ALL INDIA INSTITUTE OF MEDICAL SCIENCES (AIIMS)

ANSARI NAGAR, NEW DELHI

Dated: 21.10.2016

AMENDMENT No. – I

Project Name: Tender for "External Electrical works for OPD Block and their Maintenance during defect liability period in AIIMS Campus, Masjid Moth, New Delhi for AIIMS, New Delhi"

Tender No. HSCC/AIIMS/OPD/ELECT/2016/02; dated: 05.10.2016

(i) The Last date of submission & opening of bids has been extended as follows:

Last date to fill/upload the tender through e-Tendering. : upto 14:30 hrs. on 10.11.2016

Date of Opening of bids : on 10.11.2016 at 15:30 hrs.

Reply to Pre Bid Queries raised by bidders during pre -bid meeting held on 14.10.2016 at HSCC, Head Office, Noida

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
1	LIST OF APPROVED MAKES AND MANUFACTURERS	List of approved makes for electrical system-- item no 2	ABB /GE /Schneider /Alstom	We would like to request you to include Voltamp / Raychem -RPG / Universal as additional make as other than ABB , none of the list of make vendors manufacture dry type transformer.	Additional make: Raychem-RPG
2	LIST OF APPROVED MAKES AND MANUFACTURERS	List of approved makes for electrical system -- item no 10	L&T / ABB/ Siemens / Schneider / GE / Legrand	We would like to request you to include Godrej / C&S as additional make.	No change
3	GCC			Kindly specify if approvals from authority needs to be in Contractor scope.	Refer Cl. no. 4 of Vol.-III (SCC) : "Scope of Contract"
4	LIST OF APPROVED MAKES AND MANUFACTURERS	List of approved makes for electrical system-- item no 28	CCI/ Universal / Finolex/ Rallison	We would like to request you to include Polyad as additional make.	No change
5	LIST OF APPROVED MAKES AND MANUFACTURERS	List of approved makes for electrical system-- item no 33	OBO/ Legrand / Cooper/ BEC	We would request you to kindly approve MEM / Steelways as additional make	No change
6	Volume - 1 ,NIT	Tender Date of Submission	2nd Nov 2016 upto 14:30 hrs.	We would request you to kindly extend date of submission of tender till 14th Nov,16	Last date of submission of bid through e-tendering extended upto 14:30 hrs. on 10.11.2016.
7	BOQ-E 7 R3	3.01	Sound Proof DG sets of 1000 KVA DG sets	We request you to furnish the DG sets Equipment lay out drawings/ schematic diagram enable us to work out the cost of mechnical work like Piping & accessories etc.	DG can be installed outside building as per the actual site condition
8	BOQ-E 15 R3	7	Sub Head -7 Building Management System	We wish to inform you that the BMS BQO items Qty & BMS I/O summery are not matching, Also BMS I/O summary seems to incomplete, Request you to review & furnish the complete details.	I/o summary enclosed at **ANNEXURE -I.**
9	VOL05 BOQ	SUBHEAD 6 OUT DOOR LIGHTING		For item no. 6.05 High mast light. Please share the technical specification of the high mast as the same is missing from the tender.	Enclosed at **ANNEXURE - II.**
10	Tech. Specs		Escalator	We request you to furnish Technical specifications of Escalators.Since the specifications is not in the tender document.	Technical specification enclosed at **ANNEXURE-III**.

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
11	SPEC Page E-139 R1	2	Transformers	Request to give approval of M/s Voltamp & M/s Kirloskar make also.	Additional Make Raychem-RPG.
12	SPEC Page E-139 R1	10	Bus Duct/Rising Main	The approved makes M/s ABB are not manufacturing of Bus duct/ Rising Mains. So we request you to give approval of M/s C&S make also.	No change, as per tender conditions
13	SPEC Page E-141 R 1	33	Cable Trays/ Raceways	The approved makes M/s OBO & M/s Legrand does not manufacturing of Cale Tray/ Raceways as per Tender specifications, So we request you to give approval of M/s Steelways, AKG, RM-CON Slottco etc.	No change, as per tender conditions
14	SPEC Page E-142 R1	42	Solar Power system	The approved makes M/s CEL, BHEL,BEL are manufactruing of Solar PV module only & not doing turnkey project, So request to give approval of following Turnkey contratctor of Solar Power system.	MNRE certification for last 10 years can provide solar photovoltaic
			1	MOSER BAEYER	
			2	AUTONIC MUMBAI	
			3	Panasonic	
			4	PERFECT AURARAYS	
			5	Vikram Solar	
15	SCC-P-52	24	Terms of Payment		
		a	70% of BOQ rate on receipt of equipment against receipt of cpmplete material at site & test certificates	85% after initial inspection and delivery at site in good condition on prorata basis.	
		b	15% of BOQ rate on erection and installation of equipment.	10% after completion of Installation in all respects.	No change, as per tender conditions
		c	10% after successful completion of all work including all testing, commissioning & taking over.	Balance 5% will be paid after testing, commissioning & handing over to the department.	
		d	5% after taking over of all works.		
16			Single Line Diagram of Electrical system	Request to furnish the SINGLE LINE DIAGRAM of Electrical system, No drawing is available in the tender document.	Drawings will be provided to successful bidder.
17	Volume I - Page 38		Operation & Maintenance Period - During Defect Liability Period, i.e. 12 months	Please clarify the manpower details required and the number of shifts for operation to be considered. Please also confirm whether this will be considered under Bid Evaluation or not.	Only Maintenance works carried out for entire system by the contractor during DLP.
18	Volume I		Bank Guarantee for EMD	Please provide the Bank Details, Beneficiary Name, IFSC Code, Account details. for furnishing Bank Guarantee.	**HSCC (India) Limited,** Name of Branch - Indian Overseas Bank, Kribhco Branch, Noida IFSC Code - IOBA0001725 Bank A/C No. - 172502000000151 PAN No. - AAACH0086N
19	Vol I - Page no 27- Point vi - NIT & PQ		The Defects Liability Period shall be up to 12 months from the date of Completion of works	We request you to accept the "Defect liability period as 12 months from the date of commissioning or 15 months from the date of delivery, which ever ends earlier."	Shall be as per tender condition.
20	Vol I - Page 30 - Clause 5		Approvals Required - The Contractor shall obtain all necessary approvals Electric Supply and inspectorate. Agencies concerned, such as, but not limited to, Police and Security Agencies, in accordance prevailing rules, Building Bye-Laws etc., as the case may be with related to/ required for Construction/Completion. All expenditure on this account will be borne by the contractor.	Please confirm whether CEIG Approval is in the scope of the contractor or not? Or only Technical Documentation needs to be furnished for the same.	as per tender conditions.

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
21	Vol I - Page 30 - Clause 5		Approvals Required - The Contractor shall obtain all necessary approvals Electric Supply and inspectorate. Agencies concerned, such as, but not limited to, Police and Security Agencies, in accordance prevailing rules, Building Bye-Laws etc., as the case may be with related to/ required for Construction/Completion. All expenditure on this account will be borne by the contractor.	Please confirm that Load Sanctioning work is not in our scope of work.	load is in the scope of contractor.
22	Vol I - Page 48		Undertaking - Form H	Please confirm for which Items, we need to furnish this Undertaking.	for specialized work.
23	Vol I - Page 55		Form T-4 - Performance Report of Works	Please confirm whether we can furnish the Completion Certificate as per standard format of Client, inplace of the given format.	Shall be as per tender condition.
24	Vol II GCC - Clause 25		SETTLEMENT OF DISPUTES & ARBITRATION	All disputes to be resolved by one arbitrator from each side (Client & Contractor) and third selected by both the parties.	Shall be as per tender condition.
25	Volume II GCC - Clause 37		LEVY/TAXES PAYABLE BY CONTRACTOR	Please confirm that Service Tax to be excluded from our Rates to be quoted and it shall be re-imbursed to us on documentary proof.	Refer Cl. 2.3.7 of Vo.-I (NIT / PQ) and Cl.- 37 of Vol.-III (SCC).
26	Volume II GCC - Clause 37		LEVY/TAXES PAYABLE BY CONTRACTOR	Please confirm whether Labour Cess to be included in our rates or not.	Refer Cl. 2.3.7 of Vo.-I (NIT / PQ).
27	Volume II - GCC Clause 2 - Page 17 of 121		Compensation for Delay	We request you to accept the Compensation of delay shall be 0.5% per week subject to maximum of 5% of the contract value.	Shall be as per tender condition.
28	Vol II GCC - Clause 10 C, Page 34 of 121 & Clause 38, Page 70 of 121		Variation in Taxes and Duties and Imposition of New Taxes	The statutory variation in prevailing taxes & duties, along with new levy or imposition of GST due change in govt. rules and regulation during the currency of the project, will be re-imbursed against the documentary evidences.	Refer Cl.- 38 of Vol.-III (SCC).
29	Vol III SCC - Clause 24 - P 52		Terms of Payment (Only for items of major electrical equipments) a. 70% of BOQ rate on receipt of equipment against receipt of complete material at site & test certificates. b. 15% of BOQ rate on erection and installation of equipment. c. 10% after successful completion of all works including all testing, commissioning & taking over. d 5% after taking over of all works.	Please specify Items covered under "Major Electrical Equipments" to be paid for Terms of Payment.	All equipments covered.
30	Vol III SCC - Clause 24 - P 52		Terms of Payment (Only for items of major electrical equipments) a. 70% of BOQ rate on receipt of equipment against receipt of complete material at site & test certificates. b. 15% of BOQ rate on erection and installation of equipment. c. 10% after successful completion of all works including all testing, commissioning & taking over. d 5% after taking over of all works.	We request you to pay the specified Terms of Payment for ALL the Items, inplace of Major Electrical Equipments.	No change
31	Vol III SCC - Clause 42.2.4		The Contractor shall also make his own arrangements for power supply at Site for construction, testing & commissioning of all services and general use at his own cost.	We request you to provide Power for Testing & Commissioning free of cost to the contractor.	Shall be as per tender condition.

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
32	Vol IV - Tech Specs - Page E 138 R1		LIST OF APPROVED MAKES FOR ELCTRICAL SYSTEM - HSCC electrical engineer (approving authority) reserves the right to opt for the best preferred listed make.	We confirm to provide one of the approved makes as per tender, however final choice of make shall remain with us. We also confirm that we shall submit the technical details to you before ordering major items.	as per tender conditions.
33	Volume IV - Technical Specs - List of Makes Page E-139 R1		Makes of Transformers - ABB/GE/ Schneider/Alstom	Since out of the approved Makes, only ABB will be able to Offer us Dry type Transformers. So Request you to add makes of Voltamp and Kirloskar in your approved list.	Additional Make: Raychem-RPG
34	Volume IV - Technical Specs - List of Makes Page E-139 R1		Make of APFC Panel	We request you to accept the makes specified in MV Panels to be considered for APFC Panels	No change
35	Volume IV - Technical Specs - List of Makes Page E-139 R1		Make of Bus Duct / Rising Mains	We request you to accept the make of C & S in your approved make list.	No change
36	Volume IV - Technical Specs - List of Makes Page E-141 R1		Make of HT/LT- XLPE cables	We request you to accept the make of KEI / Polycab in your approved make list.	No change
37	Volume IV - Technical Specs - List of Makes Page E-141 R1		Make of Copper Control cable	We request you to accept the make of KEI / Polycab in your approved make list.	No change
38	Volume IV - Technical Specs - List of Makes Page E-141 R1		Make of Cable Trays/ Raceways	We request you to accept the make of MEM / Steelways in your approved make list, since the approved makes are not equivalent with each other.	No change
39	Vol IV - Tech Specs - Page E 4 R1		11 KV Panels Specs - Clause no. 3.2.3	Please clarify whther Earthing Truck / Trolley needs to be considered in our Prices or not, since it is not clear. If yes, please specify Nos?	earthing truck tobeconsidered.
40	Volume IV - Technical Specs - List of Makes Page E-139 R1		Makes of Parking Management system	Please specify Makes for Parking Management system.	mentioned in BOQ
41	Volume IV - Technical Specs - List of Makes Page E-139 R1		11 KV VCB Panel Board/ RMU - Siemens/L&T/ABB/Schneider	Please confirm whether we can consider System Houses of the approved VCB manufacturers.	No change
42	Vol V - BOQ - Item no. 5		Cables	BOQ defines as XLPE Cables, however in the Tech Specs (Page E 81 R1) defines XLPE Cable PVC insulated Cables. Please clarify whether we need to consider XLPE Insulated or PVC Insulated Cables.	XLPE cables as per IS 7098 amended upto date.
43	Vol V - BOQ - 10.0.3		Well Pressurization	Please clarify if it is an existing shaft; Well Pressurisation not in Contractor Scope; Details of pressurization to be shared.	as per tender conditions.
44	Vol V - BOQ - 10.0.3		0.5 mps speed	We request you to approve 1 mps speed as well as per manufacturer standards.	1 MPS speed accepted.
45	Vol V - BOQ - 10.0.1		Moon Rock Finish	We shall provide a Scratch Proof Finish with some other name. Kindly approve the same.	as per BOQ
46	Vol V - BOQ - 10.0.1		0.75 mps speed	We request you to approve 1 mps speed as well as per manufacturer standards.	1 MPS speed accepted.
47	Vol IV - Specs for Capacitor - 5.05 (ii)		Capacitor type: The capacitor unit shall be Heavy Duty MPP resin filled, copper wound type. The dielectric should be made of polypropylene	The metalisation in MPP type Capacitors is done with aluminium. Specifications says "Cooper Wound". Please clarify.	alluminium, as per standard.
48	Vol IV - Specs for Capacitor - 5.05 (iii)		Temperature category: -25 degree C to 70 degree C	MPP Capacitors has maximum temperature limit of 55 deg C	55 degree limit may be considered
49	Vol IV - Specs for Capacitor - 5.05 (v)		Over current: 2.5x In	Over current should be 1.8 x In	1.8 x In may be considered
50	Vol IV - Specs for Capacitor - 5.05 (vi)		Peak inrush current withstand: 400 x In	Peak inrush current withstand should be 250 x In	250 x In may be considered

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
51	Vol IV - Specs - LT Switchgears - 7.1.6 ACB ACCESSORIES		i. Auxillary contacts 6 NO + 6 NC, of rating 16Amp at 415 volts 50Hz.	Please amend to 4NO+4NC as per series mentioned for approved makes in make list.	4 No+NC as per manufacturer standard practice may be considered
52	Vol IV - Specs - LT Switchgears -7.2 MOULDED CASE CIRCUIT BREAKERS.		MCCB should have Spreader links & Phase barriers as standard feature	MCCB should have Copper Spreader links & Phase barriers as standard feature. Please specify the material	spreader link will be of copper.
53	Vol IV - Specs - LT Switchgears -7.2.2 FRAME SIZES		The MCCBs shall have the following frame sizes subject to meeting the fault level or as per manufacturer's standard practice. a. Upto 100A rating ..... 100A frame. b. Above 100A upto 200A ..... 200A frame. c. Above 200A up to 250A ..... 250A frame. d. Above 250A up to 400A ..... 400A frame. e. Above 400A up to 630Aq ..... 630A frame. f. Above 630A to 800A ..... 800A frame.	The Frame sizes of MCCBs shall be as per manufacturers standard design.	manufacturer standard design will be accepted.
54	Vol V - BOQ - SUBHEAD 2: MAIN LT PANEL		All ACBs shall have spare contacts & BMS Compatiable	Please clarify requirement of RS485 communication port for BMS connectivity	ON-OFF-Trip status is requiredon BMs
55	Vol V - BOQ - SUBHEAD 1: HT Panel		500 MVA (26.3KA) rupturing capacity Vacuum Circuit Breaker	Please specifiy the Withstand time ie 3.0 secs in BOQ	withstand time 3.0 sec accepted.
56	Vol V - BOQ - SUBHEAD 1: HT Panel		1 Set of Microcontroller based numerical relay having 4 element relay (3O/C+1E/F)	1 Set of Microcontroller based numerical relay having 4 element relay (3O/C+1E/F) with High set S/C setting	instantaneous trip will be provided
57	Vol V - BOQ - SUBHEAD 1: HT Panel		HT Panels	Are the Numerical relays communicable, If yes then what shall be the protocol.	as per BOQ
58	Vol V - BOQ - SUBHEAD 1: HT Panel		HT Panels	There is no requirement of other meters if MFM is provided, as MFM shows all the metering parameter.	as per BOQ
59	Vol V - BOQ		LT Panels	Temperature rise shall be as per IEC. Kindly confirm.	As per IEC
60	Vol V - BOQ		LT Panels	All LT panel, DG panels, APFC panel should comply to latest IEC-61439-1 Temperature rise shall be as per IEC.	Main LT panel, Main HVAC &capacitor will be IEC 61439
61	Vol IV - Specs -6.0 MAIN LT, MV & FLOOR PANELS - Clause No. 6.2-v)		LT Panels	Switchboard shall be Single Front Drawout Type	single front type
62	Vol IV - Specs -6.0 MAIN LT, MV & FLOOR PANELS- Clause No. 7.4.4)		LT Panels	We have considered Metering CT as CL-1 & Protection CT as CL5P10	as per BOQ
63	Vol IV - Specs -6.0 MAIN LT, MV & FLOOR PANELS- Clause No. 6.2)		LT Panels	Bus bar shall have higher clearances in air those prescribed by global switchboards standard is 25mm Ph to Ph & 19mm Ph to N or Ph to E	as per tender
64	Vol IV - Specs -6.0 MAIN LT, MV & FLOOR PANELS- Clause No. 7.2.1		LT Panels	Breaking capacity of MCCB shall be as per BOQ given by you	as per BOQ
65	Vol IV - DG Specs - Cl 14.2.1		HSD & Load for DG sets	HSD and Load for commissioning and testing of DG Sets shall be provided by customer on free of cost basis.	as per tender
66	Vol IV - DG Specs - Cl 14.4.2		DG Sets Specs	No deration is applied upto 50 deg C for Engine. Alternator is designed for operation at 40 deg C.	asper manufacturer standard practicer
67	Vol IV - DG Specs - Cl 14.4.10		DG Sets Specs	For 800 KW and above rating DG Sets, noise attenuation shall be 25 dBA at 1 meter upon acoustic enclosure as per CPCB/MOEF norms.	as per CPCB norms
68	Vol IV - DG Specs - Cl 14.5.8		DG Sets Specs	Cooling Tower is not applicable since radiator cooled DG Sets have been offered.	as per BOQ

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
69	Vol IV - DG Specs - Cl 14.9.1		DG Sets Specs	Factory acceptance test of combined DG Sets for 2 hours duration has been considered as per manufacturer standards at their Works. All travelling, lodging & boarding expenses shall be to customer's account.	as per CPWD norms/ tender conditions
70	Vol IV - DG Specs - Cl 14.9.1		DG Sets Specs	HSD and Load for commissioning and testing of DG Sets shall be provided by customer on FOC basis.	as per tendeer
71	List of Makes		List of Makes for DG Accesories	Make of Anti-vibration mounting shall be as per DG manufacturer standards.	as per DG manufacturer standard practice
72	List of Makes		List of Makes for DG Accesories	Make of Batteries shall be as per DG manufacturer standards.	as per DG manufacturer standard practice
73	DG BOQ		DG BOQ	You have asked for 1000KVA DG set, please note some of the approved DG manufacturer is having 1010 KVA Rating, hope this is acceptable to you, please confirm.	1010 KVA DG set accepted
74	DG BOQ		DG BOQ	Exhaust needs to be as per the CPCB guidelines applicable for above 1000KVA (800KW) i.e. for 1010 KVA only, as per the CPCB, 30 mtr. self supporting structure is required, please confirm	as per CPCB norms
77	DG BOQ		DG BOQ	Request please confirm the scope, MS Steel for structure & MS Pipe with bellow & insulation is the part of DG vendor or not.	complete system is in the scope
78	DG BOQ		DG BOQ	Request please confirm the testing hrs. to be witnessed at our works for both the DG sets or for One Nos. 1010 KVA Only	All DG sets
79	DG BOQ		DG BOQ	Synchronization required thru PLC or DG Controller, please confirm	as per BOQ
80	DG BOQ		DG BOQ	As per your Tender, Please note Engine is designed for 50 deg C, however please also confirm the abmient temp to be considered for alternator as all alternator manufacturer design their machine @40 deg C.	as per manufacturer standard practice
81	DG BOQ		DG BOQ	The acoustic enclosure of DG Sets shall be as per approved manufacturer design. Kindly confirm.	it should meet CPCB requirement
82	DG BOQ		DG BOQ	The synchronizing shall be through Woodward relay microprocessor based. Kindly confirm.	as per BOQ
83	DG BOQ		DG BOQ	Is the underground tank of 20 KL required as the same is not there in the detailed specifications. Please clarify.	20 KL tank will be as per BOQ
84	HT Panels BOQ		Digital frequency meter,Digital Tri vector meter.	Frequency Meter shall be part of TVM. No separate Frequency Meter is required.	as per BOQ
85	HT Panels BOQ		I Set of undervoltage relay and Overvoltage relay	Relay shall be Electro-Mechanical type as per manufacturer standard.	microprocessor based
86	HT Panels BOQ		1 No. Digital Power factor meter	Part of TVM, No separate Meter required.	as per BOQ
87	HT Panels BOQ		1 no. Phase reversal Relay	Not Envisaged. Please provide the purpose of this relay.	as per BOQ
88	HT Panels BOQ		1 set of 11kV/110V-110 V Potential Transformers with HRC fuses for metering & protection	Not Envisaged. Please provide the purpose of offering PT in outgoing feeder.	as per BOQ
89	List of Makes		Makes of CT, PT	We request you to add make of ECS, Pragati, Jyoti for CTs & PTs.	No change
90	List of Makes		Makes of MCB	We request you to add make of ABB & HPL for MCB.	No change
91	List of Makes		Energy Meter/MFM	We request you to approve make of SECURE, RISHABH, ELMEASURE, L&T for Energy Meter / MFM.	No change
92	HT Panels Specs	Clause 3.1		vcb/panel shall follow strictly latest IEC 62271-100/200.	asper CPWD specs
93	HT Panels Specs	Clause 3.1		please confirm duration of Internal ARC tested panel.	3 sec
94	HT Panels Specs	Clause 3.2.2		vacuum interrupter body & material shall be as per manufacturer standard design.	standard design will be accepted

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
95	HT Panels Specs	Clause 3.2.3		busbar support insulator not applicable in our type tested design. As our busbar design is self supported design	standard design will be accepted
96	HT Panels Specs	Clause 3.2.7		LV SIDE OF PT SHALL BE OFFERED WITH MCB. VT BURDEN SHALL BE 50VA. WE HAVE NOT CONSIDERED PT IN O/G FEEDERS.	as per BOQ
97	HT Panels Specs	Clause 3.2.8		PENETRATION TYPE BUSHINGS SHALL BE AS PER MANUFACTURER TYPE TESTED DESIGN	standard design will be accepted
98	HT Panels Specs	Cl 3.2.12		BUSBAR SIZE SHALL BE TUBULAR DESIGN AS PER MANUFACTURER STANDARDS.	standard design will be accepted
99	HT Panels Specs	Cl 3.2.12		BUSBAR SUPPORT NSULATOR NOT APLICABLE IN OUR DESIGN	standard design will be accepted
100	HT Panels Specs	Cl 3.2.12		R,Y,B STICKER SHALL BE OFFERED AT REGULAR INTERVAL TO IDENTIFY PHASES OF BUSBAR	standard design will be accepted
101	HT Panels Specs	Cl 3.2.12		TEMPERATURE RISE OVER AMBIENT TEMPERATURE SHALL COMPLY IEC ONLY.	as per BOQ
102	HT Panels Specs	Cl 3.3.4		WE DON'T ENVISAGE EARTHING ROD IN OUR SCOPE. WE CAN OFFER EARTHING TRUCK BUS/CABLE SIDE AS PER YOUR REQUIREMENT.NO EARTHING SWITCHES OFFERED. KINDLY CONFIRM	earthing truck will be accepted
103	HT Panels Specs	Cl 3.3.5		PLEASE NOTE CT/PT RATIO,ACCURACY,BURDEN SHALL BE CONFIRMED DDE AFTER TAKING CONFIRMATION FROM MANUFACTURRER.	as per tender
104	HT Panels Specs	Cl 3.3.6.3 - v		The door can be closed even if the LV plug is not fitted, However the breaker cannot be racked in to service position unless the LV plug has been fitted.	as per tender
105	HT Panels Specs	Cl 3.3.6.3 - vi		It shall be possible to meachanically trip the Circuit breaker, however for closing we have provided Electrical switch.	as per tender
106	HT Panels Specs	Cl 3.3.8.1 - iv		PART OF BREAKER...NO SEPARATE HANDLE	as per tender
107	HT Panels Specs	Cl 3.3.9.1 - d		CB OFFERED SHALL HAVE INTEGRATED SPRING CHARGING HANDLE, NO SEPARATE HANDLE IS REQUIRED	as per tender
108	HT Panels Specs	Cl 3.3.9.1 - f		PLEASE CONFIRM QTY	as per tender
109	HT Panels Specs	Cl 3.3.11 - a		POWER PACK CONFIG SHALL BE AS PER MANUFACTURER STANDARD PRACTICE ONLY. Battery & battery charger not applicable	as per tender
110	HT Panels Specs	Cl 3.3.13		Site Test is not applicable.	as per tender
112	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		Are the Numerical relays communicable, If yes then what shall be the protocol. · There is no requirement of other meters if MFM is provided, as MFM shows all the metering parameter · Temperature rise shall be as per IEC	No change
113	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		Please confirm the panel shall be suitable for indoor application or outdoor application.	Indoor type
114	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		As relay have metering facitlies as well, we have not envisaged any separte meters in our scope. Kindly confirm.	as per BOQ
115	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		At the incomer side of HT panel 1 no. phase reversal is written. Please clarify rhe purpose of offering phase reversal relay. Is the same can be omitted from tender.	as per BOQ
116	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		At the outgoing feeder side 1 set of PT is mentioned. Please clarify the purpose of offering PT at outgoing feeder. Is the same can be omitted from tender.	as per BOQ

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117	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.01 HT PANEL		The undervoltage relay and overvoltage relay shall be electromechnical type. Please confirm.	as per BOQ
118	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO 1.02 Transformer		The foundation for the transformer if any shall be in the scope of civil authority. Please confirm.	As per tender condition.
119	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO. 1.04 BUS DUCT		Please share SLD of electrical distribution/ or the feeder details from wher the Bus duct is being connected to other feeder incomer.As it is required to calculate no. of cu flexibles, bends, flange end, adaptor box etc.	drawing shall be provided to successful bidder.
120	VOL05 BOQ	SUBHEAD 1: H.T. SUB STATION; S.NO. 1.04 BUS DUCT		Please confirm can we consider Class B (130 deg) type insulation in place class F insulation mentioned in tender specs.	As per tender condition.
121	VOL04TECHSPECS	9.0 BUS TRUNKING/ RISING MAINS		Clause 9.5, the bus trunking rating shall be read as 40 degC ambient considering a temperature rise not exceeding of 55 deg C. As per our understanding there is some typographical error in specs.	As per tender condition.
122	VOL04TECHSPECS	9.0 BUS TRUNKING/ RISING MAINS		Clause 9.4, can we consider rated insulation voltage 1000v insead of 1100V written in specs. As there is only one make, which can have 1100V. Please confirm.	insulation voltage 1000v accepted
123	VOL04TECHSPECS	9.0 BUS TRUNKING/ RISING MAINS		Clause 9.9, as per the specs the bus duct shall be suitable for 12 KV impulse voltage. As there is only one make from tender which can meet the rating. Can we consider 8 KV impulse voltage Bus duct in place of 12 KV. Please confirm.	impulse voltage 8KV accepted.
124	VOL05 BOQ	SUBHEAD 3 : DG SET & ACCESSORIES		As per the CPCB norms, with accoustic enclosure noise insertion loss shall be 25 dbA at one meter distance from Dg sets. Please confirm.	latest CPCB ammended upto date will be followed.
125	VOL05 BOQ	SUBHEAD 3 : DG SET & ACCESSORIES		The foundation for the DG sets shall be in the scope civil authority. Please confirm.	As per tender condition.
126	VOL05 BOQ	SUB HEAD 10: LIFTS AND ESCALATORS		For S.no. 10.01 and 10.02. As the lift is being used for hospital application, the stetcher lift shall be provided with stretcher impact protection. So, further ss handrail arrangement is not required at this point. Please confirm.	ok, hand rail is stands deleted
127	VOL05 BOQ	SUB HEAD 10: LIFTS AND ESCALATORS		For S.no.10.01 (ii) and s.no. 10.03, As per the BOM the floor lift speed shall be 0.75MPS and 0.5 MPS Vice of versa. As per the OEM standards the lift speed would be 1MPS instead of 0.75 MPS and 0.5 MPS. Please confirm.	as requested .75 MPS may beread as 1.0 MPS
128	VOL05 BOQ	SUB HEAD 10: LIFTS AND ESCALATORS		For S.no. 10.03, goods lift, Please clarify if it is an exisitng shaft, the details of the well pressurisation need to be shared.	through shaft only
129	VOL04TECHSPECS	10.0.LIFT INSTALLATION		Clause 10.01 (d), As per specs providing suitable trap doors with steel chequered plate covers, comes under the civil scope of work. The same shall be done by civil authority. Kindly confirm.	ok, part of the civil but the details to be provided by the contractor.
130	VOL04TECHSPECS	10.0.LIFT INSTALLATION		As per the clause 10.01 (f), Load hook as per approved GA drawing shall not be in the scope of electrical authority. The same shall be provided by client. Please confirm.	ok, part of the civil but the details to be provided by the contractor.
131	VOL04TECHSPECS	10.0.LIFT INSTALLATION		Clause 10.9.15; As per specs Phase reversal relay shall be provided on controller. Since VVVF drive system is provided in controller. Hence the phase reversal relay shall not be applicable at this point. Please confirm	As per tender condition.
132	VOL04TECHSPECS	10.0.LIFT INSTALLATION		Clause 10.9.25 Car Door: As per specs, the lift car door shall have a fire resistance rating of 1 hr. As per OEM's the fire rated doors are not applicable as per BIS standards.	lift landing doors shhall have fire resistance of 1 hour.
133	VOL05 BOQ	SUB HEAD 8: SOLAR PHOTVOLTAIC POWER GENERATION		Allow us to have additonal make as Jaskon for solar PV system.	MNRE certification for last 10 years can provide solar photovoltaic

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
134	VOL04TECHSPECS		LOM	Allow us to consider the following make as the same is missing from the tender document and some additional makes:	As per tender condition.
		a	RCC Hume Pipe	DD Spun/ Radhey Spun	
		b	Swaged Tublar Pole	Mastech/ Sohan Lal Sons	
		c	HT/ LT XLPE Cable	Gloster/KEI/ RPG	
		d	Control cable	Gloster/KEI/ RPG	
		e	Light Fittings	Bajaj	
		f	Cable Tray	MEM	
135	BOQ-LT Panels	2.00 SUBHEAD 2: MAIN LT PANEL	All ACBs shall have spare contacts & BMS Compatiable	Please clarify requirement of RS485 communication port for BMS connectivity	ON-OFF-Trip status is requiredon BMs
136	LIST OF APPROVED MAKES FOR ELCTRICAL SYSTEM	Transformer	ABB/GE/ Schneider/Alstom are approved. As per our information, only ABB offers Dry type Transformers	Please add RPG-Raychem in make list for Dry type Transformers.	Additional Make: RPG-Raychem
137	BOQ- HT Panels	SUBHEAD 1: H.T. SUB STATION	500 MVA (26.3KA) rupturing capacity Vacuum Circuit Breaker	Please specifiy the Withstand time ie 3.0 secs in BOQ	3.0 secs
			1 Set of Microcontroller based numerical relay having 4 element relay (3O/C+1E/F)	1 Set of Microcontroller based numerical relay having 4 element relay (3O/C+1E/F) with High set S/C setting	Insrantaneous trip will be provided.
			VCB and VI must be of same make.	IEC standard does not state that VCB and VI must be of same make. Manufacturer of VCB can use any VI provided that design is tested as per IEC 62271.	It should be as per IEC 62271. third party test report alongwith the vacume bottel to be submitted at the time of approval of GA drawing
			Requirment of separate TVM, PF meter, Frequency meter etc	All these parameters can be seen in MFM.	As per BOQ
138	LT Panels			We presume that only Main LT Panel is TTA type and rest of the panels are PTA type. Also, please provide makes for PTA panels.	Makes are as per list of approved makes.
139	HT Cable	BOQ item no. 1.05	HT Cable	Please clarify whether HT cables are earthed or unearthed type	Earthed system
140	Cable Tray	BOQ item no. 1.15 & 1.16	Perforated & ladder type tray…	We presume that hanging arrangements for these trays shall be covered under item no. 1.14. Please confirm.	As per tender conditions.
141	DG Sets	BOQ item no. 3.01	Exhaust System	Please incorporate the pipe size, bellow, insulation & MS Steel in the BOQ as separate line items. Please also provide us the site layout.	As per tender conditions.
142	DG Sets	HSD / BOT (FUEL SYSTEM)	Fuel system	Please incorporate the piping & related acessories in the BOQ as separate line items. Please also provide us the site layouts and P&I of fuel syetm to understand the scheme.	As per tender conditions.
143	MS Conduit	BOQ item no. 5.06	...in fexiabel MS condiut / Pipe…	Please clarify if conduit to be considered in this item. If yes, then plaese clarify whether flexible conduit or pipe to be considered.	M.S Conduit
144	Swaged steel tubular pole	BOQ item no. 6.01 & 6.02	...LED street light fixture…	We presume that pole is comprising of light fixtures also. Please confirm.	As per BOQ
145	BMS BOQ item No. E-7	Ultrasonic Flow Metre	BOQ-Building Management System Item No.E-7	Kindly provide the alternate makes for this item.The mentioned makes doesn't manufacture this item. Also, please provide pipe size.	as per tender
146	BMS BOQ item No. E-18	Level Switch	BOQ-Building Management System Item No.E-8	Kindly provide the alternate makes for this item.The mentioned makes doesn't manufacture this item. Also, please provide the tank depth.	As per BOQ
147	BMS BOQ item No. E-9	Flame Proof Level Switch	BOQ-Building Management System Item No.E-9	Kindly provide the alternate makes for this item.The mentioned makes doesn't manufacture this item.	As per BOQ
148	Lifts	BOQ item no. 10.01 (II)	Speed -0.75 MPS	Please approve speed of 1.0 m/s also.	Speed of 1.0 MPS accepted
149	Drawings			Please provide Layout drawings & SLDs.	drawings will be provided to Successful bidder
150	11 KV Panels	Make List, s.no. 1	Siemens/L&T/ABB/Schneider	Please approve authorized channel partners of OEMs to quote with.	No, As per tender conditions.
151	Main LT Panel (TTA) / APFC panels	Make List, s.no. 3	Siemens/ L&T/ABB/Schneider	Please approve authorized channel partners of OEMs to quote with.	No, As per tender conditions.
152	Bus Duct	Make List, s.no. 10	L&T/ABB/Siemens/Schneider/GE/Legrand	Please approve C&S and Godrej as additional makes.	No change

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
153	HT/LT- XLPE cables	Make List, s.no. 28	C C I / U niversal/Finolex/ Rallison	Please approve KEI and Polycab as additional makes.	No change
154	Taxes & duties	Cl. No. 2.3.7 of Vol 1, page no. 21	These prices should include all costs associated with the Project including any out of pocket / mobilization expenses, taxes, charges, levies, cess, VAT etc. and excluding Service tax...	Please clarify about the applicability of labour cess.	Yes
155	Order of preference	Cl. No. 8.1 of Vol 2, page no. 13 of 121	Order of preference: a) Description of Schedule of Quantities b) Particular specifications and Special Condition, if any. c) Drawings d) CPWD Specifications e) Indian Standard Specifications of B.I.S.	We presume that addendum / pre-bid response shall get preference over other documents. Please confirm.	Yes
156	Mobilization Advance	Cl. No. 10B (2) of Vol 2, page no. 32 of 121	Mobilization advance not exceeding 10% of the tendered value…., The mobilization advance will bear simple interest at the rate of 10 per cent per annum…	We request you to provide interest free advance.	No change in Tender terms and conditions. Tender conditions shall prevail.
157	Arbitration	Cl. No. 25 of Vol 2, page no. 59-60 of 121	...disputes or difference shall be referred for adjudication through arbitration by a sole arbitrator appointed by the Client.	We request you to ammend this clause as "Arbitration process shall be by three Arbitrators. First Arbitrator shall be appointed by client, second by contractor and third will be jointly appointed by first and second Arbitrator. Arbitration proceedings will be governed by the provisions of the “The Indian Arbitration and Conciliation Act”, 1996 and any re-enactments or statutory modifications thereof for the time being in force".	Shall be as per tender condition.
158	Storage	Cl. No. 9(e) of Vol 3, page no. 11		We presume that space shall be provide within site premises for store & site office of contractor. Please confirm.	Space for Store may be provided depending upon availability. The bidder shall not have any claim whatsoever reason in case the space is not provided. Bidder should visit and examine the site before submitting the bid.
159	Cleaning of site	Cl. No. 9(e) of Vol 3, page no. 12	Contractor shall be responsible to keep entire site free from water due to water coming from any source at any level…	We presume that cleaning of site will be pertaining to our scope of wiork only. Please confirm.	cleaning of site as per the scope of work awarded to the contractor.
160	Retention Money	Cl. No. 31(e) of Vol 3, page no. 33-34	BG of 2.5%, valid till completion & deduction of 5% from RA bills amounting to 2.5% of contract price, to be released on completion. OR: deduction of 10% from RA bills amounting to 5% of contract price, 50% to be released on completion & remaining 50% after DLP.	Please clarify which option to follow. Also, we request you to allow to submit BG of 5% of contract price valid till DLP so that no deduction shall be made towards retention money.	Shall be as per tender condition.
161	Training of Personnel	Cl. No. 25 of Vol 3, page no. 452-53	The Contractor shall arrange to train the Employer's personnel…	Please provide no. of personnel to be trained & for how many days.	Shall be as per tender condition.
162	BOQ			You have asked for 1000KVA DG set, please note all DG manufacturer having 1010KVA Rating, hope this is acceptable to you, please confirm	DG rating will be 1010KVA
163	BOQ			Exhaust needs to be as per the CPCB guidelines applicable for above 1000KVA (800KW) i.e. for 1010 KVA only, as per the CPCB, 30 mtr. self supporting structure is required, please confirm	as per CPCB/CPWD norms ammended upto date
164	14.4.7 Cooling:			request please confirm the cooling system to be considered, it has to be Radiator cooled as per the BOQ, please confirm	as per BOQ
165	BOQ			Request please confirm the scope, MS Steel for structure & MS Pipe with bellow & insulation is the part of DG vendor or not.	complete work isin the scope
166				Request please confirm the testing hrs. to be witnessed at our works for both the DG sets or for One Nos. 1010 KVA Only	as per CPWD specifications.

S.No.	Specification / Vol. BOQ Reference	Ref. / Clause no.	As per Tender	Bidders Queries / Request	Clarification/ Reply /Amendment
167				For Site Testing, Diesel & load needs to be provided by Client, please confirm	as per tender
168				Synchronization required thru PLC or DG Controller, please confirm	as per BOQ
169				CEIG approval needs to taken care by DG Vendor or it is the part of DG Vendor, please confirm	as per tender
170				As per your Tender, Please note Engine is designed for 50 deg C, however please also confirm the abmient temp to be considered for alternator as all alternator manufacturer design their machine @40 deg C.	as per manufacturer standard practice.
171	14.3.5 Period of Operation/Duty Cycle & 14.4.2 Rating			There is conflict of statement as per "CPWD General Specification for electrical Part VII DG set 2013" prime power rating is not applicable for continuous loading at full load (mentioned in 14.3.5), As per clause no. 14.4.2 we are quoting for Prime power application, kindly confirm.	DG will be prime power rating as per BOQ
172	14.2.1 - Scope of supply clause m			Kindly provide distance between DG & panel room for calucating control cable length. Also kindly confirm power cable will be in scope of client	As per actual site condition
173	**Escalators :**		**Additional information: Escalators :**		**All Escalators will be of heavy duty type**

All other terms & Conditions of the Tender shall remain unchanged.

Prospective bidders are advised to regularly scan through HSCC e-tender portal http://www.tenderwizard.com/HSCC and HSCC Website www.hsccltd.co.in as corrigendum/amendments etc., if any, will be notified on this portal only and separate advertisement will not be made for this.

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Dy. General Manager (Elect.), HSCC (India) Ltd.,
For & on behalf of Director, AIIMS, New Delhi

APPENDIX – I - IO Summary for BMS AIIMS OPD BLOCK NEW DELHI

SCHEDULE OF DATA POINT SUMMARY-AIIMS OPD Building						
Di Digital Input Ai Analog Input, Do Digital Output, Ao Analog Output						
S.NO.	DESCRIPTION	DATA PIONT TYPE				FIELD DEVICE
		Di	Ai	Do	Ao	
	Chilled Water Plant					
A	**Water Chiller - 6Nos.**					
	Chiller integration	150 soft points				Chiller Integration on Bacnet/IP
B	**Primary Pumps –6 Nos.**					
1	Primary CHW pumps START/STOP			6		At local Panel
2	Primary CHW pumps Status	6				At local Panel
3	Trip status	6				DP switch
4	Primary pumps auto/manual status	6				Electric panel
C	**Second Pumps 8 Nos.**					
1	Secondary CHW pumps START/STOP			8		At controller of variable pumping system
2	Secondary CHW pumps Status	8				At controller of variable pumping system
3	Trip status					Dp switch
4	Secondary Pumps auto /manual status	8				Electric panel
5	Pump VFD ntegration	20 Points per VFD				Modbus/RS485 integration
D	**Condenser Pumps –6 Nos.**					
1	Cond. pumps START/STOP			6		At local Panel
2	Cond. CHW pumps Status	6				At local Panel
3	cond pumps trip status	6				DP switch
4	Cond. Pump auto/manual status	6				Electric panel
	Total ForAC Plant	**52**	**0**	**20**	**0**	72
D	**Cooling tower - 6 Nos.**					
1	Cooling tower START/STOP			6		At local panel
2	Cooling tower operation status	6				Current Relay
3	Cooling tower IN isolation valve OPEN/CLOSE			6		Actuator Control Panel
4	Cooling tower IN isolation valve OPEN/CLOSE sts	6				Actuator Control Panel
5	Cooling tower OUT isolation valve OPEN/CLOSE			6		Actuator Control Panel
6	Cooling tower OUT isolation valve OPEN/CLOSE sts	6				Actuator Control Panel
7	Cooling tower low water level Alarm	6				Level Switch
8	VFD Integration					VFD Integration on MODBUS RS485
	Total ForCooling Tower	**24**	**0**	**18**	**0**	42
B	**Hot Water Generator -2Nos. & Pump -3Nos.**					
1	Fan ON/OFF			5		Panel
2	Fan Run Status	5				DP Switch-Blower

3	Fans Auto Manual Status	5				Volt Free Contact from Auto /Manual Switch
	Total for AHU Units	**10**	**0**	**5**	**0**	
C	**AHU Units-With VFD (one DDC per AHU)**					
1	AHU On/Off Status	65				AHU panel
2	AHU On/Off Control			65		AHU panel
3	AHU Trip status	65				Air DP Switch
4	A/M status	65				AHU Panel
5	Ahu Filter Status	65				DP Switch
6	Return Air Temp + Humidity		130			Duct mounted T+Rh sensor
7	Supply air temp		65			Duct mounter temp sensor
8	Chiller water Valve status		65			1-10V signal
9	Chilled water Valve control				65	1-10V signal
10	Fresh Air damper status	65				AHU panel
11	Fresh Air damper control				65	1-10 V signal
12	Supply Fire Damper control			65		AHU panel
13	Return Fire Damper control			65		AHU panel
14	VFD speed control				65	0-10V signal
15	Chilled water inlet temperature		65			Water temp sensor
16	Return Air CO2 level		65			Duct mounter Co2 sensor
17	Spares	65	65	65	65	
	Total for AHU Units	**390**	**455**	**260**	**260**	1365
E	**Exhaust Fans**					
1	Fan ON/OFF			365		Ventilation Panel
2	Fan Run Status	365				DP Switch-Blower
3	Fans Auto Manual Status	365				
	Total	**730**	**0**	**365**	**0**	1095
F	**Lift & Lift Lobby Pressurisation Fans**					
1	Fan ON/OFF-Test Run			26		Ventilation Panel
2	Fan Run Status	26				DP Switch-Blower
3	Fans Auto Manual Status	26				Volt Free Contact from Auto /Manual Switch
	Total	**52**	**0**	**26**	**0**	
H	**FIRE FIGHTING**					
1	Main Fire Pump Status	2				Differential Pressure Switch for Pumps
2	Main Fire Pump On/Off			2		PFC To panel
3	Jockey Pumps Status	2				Differential Pressure Switch for Pumps
4	Jockey Pumps On/Off			2		PFC To panel
5	Diesel Tank High/Low Level	4				Flame/ Explosion Poof Bi -Level Switch
6	Diesel Pumps Status	2				Differential Pressure Switch for Pumps
7	Diesel pump On/off			2		PFC To panel
8	Terrace Pump	8				Differential Pressure Switch for Pumps
9	Terrace Mump On/off			8		PFC To panel
10	Pressure Monitoring		1			Pressure Transmitter

11	Water tanks hi-low status	16				Water level swithces
	Total	**34**	**1**	**14**	**0**	49
K	**DG SET-2Nos.**					
	Integration of DG					Integration of DG on Modbus RS485 to BMS
	Disel level Monitoring	4				Flameproof Level Switch
L	**Condensor Pump for DG**					
1	Pump ON/ OFF Control			2		PFC
2	Pump Auto/manual Status	2				PFC
3	Pump run status	2				DP switch
	Total	**8**	**0**	**2**	**0**	10
L	**LT panel integration**					
	Incommer on/off status	4				LT panel
	Incommer trip status	4				LT panel
	Outgoing on/off status	40				LT panel
	Outgoing trip status	40				LT panel
	Total	**88**	**0**	**0**	**0**	88
M	**UPS Integration- 3 Nos**	**15 points per UPS**				Modbud/RS485 integration
N	**Energy Meters- 40 Nos**	20 points per meter				Modbud/RS485 integration
	Grand Total	1388	456	710	260	

ANNEXURE - II

1.00 ROAD LIGHTING

1.01 GENERAL

Road lighting shall be done by 4.0 metre high GI pole with Post top lantern globe shaped light fixture with SPSV lamp. The poles shall be provided along the internal roads and pathways and internal courtyards. The light shall be partly on emergency supply as indicated in the respective control wiring layouts.

1.02 LOW HEIGHT LIGHT POLE

Light pole made of 4 metre high Class-B GI pipe with base plate 300mmx300mmx6mm welded to the pole and painted with approved steel primer with final paint as per schedule of quantities.

1.03OCTAGONAL GI POLES

1.04.1 SCOPE

The scope of this specification covers the manufacture, installation, testing and commissioning of the 8 mtr high ,4mm thick Octagonal pole complete lighting system, including the Civil Foundation Works. The Purchaser shall only provide the supply point and the feeder cable of the required size, up to the bottom of the pole. The octagonal Poles shall be designed to mount street light luminaries with weight aprox. 15 Kg. Each. The octagonal poles shall be Hot Dip Galvanized to give average 65 micron thickness. The octagonal poles are designed for max. wind speed of 50 m/s (180 km/hr). The octagonal Poles of length up to 8 meters are manufactured in single section The Octagonal poles diameter shall be of 150mm indicates the dimension across face (above floor level). The junction box shall be used only for octagonal poles having base dia 150mm (A/F) or as specified. Position of the door shall be of 500 mm above the base plate.

1.04.2 TECHNICAL SPECIFICATIONS OF STANDARD OCTAGONAL POLES

Design	The octagonal poles shall be designed to withstand the maximum wind pressure as per IS 875 Part III. The top loading i.e. area and the weight of fixture are to be considered to calculate maximum deflection of the pole and the same shall meet the requirement of BSEN: 40-3-3:2003/BS: 5649.
Pole Shaft	The pole shaft shall have octagonal cross section and shall be continuously tapered with single longitudinal welding. There shall not be any circumferential welding. The welding of pole shaft shall be done by submerged arc welding (SAW) process.

All octagonal pole shafts shall be provided with the rigid flange plate of suitable thickness with provision for fixing 4 foundation bolts. This base plate shall be fillet welded to the pole shaft at two locations i.e. from inside and outside. The welding shall be done as per qualified process.

Door opening — The octagonal poles shall have door of approximate 400 mm length and suitable width at the elevation of 500 mm above the base plate. The door shall be vandal resistance and shall be weather proof to ensure safety of inside connections. The door shall be flush with the exterior surface and shall have suitable locking arrangement. There shall also be suitable arrangement for the purpose of earthing.

The pole shall be adequately strengthened at the location of the door to compensate for the loss in section.

Material

Octagonal poles	Conforming to grade S355JO/ BSEN 100 25 Or equivalent (IS 2062).
Base Plate	Fe 410 conforming to IS 2062
Foundation bolts	6.8 Gr. As per IS 1367

Welding — The welding shall be carried out confirming to approved procedures. The welders shall also be qualified for welding the octagonal shafts in accordance with ANSI/AWS.D1.1(96) Section 4

Pole sections — The octagonal poles up to the length of 8 meters shall be in single piece with single longitudinal welding joint. There shall not be any circumferential weld joint.

Galvanization — The poles shall be hot dip galvanized as per IS 4759/BSEN 1461 standards with average coating thickness of 65 micron.

Fixing Type — The octagonal poles shall be bolted on a pre-cast foundation with a set of four foundation bolts for greater rigidity.

Top Mountings — The galvanized arm shall be supplied along with the octagonal poles for installation of the luminaries.

1.05 Highmasts

The High mast shall be of 16/20 mtrs as per BOQ high the vendor shall be capable of every aspects of project design from engineering and manufacturing to construction and installation. The vendor capabilities include in-house engineering team of civil & structural designers quickly provide engineering solution tuned to customers need.

1.06.1 Scope of Work:

The Scope of work is design, manufacture, supply & erection of highmast lighting system.

- Highmast with its accessories.
- Raising lowering mechanism with integral power tool.
- Foundation Bolts
- Light fixtures
- Control Panel
- Construction of Civil foundation
- Erection & Commissioning of Highmast Lighting system.
- Earthing
- Erection of control panel.

1.06.1 Specification of high mast:

HIGHMAST STRUCTURE

a)	Standard Height of Highmast	:	16 Mtr.
b)	Highmast Type	:	Polygonal Continuously Tapered
c)	Material construction	:	BS EN 100025 or equivalent.
d)	No. of Sections	:	1/2/3 as per design
e)	Length of each section	:	Max. 12 Mtr
f)	No. of longitudinal welds /section	:	One
g)	No. of circumferential welds/ section	:	None
h)	Cross section of highmast	:	20 sided polygon
i)	Type of joints.	:	Stress fit at site.
j)	Metal protection treatment for Highmast	:	Hot Dip Galvanized.
k)	Average thickness of galvanisation (as per BSEN ISO 1461)	:	85 Micron.
l)	Earthing arrestor & AOL arrangement:		Mounting at the top.

DYNAMIC LOADING AS PREVAILING AT SITE

a)	Max. wind speed	:	As per IS 875 part 3
b)	Max. gust speed time	:	3 seconds.
c)	Factor of safety for wind load	:	1.25
d)	Factor of safety for other load	:	1.15

FOUNDATION DETAILS

a)	Type of foundation	:	Open raft shallow footing.
b)	Size of foundation	:	As per Design.
c)	Design safety factor	:	As per IS –456
d)	Considered wind pressure (Kg/Mt2)	:	As per IS-875-1987

1.06.2 DETAIL TECHNICAL SPECIFICATION FOR HIGH MAST LIGHTING.

SCOPE:

The scope of this specification covers the manufacture, installation, testing and commissioning of the complete lighting system, using Raising and Lowering type of High mast Towers, including the Civil Foundation Works. The Purchaser shall only provide the supply point and the feeder cable of the required size, up to the bottom of the high mast.

APPLICABLE STANDARDS :
The following shall be the Reference Standards for the design of the High mast system:

Code No.	Title
a) I.S.875 (Part III) 1987.	Code and practice for design loads for Structures.
b) BS EN- 100 025	Grades of Special Steel Plates or equivalent
c) BS. 5135.	Welding.
d) BS.ISO 1461.	Galvanizing.
e) TR. No.7 1996 of ILE, UK.	Specification for Mast and foundation.

HIGHMAST:

Structure:

The High mast shall be of continuously tapered, polygonal cross section, 8-20 sided, fabricated from special steel plates. The mast shall be delivered at site in sections and joined together by slip-stressed-fit method. No site welding or bolted joint shall be done on the mast. The minimum over lap distance shall be 1.5 times the diameter at penetration. The mast shall be provided with fully penetrated and welded flange.

Dynamic Loading for the Mast:

The mast structure shall be suitable to sustain an assumed maximum reaction arising from a wind speed as per IS 875 (three second gust), and shall be measured at a height of 10 metres above ground level. The design life of the mast shall be a minimum of 25 years.

Door Opening :

An adequate door opening shall be provided at the base of the mast to permit clear access to equipment like winches, cables, plug and socket, etc.

Lantern Carriage:

A fabricated Lantern Carriage shall be provided for fixing and holding the required number of flood light fittings and control gear boxes. The entire Lantern Carriage shall be hot dip galvanized after fabrication.

Junction Box.

Weather proof junction box shall be provided on the Carriage Assembly as required, from which the inter-connections of luminaries shall be made.

Winch:

The winch shall be completely self sustaining type, without the need for brake shoe, springs or clutches. The winch shall be self-lubricating type by means of an oil bath. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay, with no chances of rope slippage. It shall be possible to operate the winch manually by a suitable handle and by an integral power tool The driving spindle is positively locked when not in use by means of automatic gravity activated pawls.

Power Tool for the Winch:

A suitable, high-powered, electrically driven, internally mounted power tool, with manual over ride shall be supplied for the raising and lowering of the lantern carriage for maintenance purposes. Each mast shall have its own power tool motor.

Head Frame:
The head frame is designed, as a capping unit of the mast, shall be of welded steel construction, galvanized both internally and externally. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire ropes and the multi-core electric cable. The pulley block shall be made of non-corrodible material, and shall be of die cast Aluminum Alloy (LM-6). Self-lubricating bearings and stainless steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period.

Stainless Steel Wire Ropes :

The two/three wire rope suspension system consist of only non-corrosive ‘marine grade’ (AISI 316) stainless steel wire ropes (7/19 Construction) of suitable diameter. The end constructions of ropes to the winch drum shall be fitted with talurit.

Electrical System, Cable and Cable Connections :

The electrical connections from the bottom to the top shall be made by special trailing cable of reputed make. The cable shall be EPR insulated and PCP sheathed to get flexibility and endurance. The trailing cables shall be terminated by means of specially designed, metal clad, multi pin plug and socket provided in the base compartment to enable easy disconnection when required.

Earthing Terminals & Lighting Finial:

Suitable earth terminal using 12 mm diameter stainless steel bolts shall be provided at a convenient location on the base of the Mast. One number lighting finial shall be provided for each mast.

CONTROL PANEL

Highmast shall be provided with a control panel fabricated out of 14/16 SWG CRCA sheet comprising incoming MCB Isolator, Copper wiring, suitable timer-contactor to switch on the luminaries at a pre-set time and control arrangement for the operation of the power tool-motor.

LUMINAIRES

Luminaries shall be specially designed with suitable lamp housing and control gears for 250/400 W HPSV/MHT Lamps as per the requirement.

Suitable Aviation Obstruction Lights of reputed make shall be provided.

FOUNDATION BOLTS

Manufactured from special steels along with nuts, washers, anchor plate and template.

ANNEXURE - III

2.0 TECHNICAL SPECIFICATIONS FOR PASSENGER-ESCALATORS

This specification defines the objective, guidelines and requirement for the design, manufacture, supply, installation, testing and commissioning of **heavy duty escalators.**

2.0 SCOPE

1.1 This specification covers design, manufacture and supply at site, installation, testing & commissioning of **heavy-duty**, reversible escalator

1.2 The Escalator shall be of State-of-the-art technology, having nominal step width of 1000mm with appropriate numbers of horizontal Steps on top & bottom, with maximum carrying capacity calculated as per EN115-1:2008 of 100 passengers per minute at nominal speed of 0.5 m/sec in normal operation complete with all safety features and shall comply with International Standards EN-115 with latest version.

1.3 Escalators shall be heavy duty, reversible type and capable of operating safely, smoothly and continuously for a period of not less than 20 hours a day, seven (7) days a week with a alternating passenger load reaching 100% of Load (120 kgs per step) for 6 hours and 50% load for the remaining hours, both distributed over two-thirds of the number of steps provided, within the environmental conditions as stated in the specification and at the location where the escalators are to be installed.

1.4 The vertical-height from the Ground-level, at any of the above-mentioned Escalator Installation Points are generally varying between 4.0 meter to 7.0 meter.

1.5 The angle of inclination of escalator shall be 30°/35°(As mentioned in BOQ) and minimum transition radius shall be 2.6 meters at the upper landing and 2.0 meters at the lower landing" as per the requirement of EN 115.

1.6 The purchaser/ user shall furnish the exact information by filling all the entries, as per the format given

1.7 The scope of work shall include but not be limited to the following works:-

a) Provision of escalators for passenger movements.

b) All associated civil works for

i) Providing pits for housing escalator motors etc.

ii) Support for taking load of escalator in the middle of escalator

The Contractor shall interface and co-ordinate with the agency undertaking the associated civil works such as FOB extension. The complete responsibility of interfacing and co-ordination shall be of the contractor till final commissioning and handing over of the escalator.

c) Transportation of material and equipment for installation purpose.

d) Spare parts, special tools, testing and diagnostic equipment and measuring instruments.

e) Training.

f) Documentation

g) Control and monitoring system for Escalators. h) Maintenance for specified period

i) Services

2.0 SYSTEM DETAILS & SCHEMATICS (CONSTRUCTION)

The complete Escalator shall comprise of all parts and accessories, which are necessary for its efficient operation, whether specifically mentioned or not. The key parts and accessories along with their functions and features are listed below:

2.1 Drive Unit

2.1.1 Each Escalator shall be independently driven by a geared type driving machine (or traction machine), comprising mainly of the driving motor, a coupled Gear Box unit (for Speed reduction) and an electrically released & mechanically applied Brake (for stopping the escalator). A VVVF converter shall control the Driving Motor.

2.1.2 Each traction machine shall be mounted within the truss or the machine pit and shall be removable en-bloc from the truss for repair or maintenance.

2.1.3 The escalator's driving machine shall be suitable for operation on 3-phase, 415Volt ±10%, 50Hz ± 3% AC supply and it shall comply with IS: 325/IEC 60 03 4.

2.1.4 The 3-phase Induction Motor shall be totally enclosed with external cooling fins having minimum IP-55 Protection and class F Insulation level.

2.1.5 Sound level of the system shall not be more than 65 dBA at 1 meter from the balustrade. The required acoustic treatment shall be provided as necessary, to meet this requirement.

2.2 Controller

2.2.1 The escalator's motion, travel-direction, speed and stopping etc. shall be controlled by a compact and reliable PLC/microprocessor-based controller that is specifically designed for the escalator operation.

2.2.2 The controller shall be of a proven design and would ensure continuous-operation of the escalator over its Service-Life. The controller shall have microprocessor based diagnostic system with self-checking feature and meant for indicating/ displaying common Faults (that may occur during the escalator's operation) by a fault-code or fault's brief description, on an on-board and easily-visible LED/ LCD based display-unit. This would enable the maintenance' people to pinpoint specific fault(s) and rectify them quite-quickly, thus ensuring minimum downtime of the escalator. The diagnostic system shall be capable of recording at-least 50 latest faults that have caused the escalator to Stop and display them sequentially on last-in first-out basis.

2.2.3 The controller shall have the facility for interfacing (through suitable ports, viz RS-232/ RS-485/ USB/ Ethernet etc.) with a PC based Remote Monitoring system (RMS).

2.3 VVVF Converter

2.3.1 The escalator shall comprise of a VVVF converter (variable speed control), integrated with the escalator controller to control the driving motor. On installation, this shall ensure the escalator's movement & speed control, viz - starting and normal speed of the escalator on detecting the incoming passenger(s) as well as its crawling speed and/or stoppage, in the absence of passengers.

2.3.2 The VVVF Converter shall also control the acceleration/ de-acceleration during the motor starting/ stopping, for reducing/ limiting the starting current and the frictional wear & tear of the brake liner, respectively.

2.4 Truss

2.4.1 The escalator shall be provided with Structural steel truss or girder, which shall be designed to support the Escalator's Dead weight and additionally, the peak passenger-load at escalator's full capacity operation.

2.4.2 The truss design shall also ensure required safety to sustain the Steps and running Gear in operation. In the event of failure of the track system, it shall retain the running gear in its guides.

2.4.3 The construction design of the truss shall be such that it allows for easy inspection of the interiors of the escalator.

1.4.4 Truss should have maximum deflection value of 1 in 1000.

1.4.5 .4.5 Cladding of the truss shall be done with SS 304.

2.4.6 The truss of escalator shall be hot dip galvanized. Other parts inside the truss such

as return station, shaft etc. shall be given suitable anti-corrosive treatment with zinc painting or similar process.

2.5 Balustrade

2.5.1 The escalator shall be provided with a solid inclined balustrade on its each side, having adequate mechanical strength and rigidity.

2.5.2 The Interior and Exterior Panels shall be fixed in a manner to withstand the stresses and impacts expected during operation and use of the escalator at its full capacity. The balustrade height shall be minimum 1000mm or more.

2.5.3 Material of the skirting shall be SS 304 having thickness of 1.5mm

2.6 Hand Rail

2.6.1 The escalator's balustrades top shall be provided with black-colour hand rails made of a special, high-quality and water-repellant synthetic rubber material, having long-durability.

2.6.2 The hand rails shall move in the same direction and at substantially the same speed, as that of the steps.

2.6.3 The handrail drive system shall be provided with guides immediately before and after the drive wheel. The returning portion of the handrail shall be supported by guide rollers at not more than 2 m interval. Adequate provisions shall be provided to maintain proper tensioning throughout the service life of the handrail and prevent tightening/loosening and excessive heating up of the handrail during operation. The temperature rise of the handrail during operation shall not exceed 6ºC above station ambient temperature.

2.6.4 The handrail shall overlap sufficiently with the handrail decking (top deck), to prevent pinching and trapping fingers or hands due to running clearance. The lips at the handrail shall be of sufficient rigidity to prevent the handrail being easily removed from the handrail guides by a force of 300 N.

2.6.5 The material of hand rail guide shall be SS 304.

2.7 Step Tread

2.7.1 The escalator Steps shall be made of corrosion-proof Casting-grade Aluminum Alloy, having sufficient mechanical strength and good construction to fully satisfy the intended purpose of their use; that-is, carrying the peak load of passengers without distortion.

2.7.2 Each step shall be supported on four wheels, two of which shall be the step chain,- wheels and shall be capable of carrying the basic load with the safety factor as per 2.7.3. Individual step loading shall be assumed as 6000N/m². The design of the mounting of all wheels on the step shall ensure that the centre

line of the wheel shall remain perpendicular to the running track under all the load conditions. Step dimension shall have a tread width of at least 400 mm deep and not more than 210 mm high.

2.7.3 Safety factors used in the design shall, as a minimum, conform to the following, As per EN 115-1:2008 (as applicable for Public Service Escalators),

- For all driving elements viz. shafts, gear wheels, driving gear chains - 5.
- Step Chains –
5.
- Any other item (if not specified elsewhere) – As per BS EN 115-1:2008 (as applicable for Public Service Escalators).

2.7.4 The step shall be one piece, pressure die cast, high wear and corrosion resistant aluminum alloy. The step casting shall bear a marking, which clearly indicates the month and the year of manufacture.

2.7.5 The step shall be type tested according to EN 115 (Latest version).

2.7.6 The tread surface of each Step shall be slotted in parallel-direction to the travel of the Steps.

2.8 Main and Step Chains

The drive unit shall be connected to the main chain wheel (attached to the main shaft) with a duplex chain. The Main Shaft shall further drive the Step Chain Bands. The Step Chain Band shall be of endless roller type located on both sides of the moving steps and having step chain strength value of 260kN or more. Each Step Chain shall be provided with an integrated Tension Device to ensure its proper tension under varying load conditions.

2.9 Automatic Lubrication Device

The escalator shall comprise of an in-built automatic lubrication device, to lubricate the main driving-chain and step-chain automatically, which can ensure their smooth-operation for a long period and thus shorten the maintenance downtime.

2.10 Comb Plate

The escalator comb plates in the entrance/ exit areas must have easily replaceable comb segments, having teeth that interlock deep into the steps. All comb segments must be identical & easily inter-changeable. In the event of some foreign body's penetration into the comb segments, safety contacts must bring the escalator to a halt. To activate the safety contacts, the comb plate must be able to slide horizontally.

2.11 Landing Plate

The landing plate of the escalator meant to provide a secure foothold, must be preferably made of etched Stainless Steel ASTM - SS316 grade and shall have an Anti-slip Pattern.

2.12 Key Operated Start Function

The escalator operation shall be started/ switched-off by a special key provided along with the escalator.

2.13 Traffic Direction Light

The escalator shall have traffic direction light of distinct color at highly-visible location(s) near the escalator, to indicate the direction of its movement to the approaching passengers and thus, prevent their wrong-way Entry.

2.14 Electrical Works / Items

2.14.1 All electrical works and switch gear for the escalator installation shall conform to the Indian Electricity Rules 1956 (with latest amendments).

2.14.2 All power cables and wiring shall be fire resistant low smoke copper cables of 1.1 kV grade conforming to IS:694 and IS:1554. No bare Conductor shall be used in any Escalator as it may cause electrocution danger to the personnel.

2.14.3 The control switchgear must be mounted in sealed enclosure corresponding to IP-55 protection.

2.14.4 All screws, nuts, fasteners and washers shall be of stainless steel

2.15 Grease/ Oil/ Dirt and Water (separate) Collector & Drainage Sumps

Separate collector & drainage sumps for loose/ falling/ accumulated - grease/ oil/ dirt and water shall be provided in the escalator, at its lower return station, to ensure the escalator's cleanliness w.r.t. these elements and thus, preventing the happening of any likely hazard due to them.

2.16 General Arrangement/ Layout Diagram

As part of the "Technical Information Document", each Bidder would be required to submit their detailed general arrangement/ layout diagram, which shall include the following essential details:-

a. Vertical rise

b. Horizontal span length

c. Step width

d. Handrail center distance

e. Width of escalator

f. Width of end opening &

Pit g. Width of opening

h. Maximum Inclined span length without Intermediate Support.

2.16.1 Design

The design shall meet the following criteria: -

a) Application of state of the art technology b) Service proven design

c) Design life 30 years

d) Minimum life cycle cost e) Low maintenance cost

f) Use of interchangeable, modular components

g) Extensive and prominent labeling of parts, cable and wires h) Use of unique serial numbers for traceability of components i) High reliability

j) Less energy consumption

k) System safety

l) Adequate redundancy and factor of safety

m) Fire and smoke protection

n) Use of fire retardant materials

o) Environment friendly

p) Adherence to operational performance requirements

q) Maximum utilization of indigenous materials and skills, subject to quality conformity

r) Safety against garments such as Saree and loose cloths etc.

3.0 SYSTEM OPERATING CONDITIONS

3.1 The escalator shall be able to make-use & operate at the below mentioned power supply conditions. :-

a) For power supply: AC 3-phase, 415Volts ± 10% 50Hz ± 3%.

b) For lighting supply: AC Single-phase, 220Volts ± 10% 50Hz ± 3%.

5.0 GOVERNING SPECIFICATIONS

The escalator shall generally comply with the following Standards:-

- EN-115: safety rules for construction and Installation of escalators and passenger conveyers.
- IS-4591: Code of practice for installation and maintenance of escalators.

Note: Latest version of the above standards shall be applicable.

8.0 Other Key Technical Information related to Escalator, to be supplied by Each Bidder, along with their Offer: -

SN	Feature	Details
1.	Escalator manufacturer	
2.	Escalator brand name	
3.	Escalator model number	
4.	Overall dimension	
5.	Sound level	
6.	Drive unit arrangement	
7.	Type of motor	
8.	Motor rating	
9.	Class of insulation of motor	
10.	Protection class of motor	
11.	Gear type & material	
12.	Coupling type & material	
13.	Main drive chain's material & breaking strength	
14.	Step chain/ band's Material & breaking strength	
15.	Controller - make/ model	
16.	VVVF converter - make/ model	
17.	Truss structural material	
18.	Truss surface treatment	
19.	Truss construction details	
20.	Lubrication mechanism – Type/ Model	
21.	Details of brake mechanism	
22.	Details of intermediate support to inclined span length, if any	

9.0. SAFETY DEVICES/ FEATURES REQUIRED

9.1 Operating and Safety Devices

Operating and safety devices conforming to the following requirements shall be provided: -

9.1.1 Motor Overload & Thermal Protection Device

a) The driving motor shall be protected against excessive current due to either overloading or short-circuiting by means of a suitable device to be submitted for review without objection by the "Engineer". Such protective devices shall be provided for each phase of the motor winding. After the intervention of this safety device, the power supply to the motor shall be disconnected and it shall only be possible for a competent person to reset it back to its normal working condition.

b) If the detection of excessive current depends upon a temperature increase in the motor winding, such a device may be automatically reset after the fault is removed and the winding cooled down sufficiently, but shall not restart the escalator automatically.

c) Built in type thermal protection, if offered, shall conform to EN 115-1:2008.

9.1.2 Starting switch

Spring return key operated starting switch with running directions marked on the faceplate shall be provided at both ends of the escalator. These switches shall be positioned to enable the operator, when using the key to start the escalator, to see the entire escalator. The key shall be removable only in the neutral position.

9.1.3 Service Stop Switch

Service switches shall be provided within the machinery spaces at both ends of the escalator. The switches shall be conspicuously and permanently marked and located such that switching can be accomplished without passing or reaching over any part of the machinery. The operation of these switches shall disconnect electrical power to the controller and the drive mechanism and shall activate the brakes. The switch shall be rated to interrupt the starting current of the motor and the fuses shall be rated for the available fault current at the switch. Inspection run shall also be prohibited.

9.1.4 Emergency Stop Switch

Recessed type, momentary pressure, emergency push button stop switches with extended sleeve to protect against accidental operation shall be provided on each escalator. A minimum of one switch shall be located in conspicuous and accessible positions at the incline section or at the newel at both ends of the escalator. The switch provided at the incline portion shall have protection from the dust ingress. The distance between the switches shall not exceed 15 m for the escalators, otherwise, additional switches shall be provided. The operation of these switches shall disconnect electrical power to the drive mechanism and activate the brakes(s). It shall not be possible to start the drive mechanism by the use of these switches. Proper signage shall be displayed so that the location of the switch can be easily identified.

9.1.5 Speed Governor

Speed governor shall be provided which disconnects electrical power to the drive mechanism and activates the brake, should the speed of the steps exceed the rated speed by more than 20%.

The speed governor is not required in cases where alternating current induction driving motors are used, provided the slip does not exceed 10% and the motor is directly connected to the drive mechanism.

9.1.6 Broken step chain safety device

Devices shall be incorporated as part of each tension carriage which shall disconnect electrical power to the drive mechanism and activate the brake if the step chain breaks or if the tension on either chain drops below (or exceeds) a predetermined value, or if the motion of a chain is interrupted.

9.1.7 Broken drive device

Where the drive mechanism is connected to the main drive shaft by chains, a device shall be provided which will disconnect electrical power to the drive mechanism and shall activate both the operational brake, and the additional brake in the event if the driving chains fail or excess sagging.

9.1.8 Non Reversing Device

A device shall be incorporated to detect reversal from the pre-set direction of motion and activate the operational and auxiliary brakes to stop the escalators.

9.1.9 Handrail Finger Guard Safety Device

Detection device shall be provided at points where the handrails enter the escalator newels. These devices shall disconnect electrical power to the drive mechanism and activate the brake in the event of an object entering the gap between the handrail and newel.

9.1.10 Step and Skirt Safety Devices

Detection devices shall be provided in escalator skirting panels in close proximity to the upper and lower comb plate tips, on the track system at the upper and lower curves and at 7.5 m intervals along the incline of each escalator. Electrical power to the drive mechanism shall be disconnected and the brake(s) applied should any one of these devices be activated due to the skirt panels being forced away from the steps.

9.1.11 Comb plate safety device

Safety devices shall be incorporated at both sides on the comb plates at each landing, which shall disconnect electrical power to the drive mechanism and activate the brake should any object become wedged between the comb and the step. The device shall be able to operate in the horizontal and vertical direction.

9.1.12 Step Lowering Device

Devices shall be provided which will disconnect electrical power to the drive mechanism and activate the brake, should a step be lowered due to excessive load or breakage. The detection shall be effective at the left, centre and right side of the step. The device shall be located near the top and bottom curves for the escalators. These shall be located such that the lowered steps stop in front of the comb in order to prevent further damage.

9.1.13 Inspection Control

Inspection control complying with BS EN115 shall be provided at both landings.

9.1.14 Missing step detection device

Detection devices shall be provided to stop the escalator before the missing step opening appears on the passenger side of the escalator.

9.1.15 Handrail Speed Detection Device

Each handrail shall be fitted with a device, which shall stop the escalator when the handrail speed exceeds ±30% of the rated speed.

9.1.16 Broken Handrail Device

Each handrail shall be equipped with a mechanically operated electrical safety devices of approved design to detect undue tension, excessive elongation and handrail failure.

9.1.17 Floor plate safety device

Safety switches of approved design shall be provided underneath each hinged floor plate at both the upper and lower landings. The escalator shall stop when the floor plate is opened unless under maintenance / inspection

mode.

9.1.18 Step up-thrust device

Safety device of approved design shall be provided at the upper and lower landings to stop the escalator should a step be lifted or displaced against the "up-thrust" track at the transition curve from incline to horizontal in the passenger carrying side of the track system.

9.1.19 Dress Guard

Brush type deflector device shall be provided along the step nose line on the skirt panel to keep feet and loose clothing clear of the possible trapping point and safety against garments such as Saree and loose cloths etc. The brush bristles shall be made of fire resistant nylon filaments with split ends to give a soft face.

9.1.20 Brake Lining Safety switch

Details of safety device shall be submitted for design review without objection by the purchaser and same shall be provided at each shoe of the machine brake to monitor the lining thickness and to detect any abnormal or uneven wear of brake lining.

9.1.21 Phase Protection Device

A phase protection device shall be provided in the controller to prevent setting in motion or to stop the escalator in the event of phase failure or phase sequence reversal of the power supply. An illuminated visual indicator shall be provided on the control cubicle/controller to signify actuation of this device due to phase failure or phase sequence fault. The indicator shall remain illuminated until the fault is rectified.

9.1.22 Earth leakage protective device

An earth leakage protective device or residual current device to be submitted for review by the "Engineer" shall be provided such that any dangerous earth leakage to the escalator metalwork shall cause the immediate stopping of the driving machine and disconnection of the power supply/controller. The return

to service shall not be possible, except if it is reset manually by a competent person.

9.2 Monitoring and Fault Diagnostic System

A microprocessor based monitoring and fault diagnostic system to provide information on the operation; identification and display of all faults that have caused the escalator stop including emergency stops shall be provided. The system shall be able to record at least 50 events in their order of occurrence and display them sequentially in a last in first out sequence.

An alpha – numeric display unit indicating the fault code or fault message shall be installed at an easily accessible and protected location on the handrail decking at both the landings.

The display of the last fault can only be reset after the fault causing the stop is cleared but the historical record shall remain in the microprocessor.

Faults that do not require the attendance of the maintenance staff shall be easily identified to enable the operator to re-set and re-start the escalator.

The system shall capture, display and retain the following information:-

a) Record number
b) Fault/ status code/ alphanumeric display
c) Date
d) Time at which fault started
e) Time at which fault cleared
f) Direction of operation with starting time
g) Total operation hours with break down for "UP" and "DOWN"operations.

A LED/ LCD display panel and means for programming the system shall be provided at the controller.

In addition, serial interface output ports shall be provided at the controller to allow the system to be connected to a notebook computer for down loading the historical data for trend analysis. Suitable compatible driver software has to be provided to download data for analysis and presentation by Microsoft office.

The summarized critical safety features are detailed as under:-

SN	Safety devices/ features required	Description
1.	Emergency stop device	In an emergency, it stops escalator immediately, if pressed
2.	Comb plate safety device	It stops escalator, if objects are caught between comb plate and step treads
3.	Handrail entry safety device	It stops escalator, if human-finger or any Foreign-object is pulled into the hand-Rail entry/Inlet
4.	Phase monitoring device	It stops escalator, if there is a missing phase or a wrong phase sequence
5.	Over-speed detector	It stops escalator, if the movement is above the normal speed
6.	Non-reversal safety device	It stops escalator, if the direction of movement is suddenly reversed

7.	Main driving chain safety device	It stops escalator, if the main driving chain loosens excessively or breaks
8.	Step chain safety device	It stops escalator, if the step chain breaks or becomes excessively loose
9.	Step sag protection device	It stops escalator, if the Steps start sagging after getting fractured or otherwise
10.	Static electricity prevention device	Eliminates static electricity created by running of the escalator steps &/or hand rails
11.	Skirting panel safety device	It stops escalator, if objects are caught between any step and skirting Panel
12.	Skirting panel safety brush (special heavy duty)	It prevents stray objects, clothes such as saree and chuuni etc. being caught between Step and Skirting Panel
13.	Step's three-sides yellow demarcation lines	It demarcates the two horizontal-ends and one inner end of the steps and the safe foot-hold area for passengers
14.	Step gap green illumination	The green light illuminates the riding edge of the steps from below, ensuring safe ride of passengers
15.	Comb plate light	The lights at skirting level on both sides of the comb plate ensure safe ride of passengers
16.	Hand Rail broken safety device	It stops escalator, if hand rail stops or breaks
17.	Hand rail speed detection device	It stops escalator, if handrail movement is above/ below the normal speed

SN	Safety devices/ features required	Description
18.	Auxiliary brake	It stops escalator, if the Driving Chain breaks &/ or escalator over-speeds
19.	Motor overload & overheat Protection	It stops escalator, when the motor current /temperature is exceeded abnormally
20.	Brake monitoring device	It stops escalator, before a brake-fail situation can occur (due to excess brake lining wear)
21.	Step missing device	It stops escalator, if the Step is missing
22.	"START" Buzzer device	It alerts the passengers when escalator starts working/ moving
23.	"WRONG-ENTRY" alarm device	It alerts the passengers, if they approach to enter the escalator from a Wrong entry-point/ opposite- direction to its movement-direction, by sounding the warning-buzzer and beginning the escalator movement in its pre-set, correct direction.
24.	"AUTO-START" on passenger-approach device	It ensures the stopped-escalator to start operating/ moving after detecting the approaching passengers by a 3-D scan.
25.	Oil-water separator & drainage system	It ensures separate collection & disposal of the loose/ falling oil/ grease and accumulated water and thus preventing a potential hazard.
26	Design of earth system	As per IS 3043:1987

Note: Each bidder must submit their compliance or deviations in a "Compliance Statement", as well as, the specific details related to their escalator-design, against each safety device/ feature mentioned above.

10.0 GENERAL REQUIREMENT

10.1 The complete escalator system shall be reliable and conform to the latest version of the International/ EN-115 and National/ IS-4591 standards.

10.2 All materials used in manufacturing the escalator, shall be fire-retardant and not easy to ignite.

10.3 All power devices and electro-mechanical units including the drive unit, controller, and converter etc. to be used in the escalator shall be suitable for a heavy-duty application of a Public Service escalator as per above Standards.

10.4 All mechanically moving parts of the escalator shall be completely enclosed within imperforate panels or walls, except the accessible Step treads, part of hand Rail and permitted apertures for ventilation.

10.5 The balustrades shall not have any parts that would tempt/ allow any person to stand on the same. The balustrades interior panels shall be smooth and shall not have any protruding part or sharp edged covering strips etc.

10.6 The balustrades design & construction shall provide for adequate mechanical strength and rigidity, such that the vertical force distributed over the Handrail surface/ length shall not be able to cause any permanent deformation, breakage or displacement of any balustrade part(s) as per the provisions of the standard EN-115 clause 5.1.5.3 meant for this purpose.

10.7 At the landings of the escalator, a sufficient unobstructed area shall be available to accommodate the passengers. Similarly a clear height of minimum 2.30m or more shall be available above the Steps of the escalator at all points. As per the provisions of the standard EN-115 clause 5.2.1 meant for this purpose.

10.8 All of the escalator's equipment, structures and other metallic parts shall be suitably earthed as per the standard practice conforming to IS: 3043.

11.0 ELECTROMAGNETIC COMPATIBILITY REQUIREMENTS (EMC)

The contractor shall ensure that the critical equipment supplied, i.e. VVVF converter shall cause minimum radio frequency Interference into main network and comply with the electromagnetic compatibility (EMC) requirements of the EN-115 Standards. The Contractor should furnish any independent/ reputed/ national test agency/ lab's certification in this regard.

12.0 ESCALATOR INSTALLATION AND FINAL ACCEPTANCE INSPECTION/ TESTING

12.1 After installation, the escalator shall be tested by the Contractor , in the presence of the purchaser's representative/ inspection agency/ testing authority . Following tests shall be conducted:-

a. Each installed escalator shall be subject to the final acceptance inspection/ testing to prove the functionality of the escalator in terms of its movement, control and safety. This shall include testing of the escalator's over-speed, in order to ensure the soundness of the equipment and its installation.

b. Each installed escalator shall be subject to the weight test including verification of its Braking distance.

c. Each installed escalator shall be subject to the final visual Inspection including the check for satisfactory workmanship and shall cover all connections, paintings and general cleanliness of the installation as a whole.

d. After satisfactory completion of above inspection/ testing, the purchaser's representative/ inspection agency/ testing authority –will authorize the commissioning of the escalators for public use by issuing the "Escalator installation final acceptance certificate".

13.0 WITHDRAWAL OF APPROVAL

Approval granted to the Contractor is liable to be withdrawn in the event of noticing any major change at a later date in the design or major change from the Bill of material as approved earlier without seeking the Prototype approving authority i.e. Production Units'/ HSCC approval or using any major Sub-assembly of inferior specification/ quality, thus compromising with the reliability.

14.0 LIGHTING

14.1 The escalator and its surrounding area shall be sufficiently and adequately illuminated , especially in the vicinity of the comb to ensure safe and comfort ride of passengers.

14.2 The escalator interior shall also have adequate and permanent electric lighting installations; especially, driving & return stations and machine rooms inside the truss.

14.3 Light intensity on tread surface shall be minimum 20 lux or more as per IS 4591.

14.4 The electric lighting installation and the socket outlets shall be independent of the power supply to the machine being fed by a separate cable from the main switch as per the provisions of the standard EN-115 clause 6.3.2 meant for this purpose.

14.5 LED based emergency light having minimum 20 lux at ground surface shall be provided at Entrance, Exit and middle points of the escalator with UPS system having back up of at least half-an-hour.

15.0 ACCESSIBILITY

15.1 The escalator design shall allow easy & safe accessibility on both sides, to authorized persons for Inspection, maintenance & repairs.

15.2 Driving & return stations, machinery spaces inside the truss and also separate machinery spaces, shall not be accessible to unauthorized persons. Hence, lockable Inspection & trap doors shall be provided.

16.0 MOVEMENT OF MATERIAL

16.1 Completely assembled escalator or its sub-assemblies (which cannot be handled by hand), shall be:-

a. Equipped with fittings for being lifted/ moved by a lifting device, or

b. Designed in a way, to allow the attachment of above type fittings, e.g., threaded holes, or

c. Designed/ shaped in a way, to allow easy attachment to the lifting device or transportation means.

17.0 INSTALLATION & COMMISSIONING

17.1 All works at the installation site shall be carried out in accordance with the standard acceptable methods and practices of installation of escalators and electrical equipment.

17.2 All equipment, sub-assemblies, structures, truss etc. shall be installed as per their respective sub-contractor's installation instructions.

17.3 Special care shall be taken of leveling/ plumbing, which shall be done meticulously before any equipment, sub-assembly or structure is fixed finally in position.

17.4 Adequate care shall also be taken during installation of the complete Escalator to avoid damage to any equipment, sub-assembly or building structure.

17.5 ConTractor will be responsible for major civil work needed for installation and commissioning of escalator at designated platform. The Contractor shall be responsible for providing 4 horizontal steps at top and bottom landing. The Contractor will provide a terminal board near escalator and contractor will provide electrical wiring/connection upto this terminal board. Contractor will provide site assembly area with proper power connection as per the extant rules.

18.0 LABELING AND MARKING

18.1 All equipment & apparatus, inside or outside the switchboard, including instruments, meters & relays shall be labeled or marked adequately.

18.2 In addition, warning labels shall be fitted at all points, where the removal of covers/ panels may expose live equipment, operating above 50V between circuits or to earth and shall bear the inscription 'Danger- Live Parts' in red color that is clearly visible from a viewable distance.

19.0 PACKING, SHIPPING AND DELIVERY

19.1 All equipment shall be properly inspected before the Shipment. An inspection tag bearing the word "INSPECTED" or "PASSED" giving details of the inspection date etc. shall be attached to the Packaged Consignment. All four sides of the packaged consignment shall contain details of the Consignee & Consignor.

19.2 Appropriate caution notices such as "Fragile" or "Handle with care" etc shall be displayed on the out side surface of the boxes, crates and packages.

19.3 The Contractor shall be responsible for the safe transportation and delivery of materials to the location, as specified by the purchaser.

20.0 ON-SITE SUPPORT TO CONTRACTOR

20.0 WARRANTY

20.1 The Contractor shall be responsible for carrying out all the modifications at his cost on any part of the equipment during the period of warranty required for satisfactory operation of the equipment as per technical specification. For any technical decision the final authority is HSCC.

20.2 All the replacements and repairs, that the purchaser shall call upon, the Contractor to deliver or perform under this warranty shall be delivered and performed by the Contractor promptly and satisfactory.

20.3 The warranty period would cover comprehensive maintenance inclusive of all spares, material and labour cost.

20.4 During warranty period, in case the escalators become non-functional due to any manufacturing defect, then the escalator would be considered under breakdown and the Contractor would be required to rectify the defects.

20.5 The consignee shall ensure that the records of breakdown are maintained on a shift basis.

20.6 The Contractor shall ensure that in case a failure is reported by a consignee, qualified Service Engineers shall visit the site within 12 hours from the time of complaint. This period of 12 hours after the failure report shall be treated as grace period, which will not count towards breakdown time. Complaints shall be lodged by consignee by fax, phone, e-mail or per bearer at address given by the Contractor

21.0 MAINTENANCE

21.1 The Contractor shall provide free-of-charge, maintenance service (and all the works specified) including required spares, for the specified warranty period.

21.2 During the guarantee period, the above maintenance service shall include all preventive, scheduled & corrective maintenance and additionally, all service-request calls made by the purchaser/ user .

21.3 For this, the Contractor would be required to provide a comprehensive maintenance & service plan, for review and acceptance by the purchaser or his authorized representative.

21.4 Deleted

21.5 The maintenance work-system shall ensure safety of the personnel & eq uipment.

21.6 In the event of any failure, requiring design modifications etc. in the

escalator, the Contractor shall undertake to submit its details for a review by the Purchaser or its authorized representative. On reaching consensus and post- modification,the Contractor shall undertake fresh
testingand re-commissioning, if required.

21.7 It shall be possible to change the Steps without dismantling the Internal Panels or the Skirt of the escalator, to ensure minimum down time during maintenance and repairs of the escalator.

22.0 TRAINING PROGRAM

The Contractor shall design a training program on the correct operations and basic maintenance procedures of the escalator, for the purchaser's authorized/ designated personnel.

The training program shall be conducted at a convenient time and place, and shall touch all the relevant areas.

22.1 Operators Training

The Contractor shall provide the necessary Operators Training to the Purchaser's authorized/ designated Staff as per the formal Training Program designed for this purpose. This shall enable them to carry out the normal/ rescue operations under normal/ emergency situations respectively as well as minor repairs by themselves.

22.2 Maintenance Training

The Contractor shall provide the necessary maintenance training to the purchaser's authorized/ designated Staff as per the formal Training program designed for this purpose. This shall enable them to perform Minor & non-specialized maintenance of the escalators.

23.0 OPERATION AND MAINTENANCE MANUALS

23.1 The Contractor shall provide operations and maintenance manuals, for the use by the supervisory, operating and technical staffs of the purchaser.

23.2 Each manual shall be divided into indexed sections explaining the subject matter in logical steps.

23.3 The operations manual shall contain the principle and operations' details of the complete escalator; under the normal and emergency conditions.

23.4 Details of the common faults that might occur in the complete escalator &/or any of its key components/ sub-assemblies and their rectification shall also be included.

23.5 The maintenance manual shall contain the maintenance and servicing instructions for the complete escalators along with explanatory notes and drawings as necessary.

23.6 The periodic maintenance schedule recommended by the Contractor for the satisfactory performance of the escalators shall also be included.