.
32. Agency has to submit the **Preventive Maintenance Activity Plan** within **15 days of award** of work in line with the Preventive Maintenance Schedule, considering site requirement for approval of Engineer-In-Charge or his authorized representative. All the maintenance works shall be performed as per the Maintenance schedule attached.
33. The agency shall provide minimum 01 no. mobile phone with active SIM of Incoming and Outgoing facility to each site (66kV Substation , DTB Power House, DTB Switch Room, GLF Section, Wireless Station & RADAR) only for official use during the currency of the contract ,nothing extra will be paid on this account.
34. The agency shall provide minimum 01 no. First Aid kit of approved make (Preferably from St. John's Ambulance) containing all the necessary medicines, such as anti septics ointments, Adhesive bandages, anti septics , disposable sterile gloves etc. for the following locations :-
- 66kV Substation.
 - GLF Section
 - GLF Power House.
 - RADAR Power House
 - DTB Switch room.
 - DTB Power House.
 - DTB Pumphouse.
 - Wireless Station Power House.

35. Dismantled materials :

- (i) The contractor shall make entry of all the materials issued for the work, time to time in the material issue register (to be separately maintained by the contractor).
- (ii) After completion of the work necessary entries shall also be made in the register indicating the location where the materials are installed and the balance materials left out need to deposited to AAI store after completion of work.
- (iii) The dismantled materials shall be duly handed over to Engineer in charge or his authorized representative and necessary endorsement shall be obtained in both material issue register and also the dismantled material register.

36. Equipment's For Night Working :-

In case, it appears, at any stage that the work may not be completed within the stipulated period due to restricted working hours in the day in view of any reasons, the contractor shall execute the work during the night as and when required. Nothing extra shall be payable to contractor for working in night time.

- 37. Consumables :** - All the consumables such as insulation tape, Test Lamps, cotton waste, soap, dusters, grease, Petroleum jelly, hack-saw blade, Measurement Tapes (30 m, 5m)

etc. will be provided by the contractor. Stationeries such as log books, work diaries to workmen, printed maintenance records, logbook of various installations, various registers, preventive maintenance schedules as per AAI format and as per the instructions of Engineer-in-charge will be provided by the contractor within 15 days of award of contract and maintained by the contractor at the site. **Reserve Stock quantity to be decided by the EIC & nothing extra payment will be made in this regard and the agency has to keep minimum quantity of consumables for one month in stock depending on the actual requirement failing which the material will be arranged by the AAI and the expenditure will be recovered from the agency with 15% over head.**

38. Training :

The Agency should arrange training on following topics once a year :-

- **Basic Electrical Engineering practices. (For supervisors & Operators)**
- **Basic Safety awareness & First aid. (For all the staffs)**

Note : - The agency may ensure that training schedule is planned in a manner so as not to affect the daily operation of Airport. A record of such trainings shall be maintained by contractor.

39. Tools And Tackles:

The contractor shall provide all the tools and tackles for the works including Measuring instruments and safety gadgets for attending breakdown of equipments. Cost of transportation of labour and material to Airport/ office premises shall have to be borne by the contractor.

- (i) Each Skilled manpower will be provided with a tool box having following minimum tools of reputed brand (Make: Taparia or equivalent) along with carrying bag for routine maintenance works: -

- Cutting pliers
- Screw Drivers (Big & Small)
- Wire strippers
- Line Testers
- Test Lamps with holder
- Knife

Qty : 39 No's

- (ii) The following tools shall be provided by the agency at AAI store/ powerhouse for use of maintenance and breakdown works: -

- Box Spanner Set complete with socket accessories, ratchet, etc
- Double end spanner set (Set of 12)
- Ring Spanner set (Set of 12)
- Screw Spanners of different sizes.
- Hammers of different sizes.
- Screw Driver Set of different sizes.
- Nose pliers.

QTY - 09 SETS

- Wire Cutters/Cutting pliers
- Punch/ Chisel
- Blower
- Hacksaw frame with blade
- Pipe wrench
- Allen Key Set
- Grease Gun
- Mini hacksaw with blade

- Welding machine
- Jack Hammer(Heavy Duty)
- Impact Wrench
- Lux Meter
- Hydraulic Crimping tools (different sizes)
- Electric drilling machine.(Rotary Hammer Type)
- Handheld electric cutting machine
- Insulated Torque Wrench With socket accessories

QTY - 01 SETS

(iii) The following instruments/ items shall be provided by the agency for use of maintenance and breakdown works: -

- Multi-meter (VAO Meter)
- Megger (500 V & 5000 V)
- Earth Tester
- Clip-on-meter
- Digital Phase Sequence Meter
- Cell Tester
- Raincoat
- Gum boot

- Rechargeable torch light
- Safety Helmet
- Safety Rope
- Blower
- Emergency light
- Heat Gun
- Hydrometer
- Non-contact Voltage checker.

QTY - 09 SETS

- Safety Gloves (66KV) - 2 SET
- Vacuum Cleaner (Big size) - 4 SET

- Safety Gloves (11KV) - 4 SET
- Earth Discharge Rod - 02 No's

Note : - The agency shall submit calibration certificates for all the meters issued to Trivandrum Airport.

40.Guidance To Tenderer:

The contractor shall quote the tender based on the expenditure towards providing of manpower (based on minimum wages) Tool & Plants, Uniform to workers, Statutory items, PIC Charges, Cost of consumables, Miscellaneous expenses, taxes & duties etc.

41.Penalty Clause:

No total Breakdown is acceptable. In case of total Breakdown due to negligence of the contractor or his workmen, suitable recovery proposed by Engineer-In-Charge will be final and binding on the contractor. Special care is required in attending the faults for the equipments where no standby is available.

Note :- In any case the total penalty at any point of time on account of any or all the categories put together shall not exceed 15 % of the total contract value per month.

If any equipment's damaged due to the negligence of the manpower, the agency shall repair the same and nothing extra shall be paid on this account by the AAI.

Once the total penalty reaches this limit, the contract shall be liable for review / rescind as per the provisions of the contract agreement and the decision of Engineer-in-Charge in this regard shall be final and binding on the contractor.

42. Obligations relating to Transfer of rights during Novation:

AAI agrees that during the Contract Period, in the event AAI transfers the rights to operate and maintain the Airport to a third party(s), AAI shall ensure that:

(a) AAI shall cause to transfer/novate this contract/agreement, in favour of such third Party(s), on the principle that such transfer/novation would release AAI of all liabilities and obligations arising from and after the date of transfer/novation of such rights. The Parties, along with relevant third party(s) shall execute necessary documentation or put in place necessary agreements for the aforesaid Transfer/novation.

(b) The contract period between AAI and the Second party is up to the completion of the work or termination of contract or the date of transfer of the Airport to the third party(s) under PPP mode whichever is earlier.

MANPOWER REQUIREMENT DETAILS**66KV SUBSTATION (ITEM NO. 1.1)**

S. No	Designation	No.	Category
1	Station Engineer (General Shift)	1	Graduate Engineer
2	Shift Engineer (Shift duty)	4	Graduate Engineer
3	Station Assistants (General shift)	1	Highly Skilled
4	Shift Assistants (shift duty)	4	Highly Skilled
5	Electrician (General shift)	1	Skilled
6	Electrical Helper (General shift)	* 2	Semiskilled
7	Documentation Assistant (General shift)	1	Highly Skilled (Computer Operator)

POWER SUPPLY & STANDBY DG SETS (ITEM NO. 1.2)

S. No	Designation	No.	Category
1	Supervisor (General Shift)	1	Highly Skilled (Supervisor)
2	Wireman cum operator (Shift Duty)*	09	Skilled
3	Electrical Helper (Shift Duty)*	09	Semiskilled

* Reliever @ 1/6th of SI No : 02 & 03 shall be provided for covering the weekly off of the shift duty personnel. The cost of the reliever shall be included in the quoted rates.

GROUND LIGHTING FACILITIES (ITEM NO. 1.3)

S. No	Designation	No.	Category
1	Wireman cum operator (Shift Duty)*	03	Skilled
2	Electrical Helper (Shift Duty)*	03	Un-skilled

*Reliever @ 1/6th of total workmen shall be provided for covering the weekly off of the shift duty personnel. The cost of the reliever shall be included in the quoted rates.

INTERNAL & EXTERNAL INSTALLATIONS (ITEM NO. 1.4)

S. No	Designation	No.	Category
1	Supervisor (General Shift)	1	Highly Skilled (Sr. Supervisor)
2	Electrician (Shift Duty)*	12	Skilled
3	Helper/Khallasi (Shift Duty)*	10	Unskilled

* Reliever @ 1/6th SI No : 02 & 03 shall be provided for covering the weekly off of the shift duty personnel. The cost of the reliever shall be included in the quoted rates.

MECHANICAL INSTALLATIONS (ITEM NO. 1.5)

S. No	Designation	No.	Category
1	Skilled Workmen (Shift Duty)*	07	Skilled
2	Semiskilled Workmen (Shift Duty)*	06	Semiskilled

* Reliever @ 1/6th SI No : 01 & 02 shall be provided for covering the weekly off of the shift duty personnel. The cost of the reliever shall be included in the quoted rates.

INVENTORY DETAILS**66KV SUBSTATION (ITEM NO. 1.1)**

1. 66KV Substation bays - 4 Nos Interlinking bay.
2. 66KV - SF6 Circuit Breakers - 4 Nos.
3. 10 MVA, 66/11KV Transformer (Make : Telco) - 2 Nos.
4. 11KV, 10 VCB Panel - 1 No.
5. 4 Pole AB Switch - 4 Nos.
6. 11KV RMU (Make : ERL) - 2 Nos.
7. 11KV RMU (Make : Schneider) - 2 Nos.
8. OLTC & Cooler Control cubicle - 2 Nos.
9. 160KVA, 11KV/440V Outdoor Transformer - 1 No.
10. LT Panel for station control & Auxiliary supply - 1 No.
11. 110V Battery bank(with 55Nos. 2V, 100AH VRLA Batteries) including battery charging panel -1No.

POWER SUPPLY & STANDBY DG SETS (ITEM NO : 1.2)**(i) DTB POWER HOUSE**

The 11 KV HT incomer is from GLF power house and A/C plant sub station (via RMU) . Two incomers are connected to HT panel with Bus coupler arrangement.

Details of Installations at DTB Power House :-

- | | | |
|--|---|---------|
| 1. 11kV H.T Panel VCB (Make : Schneider) | : | 12 Nos. |
| 2. 630KVA Transformer | : | 2 Nos. |
| 3. 1000KVA Transformer | : | 1 No. |
| 4. 500KVA Transformer | : | 1 No. |
| 5. APFC Panel (300 KVAR + 2x175KVAR) | : | 3 Nos. |
| 6. Non-Essential Panel | : | 1 No. |
| 7. Essential Panel | : | 1 No. |
| 8. 500 KVA D.G. Set with AMF panels(Make : Greaves) | : | 2 Nos. |
| 9. 500 KVA D.G. Set with AMF panels (Make : Cummins) | : | 2 Nos. |
| 10. 11kV RMU (Make : Schneider) | : | 01 No's |

(ii) GLF POWER HOUSE

The 11 KV HT incomer is from 66kV Substation (via RMU).Two incomers are connected to HT panel with Bus coupler arrangement.

Details of Installations at GLF Power House :-

- | | | |
|---|---|---------|
| 1. 11kV H.T Panel VCB (Make : Biecco Lawrie) | : | 10 Nos. |
| 2. 500KVA Transformer | : | 2 Nos. |
| 3. APFC Panel (2x175KVAR) | : | 2 Nos. |
| 4. Non-Essential Panel | : | 1 No. |
| 5. Essential Panel | : | 1 No. |

6. 500kVA D.G. Set with AMF panels (Make : Cummins): - 2 Nos.

(iii) **RADAR**

a) **Power House**

The 11 KV HT incomer is from GLF power house and A/C plant sub station. Two incomers are connected to HT panel with Bus coupler arrangement.

Details of Installations at RADAR Power House : -

- 1 11KV HT VCB panel with two incomers and two outgoing- 2 Nos. with bus coupler.
- 2 200 KVA, 11 KV/433 V indoor Transformer – 2Nos.
- 3 160 KVA DG set with AMF Panel – 2 Nos.
- 4 Essential Panel (MV switch board) – 2 Nos.
- 5 UPS panel and its change over – 1 No
- 6 Switch gears for package A/C Plant – 4 Nos.
- 7 0.5 HP Mono block Pump – 1 No
- 8 APFC panel – 1 No.s

b) **Package A/C Plant**

- 1 LT Panel - 01 No
- 2 Switch Units – 4 Nos.
- 3 22TR Package A/C units -04Nos

c) **Communication Block**

1. Essential Switch boards for Radar – 2 Nos.
2. Internal and External electrical fittings
3. Aviation obstruction light – 1 set.

(iv) **INRES**

The 02 No's LT supply to INRES is provided from GLF Power House & Localizer.

a) **Power House**

1. 125 KVA DG Set with AMF Panel – 2 Nos.
2. Essential LT Panel– 1 No.
3. Non-Essential LT Panel – 1 No.
4. Internal/external electrical installations like lighting /fans/switch boards .

b) **Communication Block**

1. Essential Panel (MV Switchboard) – 1 No
2. Power supply to ductable split AC units/Split AC units.
3. Internal/external electrical installations like lights/fans/ switchboards/ Changeover switches, DBs.
4. Street Lighting.
5. 0.5 HP mono block pump – 1 No.

(v) AC PLANT SUB STATION.

The 11 KV HT incomer is from DTB power house and 66kV sub station. Two incomers are connected to HT panel with Bus coupler arrangement.

- | | | |
|--------------------------------|---|--------|
| 1. H.T. VCB(Make : Schneider) | : | 7 Nos. |
| 2. 1000KVA Transformer | : | 2 No. |
| 3. APFC Panel (350 KVAR) | : | 2 Nos. |
| 4. Non-Essential Panel | : | 2 No. |
| 5. Essential Panel | : | 1 No. |

GROUND LIGHTING FACILITIES (ITEM NO. 1.3)

The nature of work involves daily maintenance of Runway, Taxiways, & other ground lighting facilities, Visual guidance signboards etc as per the maintenance schedule of AAI. The scheduled runway closures must be efficiently utilized for inspection, maintenance and removal of unserviceable non-aeronautical lights.

BRIEF OF GLF SYSTEM AT TRIVANDRUM AIRPORT.

- Runway Length – 3374m (Cat I Approach).
- RWY 32 is provided with truncated CAT1 approach lighting system.
- RWY14 is provided with simple approach lighting system.
- 3 x 100 kVA ON LINE UPS for all navigational aid lights. (Except Taxiways)
- Taxiways – Alpha, Bravo, Charlie, Parallel Taxi (P1 to P5), Delta, Echo, Foxtrot.

DETAILS OF GLF INSTALLATIONS

Sl No.	Description	Location	Quantity
1	Approach lights	Runway 32	56
2	Approach lights	Runway 14	17
3	Inset Threshold CKT - I	Runway 32	16
4	Inset Threshold CKT - II	Runway 32	16
5	Inset Threshold CKT		
a)	Runway Ckt - 'A'	Runway 14	6
b)	Runway Ckt - 'B'	Runway 14	6
6	Runway Edge Lights		
a)	Runway Ckt - 'A'(Elevated)	Runway 14/32	100
b)	Runway Ckt - 'A'(Inset)	Runway 14/32	18
c)	Runway Ckt - 'B'(Elevated)	Runway 14/32	98
d)	Runway Ckt - 'B'(Inset)	Runway 14/32	20
7	Runway End Lights		
	Runway Ckt - 'A'	Runway 14	6
	Runway Ckt - 'B'	Runway 14	6
	Runway Ckt - 'A'	Runway 32	6
	Runway Ckt - 'B'	Runway 32	6
8	Runway Wing bar Lights		
	Runway Ckt - 'A'	Runway 14	10
	Runway Ckt - 'B'	Runway 14	10

9	Runway Turning Pad Lights		
	Runway Ckt - 'A'	Runway 14	24
	Runway Ckt - 'B'	Runway 14	23
	Runway Ckt - 'A'	Runway 32	24
	Runway Ckt - 'B'	Runway 32	24
10	PAPI	Runway 14	12
11	PAPI	Runway 32	12
12	Taxiway Edge Lights (LED)	Taxiway 'AB'	64
13	Taxiway Edge Lights (LED)	Taxiway 'BC'	64
14	Taxiway Edge Lights (LED)	Taxiway 'DF + P1P2'	81
15	Taxiway Edge Lights (LED)	Taxiway 'E + Iso . bay'	72
16	Taxiway Edge Lights (LED)	Taxiway 'OLD P'	92
17	Taxiway Edge Lights (LED)	Parallel Taxi Track	155
18	Guard Lights	Taxiway 'A'	2 set
		Taxiway 'B'	2 set
		Taxiway 'C'	2 set
		Taxiway 'P1'	2 set
		Taxiway 'P2'	2 set
		Taxiway 'P3'	2 set
		Taxiway 'P4'	2 set
		Taxiway 'P5'	2 set
19	Landing T Lights		24
20	Wind sock Lights	Runway 14	5
21	Wind sock Lights	Runway 32	5

CCR DETAILS

CCR RATINGS	QUANTITY
50 KW	4
20 KW	2
10 KW	6
7.5 KW	9
4 KW	3

INTERNAL & EXTERNAL INSTALLATIONS (ITEM NO. 1.4)

The nature of work involves preventive maintenance of Internal & External Electrical light installations at Trivandrum Domestic Airport.

Location of work :

- (i) Domestic Terminal Building
- (ii) Technical block cum control tower building, Area control centre, communication (ANS) buildings namely RADAR, INRES, DVOR, Glide path, Localizer, Outer marker and Shanghumugam residential colony.

Technical Block and Other Ancillary Buildings.

The essential and non-essential Power supply to Technical Block is from the main power house. All vital communication and Navigational control rooms are situated in Technical Block. The incoming essential and non-essential power supply cable are connected to respective changeovers. From the changeover room (old stabilizer room), the power supply feeders are connected to LT panels in the ground floor switch room. From there, individual cables are provided for essential and non-essential LT panels in each floor.

For DVOR and Glide path incoming feeder is from main power house. For Localizer the power supply is fed from the W.T. station (INRES) substation and GLF power house.

Residential Colony

The incoming power supply to Shanghumugam colony is fed from KSEB, Sreevaraham section. There are 35 quarters in Shanghumugam colony. The newly constructed Type B quarters (10 Nos) in single block also included for maintenance. Power supply to bore well (submersible pump) is from DVOR site and that for open well pumps (centrifugal pumps) is from feeder pillar near Domestic car park area. Also 3.5 X 120 Sq.mm LT cable laid from main power house to feeder pillar near colony entrance for providing power supply distribution to street lights, guest house and new pump house provided over the newly constructed 50,000 ltrs underground drinking water sump.

- Type A – 4 Nos
- Type B – 10 Nos
- Type C – 5 Nos
- Type D – 2 Nos
- Type E – 2 Nos
- Type B (new block) – 10 Nos
- MET – 2 Nos.

(iii) Ancillary Buildings such as CISF Barracks, Dog Kennel at Muttathara, QRT Barracks, Airport Fire station, GLF Section and GLF Power House Building, Project office buildings, M.T Section & Workshop, Administrative Block, Air-conditioning Plant Room, Pump House, Power House, Substations, Canteen, Gymnasium, Apron Control, Sewage Treatment Plant, Switch Rooms and any other areas as instructed by Engineer-in-charge.

I. DOMESTIC TERMINAL & ANCILLARY BUILDINGS

The types of fittings that are installed in the Domestic Terminal are as under.

- i. LED Tube light fittings of all types.
- ii. 4 Pin PLL Type fittings of all types
- iii. HPSV/MV/MH fittings of all types
- iv. Lighting and power DBs, Panel Boards along with switch gears, voltmeter, ammeter, indication lamps, push buttons, Industrial Plug Sockets, 6 & 16/20A Switch and sockets.

- v. Ceiling fans, Exhaust fans along with louvers, Air Circulators, Wall Mounted & Pedestal Fans etc.
- vi. Invertors
- vii. Calling bells and fire bell
- viii. Geysers
- ix. External Electrical Installations like Street light poles with HPSV, halogen, and LED fittings, Wall mounted single/double Arm Street light with HPSV/MH/LED fittings, High masts, Parapet lights of all heights of ancillary building, Feeder pillars, Earth pits, Lightning arrestors etc.

II. OPERATIONAL AREA

(i) Perimeter Wall Lighting- 50W LED Fittings

(ii) Main Panels

- a. Near DVOR
- b. Near 32 Static Tank
- c. Near Bay No : 28 (NITB)
- d. Near 14 Static Tank
- e. Near 14 Runway Crossing
- f. Rear Side of 66kV Substation yard
- g. Near Cable Yard
- h. Near Bay No:07
- i. Near Gate No : 06
- j. Near Gate No : 06 CISF Hut

(iii) High Mast - 07 No's

- a. Bay No : 01
- b. Bay No : 04
- c. Bay No; 05
- d. Bay No : 06
- e. Bay No : 07
- f. Bay No : 08
- g. Bay No : 09

II. Technical Block cum control Tower building:-

- 1. Essential Panel - 1 No.
- 2. Non - Essential Panel - 1 No.
- 3. Change over panel (Essential & Non-Essential) - 2 Nos.
- 4. LT panels in ground floor switch room - 2 Nos.
- 5. Essential and non-essential MCCB LT panels in each floor of Technical Block (Ground to Vth Floor) - 10 LT Panels
- 6. Aviation Obstruction lights - 1 set
- 7. Power supply to aerodrome rotating beacon assembly - 1 No.
- 8. Siren - 2 Nos.
- 9. Distribution boards/switch boards in all floors and rooms
- 10. Light fittings/Fans
- 11. 3 phase, 3 HP submersible pumpset - 1 No.
- 12. 0.5 HP Mono block pump - 1 No.

III. DVOR:-

1. Essential Panel (MV Switch Board) – 1 No.
2. Internal /external lights/fan/switch board.
3. Aviation obstruction light – 1 Set.
4. Power supply to ductable split AC unit – 2 Nos.

IV. Glide Path:-

1. Essential Panel (MV Switch Board) – 1 No.
2. Internal /external lights/fan/switch board.
3. Aviation obstruction light – 1 Set.
4. Power supply to split AC unit – 2 Nos.

V. Localizer

1. Essential Panel (MV Switch Board) – 1 No.
2. Internal /external lights/fan/switch board.
3. Power supply to split AC unit – 2 Nos.

VI. ACC (New Area Control Centre):-

1. Main Essential Panel – 1 No.
2. Internal/External lights/fans/switchboards.
3. Power supply to split AC units.

VII. Shanghumughom Residential colony:-

1. Internal / external electrical installations like lights / fans / switchboard in all quarters including AAI's Guest House.
2. Feeder pillar for street lights, pump and guest house – 1 No
3. Street light with LED lamps/tube light fittings.
4. 3 HP, 3 phase submersible pump set (Bore well) with control Panel – 1 No
5. 3 HP, 3 phase submersible pump set (Open well) with control Panel – 1 No
6. 5 HP, Mono block pump set with control panel – 2 Nos.
7. 1 HP Bore well pump- 1 No.
8. Solar water heater

VIII. CISF Barrack (Near Mutthatara)

Internal / external electrical installations like lights / fans / switchboards, DB's, Street Lights, LT Panels at : -

- (i) Gents Barrack
- (ii) Ladies Barrack
- (iii) QRT
- (iv) Dog Kennel

MECHANICAL INSTALLATIONS (ITEM NO. 1.5)

(i) SEWAGE TREATMENT PLANT.

- 1) L.T Panel.
- 2) Sewage Pumps.
- 3) Air Compressor.
- 4) Filters.
- 5) Filter Press.
- 6) Treated water pumps.
- 7) Raker assembly.

(ii) PUMP HOUSE

- | | | |
|-----------------------------|---|---------|
| 1) Drinking water pump 10HP | : | 4 Nos. |
| 2) Well water pump 10 HP | : | 02 Nos. |
| 3) Fire Hydrant Pumps | | |
| a. Diesel Pump | : | 01 No. |
| b. Electric Pump | : | 01 No. |
| c. Jockey Pump | : | 01 No. |
| d. Priming Pump | : | 01 No. |

(iii) CCR/ 66 KV Substation

- | | | |
|--------------------------------------|---|--------|
| 1) Fire Hydrant Pumps | | |
| a. Diesel Pump | : | 01 No. |
| b. Electric Pump | : | 01 No. |
| c. Jockey Pump | : | 01 No. |
| d. Sprinkler system | : | 01 Set |
| 2) 0.5 HP Mon block pump (bore well) | : | 01 No. |

(iv) WATER SUPPLY PUMPS

a) Fire station:-

- | | | |
|--|---|-------------|
| 4) 3Hp Mono Block Pump | : | 2Nos |
| 5) 1.5 Hp Mono Block Pump | : | 01Nos |
| 6) 1Hp Mono Block Pump (Drinking water | : | 02Nos |
| 7) 0.5Hp Mono Block Pump (Well water) | : | 01 No |
| 8) 5 Hp Horizontal type Submersible pump
at static Tank | : | 8 Nos (4+4) |

b) CISF Barracks/Hostel at Muttathara

a) Dog Kennel

- | | | |
|-----------------------------------|---|------|
| 1) 1HP Mono Block (CG) Pump | : | 01No |
| 2) 1HP Submersible bore well pump | : | 01No |

b) Gents Hostel

- | | | |
|-------------------------------------|---|---------|
| 1) 3HP Mono Block (CG) | : | 02No |
| 2) 2HP Submersible | : | 01No. |
| 3) 0.5 HP Mono Block (Garden& mess) | : | 02 Nos. |

c) Ladies Hostel

1) 2HP Mono Block (CG)	:	01 No
2) 0.5 HP Mono Block Pump	:	01 No

c) Residential Colony:-

1) Submersible pump	:	02Nos
2) Monoblock pump sets	:	02nos.

(d) Bore well Pumps

1) NAD Quarters (1HP)	:	01No
2) A/C Plant (1HP)	:	01No
3) Runway 14 and 32 for static tanks(1HP)	:	02Nos
4) Near 66KV Substation (3Hp)	:	01No.

(iii) LIFTS & ESCALATORS OF DOMESTIC TERMINAL

• Elevators & their control panels and machine rooms	
• Domestic SHA	: 01 No.
• Domestic departure chute	: 01 No.
• Administrative Block	: 01 No.
• Technical block	: 01 No.
• Escalator & their control panels	
• Domestic Bus Lounge	: 01 No.

(iv) BAGGAGE HANDLING SYSTEM OF DOMESTIC TERMINAL

(a) Departure Conveyor

One Departure conveyor system with 07 nos slider bed type loop and 12 nos check in counter(each with one weighing and one dispatch conveyor).

(b) Arrival Conveyor System.

Arrival Conveyor System with Endless race track type with 220 Nos slats of Length 45 mtrs – 03 No

PREVENTIVE MAINTENANCE SCHEDULE OF 66KV SUBSTATION

POWER TRANSFORMER

Monthly Maintenance

- 1 Confirm that hourly winding and oil temperature readings and load & voltage do not show any abnormality
- 2 Test high oil temp, alarm
- 3 Test high winding temp, alarm
- 4 Reset the maximum temp. indicators after noting the max. temperature of oil / winding
- 5 Check oil level in bushings and top up if required.
- 6 Examine bushings for cracks or deposits, clean or replace if required.
- 7 Check the main connections carefully for any indication of overheating
- 8 Check relief vent diaphragm and replace if cracked or broken
- 9 Lubricate cooler fan bearings, examine motors and starters, replace worn out contacts or other parts.
- 10 Check all functions of OLTC auto control independently, check step by step operation including limit switches, if faulty rectify the same
- 11 Check out level in oil cup of dehydrating breather and top up: free air passages
- 12 Confirm the daily checking of silica gel colour is done and reactivate it if required
- 13 Confirm that oil circulation through radiators is checked daily
- 14 Confirm for gas collection and release in Bucholz Relay
- 15 Check mechanical closing of relay contacts by draining oil in Bucholz Relay

Quarterly Maintenance

- 1 Clean and examine bushings for oil leakage
- 2 Check and tighten up of bushing fixing nuts for tightness
- 3 Check oil level and top up oil level if required
- 4 Check oil leakage from gauge glass, manometers, valves, flanges, radiators etc.
- 5 Tighten up the joints to stop oil leak wherever possible and apply special oil sealant wherever applicable
- 6 Check relay connections of buchloz
- 7 Check colour of silica gel and replace it if required in OLTC
- 8 Check oil in conservator tank of OLTC
- 9 Record counter readings of OLTC
- 10 Check oil in driving mechanism of OLTC
- 11 Lubricate all bearings and coupling points of OLTC
- 12 Clean and check heaters and lights of OLTC
- 13 Check connections for tightness of OLTC
- 14 Check and clean all control switches, contactors limit switches
- 15 Check fuses and bulbs and replace if required
- 16 Check forced cooling fans for proper working

Yearly Maintenance

Tank radiators, conservators & piping

- 1 Thoroughly clean all parts
- 2 Check foundation for crack settings etc.
- 3 Check oil soaking pits
- 4 Check rail stops
- 5 Tighten the loose vibrating parts to stop excessive vibrations
- 6 Check tightness of cover boards
- 7 Lubricate & operate the cut off (Butterfly) valves in the oil circuit between radiators and main tank
- 8 Check oil in OTI and WTI pockets

Bushings

- 9 Check the repaired portion of bushing and rectify
- 10 Check the tan delta of the bushings (with date)

Oil

- 11 Remove air from air removing points
- 12 Check operation of oil surge relay
- 13 Check that the drive mechanism base is fixed firmly on the transformer body.
- 14 Check that the motor drive housing is fixed firmly and properly.
- 15 Check insulation condition of wires
- 16 Check the direction of rotation of motors
- 17 Operate and check all taps by raising & lowering
- 18 Check that the tap position indicated in (1) diverted switch plate (2) in the mechanism box & (3) in the RTCC panel are same.
- 19 Check the correct operation of upper and lower limit switch
- 20 Check vibration of motor while working

CURRENT TRANSFORMER

Quarterly Maintenance

- 1 Clean the Porcelain
- 2 Check for flash over marks, Cracks & Clippings of the insulators
- 3 Check connection for tightness
- 4 Check earthing connections for tightness
- 5 Check for any oil leaking
- 6 Check oil level
- 7 Check secondary connections for tightness
- 8 Check the explosion vent diaphragm
- 9 Check and tighten CT shorting links and connections
- 10 Check secondary terminal box for any oil leaking and confirm vermin proof

Yearly maintenance

- 1 Check and tighten CT shorting links
- 2 Measure the insulation resistance of primary winding. Compare the same with respect to previous test report for healthiness.
- 3 Checking of healthiness of gaskets

- 4 Checking of space heater and illumination
- 5 Checking the tightness of all connections i/c earthing of PF terminal
- 6 Cleaning of marshalling box and junction box

POTENTIAL TRANSFORMER

Quarterly Maintenance

- 1 Check terminal connections for tightness
- 2 Check oil level
- 3 Clean porcelain
- 4 Check for flash over the marks, crack and chipping of the insulators
- 5 Check for any oil leaking
- 6 Check and ensure proper functioning of fuses

Yearly Maintenance

- 1 Check and clean connections for earthing link
- 2 Measure the insulation resistance. Compare the same with respect to previous test report for healthiness

Isolator

Quarterly Maintenance

- 1 Clean the isolator with dry cloth
- 2 Check for flash over marks, cracks and clipping of the insulators
- 3 Check the terminal connections for tightness
- 4 Check the terminal pads for decolourisation. If found changed clean with CTC and apply fresh coat of petroleum jelly
- 5 Check the fixed and moving contacts and apply fresh coat of petroleum jelly
- 6 Check the ground connections for tightness
- 7 Lubricate the mechanism
- 8 Check the bolts and nuts for proper tightness
- 9 Examine the auxiliary contacts. Clean with CTC
- 10 Examine the wiring for tightness. Tight if necessary
- 11 Check for the free movement of the contactors and switches etc./ Clean with CTC if found struck up
- 12 Check mechanism box for water tightness, replace gaskets if required

Yearly Maintenance

- 1 Check the foundation boards for tightness
- 2 Check for mechanism alignment

LIGHTNING ARRESTOR

Quarterly Maintenance

- 1 Clean the Porcelain
- 2 Check for flash over marks, Cracks & Chipping of the insulators
- 3 Check connection for tightness
- 4 Check earthing connections for tightness
- 5 Clean the surge arrester counters and its insulators
- 6 Check connections for tightness from LA to surge counter and counter to earth
- 7 Confirm the leakage current readings are within limit

SF6 CIRCUIT BREAKER

Monthly Maintenance

- 1 Checking of oil leaks from grading capacitors

Quarterly Maintenance

- 1 Tightness of hard wares & fasteners
- 2 Visual porcelain for chips and cracks
- 3 Check liquid sealer Ana bond 680 on cementing joint of porcelain -apply if not applied earlier or cracked
- 4 Check for water seepage from housing pole joining
- 5 Check for door gaskets
- 6 Healthiness of space heater
- 7 Check the drain valve of air system
- 8 Position gas valve in gas system
- 9 Compressor oil condition and level. Change in case of oil is yellow.
- 10 Check V- belt tension
- 11 Check for any dust / oil in mechanism housing . Clean using blower / wipe off oil.
- 12 Check rusting in mechanism housing.- clean and touch up
- 13 Check compressor auto start and auto stop
- 14 Check connection tightness of HV & Control wiring terminals
- 15 Check all foundations bolts for tightness and tight if necessary
- 16 Check Circlips for proper positions and pull back if necessary
- 17 Clean the compressor inlet air filter in every 250 hrs of operations & oil for every 500 hrs of operations
- 18 Make sure that the compressor start& stop occurs as per the setting of pressure switches.
- 19 Lubricate the operating mechanism, check nuts & bolts for looseness
- 20 Ensure free movement of trip plunger & close plunger

VACCUM CIRCUIT BREAKER

Half- Yearly maintenance

- 1 Clean panel bus bars, jumpers and breaker truck
- 2 Check for any loose bus bar joints and fasteners
- 3 Lubricate the mechanical joints of shutters, operating livers and cams
- 4 Check healthy conditions of indicating lamps
- 5 Check insulation resistance of 11KV bus section using 5 KV megger
- 6 Perform manual and electrical operation of breakers
- 7 Check the insulation resistance of breaker with 5KV megger
- 8 Check for any cracks in the insulating frame and insulating rod of the breaker
- 9 Visual inspection for loosened nuts, bolts or connections
- 10 Check whether the operation counter is working properly
- 11 Lubricate all rotating and sliding parts
- 12 Check the ON/OFF, spring charged/discharged indicators.

CONTROL PANEL

Quarterly Maintenance

- 1 Thoroughly clean the panel
- 2 Check for vermin & rodent proofing
- 3 Check for door gasket, door lock, door handle & locking of door
- 4 Check heater and thermostat
- 5 Check panel lighting and door switch
- 6 Check for proper dressing of wires and their insulation
- 7 Check wire connections for tightness on switches, fuses, instruments and resistance
- 8 Clean terminal strips
- 9 Check with connections on the panel
- 10 Check all indication lamps and annunciation lamp
- 11 Check working of hooter
- 12 Check fuses and fuse ratings
- 13 Check semaphore indications
- 14 Check and measure AC supply voltage
- 15 Check and measure DC supply voltage
- 16 Check the operations with control selector switches in local and remote mode
- 17 Check free movement of contactor, push buttons, switches etc
- 18 Check over heating of relays , switches instruments, fuses & resistors

Yearly Maintenance

- 1 Check operation of all trips circuit and switches
- 2 Check operations of all supervision relays
- 3 Check all alarms to annunciator , check operation of annunciator push buttons
- 4 Check operation of all interlocking schemes

RTCC PANEL

Quarterly Maintenance

- 1 Thoroughly clean the panel
- 2 Check for vermin & rodent proofing
- 3 Check for door gasket, door lock, door handle & locking of door
- 4 Check heater and thermostat
- 5 Check panel lighting and door switch
- 6 Check for proper dressing of wires and their insulation
- 7 Check wire connections for tightness on switches, fuses, instruments and resistance
- 8 Clean terminal strips
- 9 Check earth connections on the panel, check indicating lamps and annunciator lamps & hooter
- 10 Check fuses and fuse ratings
- 11 Check proper operation of taps while raisings and lowering
- 12 Check proper operation of independent and master control
- 13 Check operations of out of step relay while changing taps

STATION EARTHING

Quarterly Maintenance

- 1 Check joints and connections for tightness
- 2 Check the clamping of the earth wire for tightness

Yearly maintenance

- 1 Check the earth resistance and record the same

POWER CABLE

Quarterly Maintenance

- 1 Site inspection of 66KV feeder cables for any damaged / pilferage.

Half- Yearly maintenance

- 1 Check the cable end boxes and terminal connections at both ends
- 2 Check contacts of AB switch / RMU and connections including flexible lead and clean the contacts and apply petroleum jelly
- 3 Check operating handle of AB switches and operating mechanism and lubricate
- 4 Clean AB switches and Lightning Arrestors
- 5 Check the gap between contacts in open condition and adjust if required
- 6 Check the earth connections

BUS BAR

Half- Yearly maintenance

- 1 Check tightness of all connections and clamps
- 2 Check all disc /support insulators for flash and cracks and clean the insulators

DISCONNECTORS AND EARTH SWITCHES

Yearly maintenance

(i) Main contacts

- 1 Cleaning and lubrication of main contacts, pins and bearings
- 2 Checking of tightness of bolts, nuts and pins, etc.
- 3 Cleaning of support insulators and checking of insulator cracks, if any
- 4 Checking of interlocks
- 5 Checking of earth connection of structure
- 6 Operation check of isolators
- 7 Checking of alignment
- 8 Main contact resistance measurement

(ii) Operating mechanism

- 1 Checking and lubrication of linkages including transmission gears
- 2 Checking and tightening of stopper bolts
- 3 Cleaning of auxiliary switch contacts and greasing with silicon grease
- 4 Lubrication of operating mechanism hinges, lock joints on levers, Bearings .
- 5 Checking of all mounting bolts for tightness.
- 6 Checking of healthiness of door gaskets
- 7 Checking of earth connection of MOM box
- 8 Checking of tightness of electrical connections
- 9 Checking of space heaters and illumination

(iii) Earth switch

- 1 Checking and alignment of earthing blades
- 2 Cleaning of contacts and lubrication
- 3 Operation of earthing switch
- 4 Checking of aluminum /copper flexible connectors
- 5 Checking of earth connections of earth switch, structure and MOM box
- 6 Checking of tightness of bolts, nuts and pins etc. and lubrication of pins and bearings.
- 7 Contact resistance measurement

RELAY AND PROTECTION SYSTEM

Differential relays

Yearly maintenance

- 1 Trip contacts check
- 2 Annunciation check
- 3 Auxiliary relays healthiness
- 4 Over voltage relays
- 5 Local breaker back -up check

- 6 STUB protection check
- 7 DC logic
- 8 Auto reclose check
- 9 Over load Relay
- 10 Directional over current
- 11 Fuse Failure Check
- 12 Transformer Differential Protection
- 13 Restricted earth fault relay
- 14 Under Voltage Relay
- 15 Neutral Replacement Relay

BATTERIES AND DC DISTRIBUTION SYSTEM

Monthly Maintenance

- 1 Measurement of specific gravity and voltage of cell
- 2 Checking electrolyte level and topping up with DM water, if required
- 3 Checking of Emergency Dc lighting to control Room
- 4 Checking of any earth fault (if E/F relay not provided)

Yearly Maintenance

- 5 Checking of electrical connections of charger panel and DCDB panels for tightness and cleanliness
- 6 Checking of electrical connections for batteries and application of petroleum jelly on cell, terminal, if required.
- 7 Checking control cards of charger and measurement of test point voltage values
- 8 Battery impedance testing (Optional)
- 9 IR measurement of charger transformer

FIRE PROTECTION SYSTEM

Monthly Maintenance

- 1 Checking of starting of diesel engine
- 2 Check oil level of diesel engine, top up if required
- 3 Check leakage and lubrication of jockey pump hydrant pumps
- 4 Checking of operation of hydrant pumps & jockey pumps.

Quarterly Maintenance

- 1 Adjustment of glands for leakages and tightening of nuts and bolts

Yearly Maintenance

- 1 Checking/replacement of fuel oil/lube oil/air filter
- 2 Checking of terminal connection
- 3 Checking of alignment of pump set
- 4 Replenishment of grease
- 5 Checking of pressure of the hydrant system at the remotest end, starting of pumps, diesel engine, etc.
- 6 Cleaning and tightening of terminals

PREVENTIVE MAINTENANCE SCHEDULES OF OTHER INSTALLATIONS

(A) Schedule for Maintenance of Internal & External Electrical Installation

S. No (i)

Description
Internal Installations
Daily

- 1 Check for loose, hanging uncovered or temporary wires unauthorized connections in Terminal Building.
- 2 Check for fused lamps & tubes and replace the same.

Monthly

- 1 Clean the fixtures, ceiling Fans, pictograms and sign boards, etc.
- 2 Check for damaged switches & sockets and replace the same.
- 3 Check for overheating of any MCBs/ RCCB in DBs due to loose Connections or over loading. Check for earth connection.
- 4 Check for overheating of any SFU/MCCB in Panel boards due to loose connections or over loading. Check earth connection.
- 5 Check indication lamps & control fuses, selector switch, voltmeter/ ammeter.
- 6 Check for the Proper functioning of ceiling fans (tic regulator) & exhaust fans
- 7 Check for any loose connection in switch boards, DBs & Panel Boards.

Quarterly

- 1 Tighten all the termination points in distribution boards.
- 2 Tighten all the termination points in panel boards.

Half Yearly

- 1 Check hanging arrangement (bolt & hook) of ceiling fan, abnormal noise or unusual vibration/smell or service needs.
- 2 Tighten all the earth termination points.

Yearly

- 1 Measure & record the IR values of all incoming & outgoing cables of LT panel board.
- 2 Measure & record the earth resistance of earth pit connected to the panel board.

(i) EXTERNAL LIGHTING I/C APRON FLOOD LIGHTS

S. No

Description

Daily

- 1 Check for fused lamps & tubes and replace the same.

Monthly

- 1 Check for overheating of any SFU in the panel boards/ feeder pillar due to loose connections or overloading
- 2 Check for proper covering of loop out box at each pole. Check the door of feeder pillar.

Quarterly

- 1 Clean all the fixtures including lamp shades, domes, reflectors etc.
- 2 Tighten the terminations in loop in 100p of box at each pole.
- 3 Tighten the earth terminals in loop in loop out box at each pole.
- 4 Check the manual and motorized lowering and raising arrangement of lantern carriage including operation of power tool.

Half Yearly

- 1 Tighten all the termination points of street light controlling panel board.
- 2 Measure & record the IR values of incoming & outgoing cables to the panel board/ feeder pillar.
- 3 Measure & record the IR values of loop cable from pole to pole.
- 4 Tighten the earth terminal point at the feeder pillars.

Yearly

- 1 Dismantle & carryout thorough servicing of each fixture (at least 25% of total quantity every year). This can be carried out during lowering of lantern carriage.

Note:

- 1 These activities and periodicity are minimum.
- 2 Any missing activities can be incorporated and implemented.

- 3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
- 4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner.

(B) Schedule of Maintenance Check for HT/LT Panels Bus Duct Changeover Panel & AMF Panel.

S. No	Description
	Daily
1	Check Cleanliness of Switch room/Panels/ Bus ducts
2	Check & Clear unwanted materials from Switch rooms
3	Check for proper spreading of insulated rubber mats in front/rear side of Panels.
4	Check the working of meters, indication lamps, control switches and audio-visual annunciation in the panels.
5	Check for over heating/burning smell/any abnormality in all the panels.
	Monthly
1	Check for operation of ACBs/OCBs & switches.
	Quarterly
1	Check the termination/connection of all incoming & outgoing cables/bus ducts.
2	Check the tightness of cable termination & lugs.
3	LT panels, Bust Duct, AMF & Changeover Panel
4	Check the tightness of control cables.
5	Check the rating of fuses for all incoming & outgoing switches, control/indication circuits.
6	Check the insulated/backelite portion of switches for carbon formation.
7	Check the condition/continuity of body earthing
8	check for operation of relays.
	Yearly
1	Check for the continuity of earth bus for Panels/Bus duct.
2	Check the calibration of all relays.
3	Check for the need for painting.
4	Check the tightness of cable termination & lugs of HT panels.
*	All the panels inside the substation shall be checked daily. As regards other Panels in T.B./other installations periodicity of the daily check could be made weekly.

Note:

- 1 These activities and periodicity are minimum
- 2 Any missing activities can be incorporated and implemented.

- 3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
- 4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

(C) Schedule of Maintenance Check for Power Transformers

S. No	Description
	Daily
1	Check cleanliness of Transformer yard
2	Check for uniform spread of Gravel & grass/vegetation growth in the yard
3	Check for any abnormal noise
4	Check for any oil leakage
5	Check the condition of Silica gel
6	Check Oil level in Conservator
7	Check the explosion vent diaphragm for any crack or breakage
8	Check the locking arrangement of transformer yard
	Quarterly
1	Check oil level in breather oil cup
2	Check Emergency Trip push button operation
	Half Yearly
1	Check/Examine Bushings for crack/dirt deposits
2	Check tightness of connections at HT, LT & earth Terminals
3	Check for free operation of Tap Changer
4	Check tightness of connections at Marshalling Box (if feasible)
5	Check the condition/continuity of body earthing
	Yearly
1	Check acidity of transformer oil
2	Check insulation Resistance of Transformer
3	Check & tighten the Casketed joints
4	Check cable box for sealing of holes
5	Check cables box for moisture condensate
6	Check Buchholz relay contracts & their operation
7	Check Magnetic oil level gauge contacts & their operation
8	Check Winding temp. Indicator contacts & their operation
9	Check Winding temp. Indicator contacts & their operation
10	Check the pockets holding Thermometer for Temp. Indication.
11	Check Transformer oil dielectric strength & record.
*	Annually or earlier as per the manufacturer's recommendation.
	Note:
1	These activities and periodicity are minimum
2	Any missing activities can be incorporated and implemented.
3	The periodicity of maintenance depends on the number of hours of airport operation, life. of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
4	On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner.

(D) Schedule of Maintenance Check for Standby Generators

S. No	Description
Daily	
1	Do pre-start check, Make test run.
2	Check start time & AMF operation
3	Check for general cleanliness of DG & AMF.
4	Check Status of fuel reserves.
5	Check measuring parameters & log.
6	Check various oil levels & radiator water
7	Check for leakage of oil/water.
Monthly	
1	Perform 1/2 hour load test in auto mode.*
2	Check Serviceability of safety/control.
3	Check wiring, cable, lugs, terminations etc.
Quarterly	
1	Perform periodical check as per manufacturer's recommendations.
Half Yearly	
1	Perform periodical check as per manufacturer's recommendations.
Yearly	
1	Perform periodical check as per manufacturer's recommendations.
2	Calibration of relays
3	Check for need of painting.
4	Inspect tools and hardwires.
* This test shall be carried out once in 15 days where the DG set is very occasionally used due to healthy commercial power supply.	
Note:	
1	These activities and periodicity are minimum
2	Any missing activities can be incorporated and implemented.
3	The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on
4	these the periodicity could be further improved, if found necessary. On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

MAINTENANCE SCHEDULE FOR GLF SYSTEM

A) Maintenance Schedule for elevated type fixture (R/W, T/W, SAPL, CAT-1 Approach).

Sl. No.	Description
Daily	
1.	Inspection of all visual aids for their proper operation and functioning.
2.	Replacement of unserviceable lamps and other components.

Monthly

1. Inspection of all visual aids for their proper operation and functioning.
2. Replacement of unserviceable lamps and other components.
3. Cleaning of GLF fittings and checking the alignment of fittings.

Half yearly

1. Inspection and Maintenance of all Airfield Light fittings and replacement of gaskets, lamps and lenses.
2. Inspection and Replacement of heated up essna connectors and Isolating transformers.
3. Draining out of accumulated water from the transformer housing boxes. Measuring the insulation resistance of series and feeder cables of GLF system.
4. Replacement of faulty series and feeder cables.
Tightening of earth connections.

B) MAINTENANCE SCHEDULE FOR CCR

Sl. No.

Description

Daily

1. Cleaning of CCRs externally.
2. Switch ON the CCR to check for serviceability and observe the functioning on all brightness modes.

Monthly

1. Clean the CCR internally using vacuum cleaner after switching off the power supply.
2. Tightening of all cable and earth connections.
3. Switch ON the CCR to check for serviceability and observe the functioning on all brightness modes. Observed the values of output current.
4. Check and monitor input voltage and output current.
5. Test the CCR on local and remote modes.

Quarterly

1. Clean the CCR internally using vacuum cleaner after switching off the power supply.
2. Tightening of all cable and earth connections.
3. Switch ON the CCR to check for serviceability and observe the functioning on all brightness modes. Observed the values of output current.
4. Check and monitor input voltage and output current.
5. Test the CCR on local and remote modes.
6. Check the functioning of all protective relays.

C) MAINTENANCE SCHEDULE FOR PAPI SYSTEM.

Sl. No.

Description

Daily

1. Check for the serviceability of the system at both the approach by switching ON the system.
2. Visually examine the units for any damages and displacement.

Monthly

1. Checking, adjustment, setting and calibration of PAPI unit by using clinometers and checking stick.
2. Cleaning of lenses and replacement of defective components and lamps.

Half yearly

1. Checking, adjustment, setting and calibration of PAPI unit by using clinometers and checking slick.
2. Cleaning of lenses and replacement of defective components and lamps.
3. Checking the value of earth electrodes.
4. Checking the insulation value of PAPI cables.
5. Checking and replacement of heated up transformers, plugs & receptacles, secondary leads etc.

Yearly

1. Calibration of clinometer from the authorized laboratory. Documentation of calibration records in calibration file.
2. Flight calibration of PAPI units and checking of all other visual aids.

Schedule of Maintenance Check for Earthing System

S. No	Description
Monthly	
1	Cleanliness of Earth pit/area
2	Check the condition of earth pit cover.
Half Yearly	
1	Checked condition of Watering Funnel.
2	Watering of earth pits.
3	Check Earth Resistance & record.
4	Check tightness of earth connections & continuity.
5	Check the identification marking of earth pits.
6	Check continuity of main earthing lead from earth pit to Panel/Equipment.
*	The above schedule shall be strictly followed for sub-station equipments. For earth pit at other locations, these quarterly checks can be carried out semiannually
Note:	
1	These activities and periodicity are minimum
2	Any missing activities can be incorporated and implemented.
3	The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
4	On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

Schedule of Maintenance Check for Battery Charger/Battery Bank

S. No	Description
Daily	
1	Cleanliness of Battery room/Battery/Battery Bank
2	Check & Record Specific Gravity, Cell Voltage & Electrolyte level of Battery.
3	Check the working of exhaust fan in Battery room.
4	Check the working of meters, indication lamps and audio-visual annunciation in the Battery Charger.
5	Check the working of main & standby of Battery Charger i/c all functioning of battery charger.

Monthly

- 1 Check the Battery Terminals.
- 2 Check the interconnection of cells in Battery Bank.
- 3 Check the condition of hydrometer, cell tester used for Battery maintenance
- 4 Check for loose connections or any abnormality in DCDB

Quarterly

- 1 Check the condition/continuity of body earthing
- 2 Check the tightness of connections in Battery Charger

Note:

- 1 These activities and periodicity are minimum
- 2 Any missing activities can be incorporated and implemented.
- 3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
- 4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

Schedule of Maintenance Check for Fire Alarm & Detection System

S. No

Description

Daily

- 1 Check Cleanliness of fire alarm panels & availability of layout drawing.
- 2 Check & Clear unwanted materials near the panels.
- 3 Check the working of meters, indication lamps, control switches and audio-visual annunciation in the panels.

Monthly

- 1 Check condition of battery & battery charger.
- 2 Test the Panel through test button for proper functioning.

Quarterly

- 1 Physical Checking of termination of incoming & outgoing wires/cables.
- 2 Check correct rating & type of fuses.
- 3 Check th condition/continuity of body earthing.
- 4 Check operation of manual call push button, hooter, etc.

Half Yearly

- 1 Cleaning & Checking of detectors for proper functioning.

Note:

- 1 These activities and periodicity are minimum
- 2 Any missing activities can be incorporated and implemented.
- 3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
- 4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

(H) Schedule of Maintenance Check for Advanced Lighting System & Surge Diverters

Description

S. No**Monthly**

- 1 Check Air termination
- 2 Check lighting counter display
- 3 Check earth resistance/condition of earth pit.

Surge Diverter

- 1 Check the indication LED, connection tightness
- 2 Check Earth connections.

Quarterly**Lighting Arrestor**

- 1 Check the terminations at final
- 2 Check continuity of down conductor (earth strip)
- 3 Check earth resistance by isolating down conductor at the test joint.

Yearly

- 1 Marking the earth pits for easy identification.

Note:

- 1 These activities and periodicity are minimum
- 2 Any missing activities can be incorporated and implemented.
- 3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
- 4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner

Schedule of Maintenance Check for Pumping System**S. No****Description****Daily**

- 1 Check for glands. of Pumps for any water leakage.
- 2 Check general cleanliness of the installation and its surroundings.
- 3 Check the system pressure if pressurized system.

Monthly

- 1 Check the operation of jockey pump by releasing some pressure from the line
- 2 Check automatic stoppage of jockey pump after building up of the pressure.
- 3 Check auto and manual operation of main pump and Diesel engine operated pump.
- 4 Check abnormal noise or vibration & condition of coupling in all the motor-pump set.
- 5 inspect shaft, shaft sleeves/bearings, bearing housing lubrication/greasing by grease gun.
- 6 Check abnormal heating of motor & pump/shaft/bearing during test runs.
- 7 Tighten at the cables and terminations at motors i/c proper positioning of cable gland cover/boxes.
- 8 Tighten all the earth connection and terminations.
- 9 Check all the hydrants are equipped with reel, hose pipe & locked (key available with Eng. And fire dept.)

- 10 Check the battery of DG set regularly for termination & tightness, application of petroleum jelly and battery charging arrangement i/c water pouring etc.

Quarterly

- 1 Carry out dummy test run of the system to check operation of the system as a whole.
2 Carry out periodical maintenance of Diesel Engine as per engine manufacturer's manual.

Half Yearly

- 1 Carry out periodical maintenance of Diesel Engine as per engine manufacturer's manual.

Yearly

- 1 Carry out periodical maintenance of Diesel Engine as per engine manufacturer's manual.
2 Measure & record IR value of incoming cable and outgoing cables of Elect. Panel.
3 Check for painting requirements.

Note:

- 1 These activities and periodicity are minimum
2 Any missing activities can be incorporated and implemented.
3 The periodicity of maintenance depends on the number of hours of airport operation, life of the equipment and the climatic conditions. Hence, based on these the periodicity could be further improved, if found necessary.
4 On checking the individual parameters deficiency found shall be rectified immediately in a time bound manner.

J. Sreekumar
J & A M (E-E) II

Signature Not Verified

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