Annexure B – Corrigendum

Tender No - : Annexure A- Gem Bid Number GEM/2024/B/4485836 and CDACP/NSM-DATACENTRE-PATNA/23-24/396

Sr. No	Reference	Tender Description	Corrigendum
A		**Tender Schedule**	
1	Last date of submission of bids	14-02-2024 15:00:00	**21-02-2024 15:00:00**
2	Date of opening of Technical bids	14-02-2024 15:30:00	**21-02-2024 15:30:00**
B		**Eligibility**	
		Section-II / Pg- 6 of 88 / Clause – 3.3, Eligibility Criteria	The bidder must have successfully executed at end client sites at least 1 number of datacentre in India **in last Five years** "
C		**Technical Specifications / Features**	
1	**Drawings**	All drawings	**All revised Drawing are listed below.** 1. Building Layout Ground Floor-Existing and New Requirment-R2 2. DC Layout -R2 3. All Sections -R2 4. Electrical SLD-R2

2	**Clause No 8.2 Page no 36**	DX Based In Row Unit- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet, inlet filter, EC fans, Inverter Scroll Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Condensate pump, humidifier, Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In row-based solution improves energy efficiency and cooling ability. Direct Expansion (DX) InRow unit draws air directly from the hot aisle, allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. Each Cooling unit should have net sensible cooling capacity of minimum 20 kW based on the returning air condition of 38°C +/- 2 Deg C dry bulb, defined Relative Humidity and 21°C +/- 2 Deg. C. dry bulb supply air temperature and each in row unit should deliver minimum CMH of 5500 . Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and minimum power cost. The system should remain in operation in case fan replacement is required. Cooling system should come with monitoring and control panel. Supply cooling temperature to be maintained at 21°C or lower with an accuracy of ±2°C. at site ambient conditions.	DX Based In Row Unit- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet, inlet filter, EC fans, Inverter Scroll Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Condensate pump, humidifier, Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In row-based solution improves energy efficiency and cooling ability. Direct Expansion (DX) InRow unit draws air directly from the hot aisle, allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. Each Cooling unit should have net sensible cooling capacity of minimum 20 kW based on the returning air condition of 38°C +/- 2 Deg C dry bulb, defined Relative Humidity and 21°C +/- 2 Deg. C. dry bulb supply air temperature and each in row unit should deliver minimum CMH of 4800 . Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and minimum power cost. The system should remain in operation in case fan replacement is required. Cooling system should come with monitoring and control panel. Supply cooling temperature to be maintained at 21°C or lower with an accuracy of ±2°C. at site ambient conditions.

3	**Clause No 8.2.8 Page no 38**	The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards.. Fans needs to be easily replaceable while the unit is in operation.	The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 30% to 100%. Each fan assembly shall consist of integral fan finger guards.. Fans needs to be easily replaceable while the unit is in operation.

4	**Clause No 7.2 Page no 24**	Design, Supply, installation, testing and commissioning of all LT panels. Panels will be as per IEC 61439. Panels feeders should have rated capacity of Load manager with RS 485 communication port. This should compactable for BMS system to know the energy consumption. Bidder to submit License certificate of LT panels as per IEC 61439. Selection of switchgear should be as per IEC 60947. All the panels should be with Transient Voltage Surge Suppressor (TVSS). For selecting the source fault level bidder to consider value of transient reactance (Xd') as per IS -1180 for transformer rating and sub transient reactance (Xd") for alternator output at common bus at synchronization panel as per ISO 8528 Part 1 to 10. Typical Electrical SLD drawing along with Panel, UPS and Battery room layout drawing is provided for minimum requirement. The switchboard shall be totally enclosed, metal clad, sheet steel fabricated, compartmentalized, dead front type, dust and vermin-proof, freestanding, floor mounting type. It shall be of unit construction suitable for splitting into sections for shipping to site and to be correctly re-erected on prepared foundations without skilled supervision. The individual shipping section length shall not preferably exceed 2 metres. End busbar fishplates shall be provided. The switchgear shall be easily extensible on either side by the addition of vertical sections. The switchboard shall be fabricated preferably from cold rolled sheet steel of minimum thickness 14/16 gauge. The height of the switchboard shall be constant throughout its length, Adequate lifting facilities such as hooks for ease of handling on site shall be provided. These hooks when removed shall not leave any openings in the switchgear. Front access shall be available to all components in each cubicle, which require adjustment, maintenance or replacement. Checking and removal of components shall be possible without disturbing adjacent equipment. All auxiliary equipment shall be easily accessible. Setting of relays shall be possible without de-energizing other equipment. Each unit of switchgear shall have necessary interior barriers to form separate compartments for buses, switching devices entering cable connection etc. All barriers shall be manufactured from non-inflammable material, preferably of sheet steel. The arrangement of the feeders shall ensure that operating handle of the switch / breaker shall be above 300 mm but below 1800 mm from ground level. Horizontal busbar chambers shall be at the top of the board. Busbars shall be completely shrouded to prevent metal pieces falling on the busbar during maintenance. The busbars shall be of aluminium with continuous rating as given in the SLD. All busbars and their main current carrying connections shall have preferably the same sectional area throughout their length. The busbars shall be colour coded. The busbar sizes shall be	Design, Supply, installation, testing and commissioning of all LT panels. Panels will be as CPRI approved. Panels feeders should have rated capacity of Load manager with RS 485 communication port. This should compactable for BMS system to know the energy consumption.. Selection of switchgear should be as per IEC 60947. All the panels should be with Transient Voltage Surge Suppressor (TVSS). Typical Electrical SLD drawing along with Panel, UPS and Battery room layout drawing is provided for minimum requirement. The switchboard shall be totally enclosed, metal clad, sheet steel fabricated, compartmentalized, dead front type, dust and vermin-proof, freestanding, floor mounting type. It shall be of unit construction suitable for splitting into sections for shipping to site and to be correctly re-erected on prepared foundations without skilled supervision. The individual shipping section length shall not preferably exceed 2 metres. End busbar fishplates shall be provided. The switchgear shall be easily extensible on either side by the addition of vertical sections. The switchboard shall be fabricated preferably from cold rolled sheet steel of minimum thickness 14/16 gauge. The height of the switchboard shall be constant throughout its length, Adequate lifting facilities such as hooks for ease of handling on site shall be provided. These hooks when removed shall not leave any openings in the switchgear. Front access shall be available to all components in each cubicle, which require adjustment, maintenance or replacement. Checking and removal of components shall be possible without disturbing adjacent equipment. All auxiliary equipment shall be easily accessible. Setting of relays shall be possible without de-energizing other equipment. Each unit of switchgear shall have necessary interior barriers to form separate compartments for buses, switching devices entering cable connection etc. All barriers shall be manufactured from non-inflammable material, preferably of sheet steel. The arrangement of the feeders shall ensure that operating handle of the switch / breaker shall be above 300 mm but below 1800 mm from ground level. Horizontal busbar chambers shall be at the top of the board. Busbars shall be completely shrouded to prevent metal pieces falling on the busbar during maintenance. The busbars shall be of aluminium with continuous rating as given in the SLD. All busbars and their main current carrying connections shall have preferably the same sectional area throughout their length. The busbars shall be colour coded. The busbar sizes shall be determined taking into consideration the continuous rating without exceeding the final temperature of 45 Deg. C over maximum ambient temperature and the fault level specified. The busbars shall be supported by insulators on non-carbonizing material resistant to acid and alkali and having non-hygroscopic

		determined taking into consideration the continuous rating without exceeding the final temperature of 45 Deg. C over maximum ambient temperature and the fault level specified. The busbars shall be supported by insulators on non-carbonizing material resistant to acid and alkali and having non-hygroscopic characteristics and braced to withstand the fault level specified. Two earth terminals shall be provided on each switch cubicle, at the back, near the floor. An earth bar of at least 25 x 6 mm GI shall be fixed to these terminals. The earth bar shall be electrically continuous and shall run the full extent of each board. Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and earth terminals of the unit. Suitable holes with bolts and lugs shall be provided at each end of earth bar of switchgear for connection to a main earthing grid of 25 x 6 mm GI bus. The earth bar shall be accessible in each cable entering compartment either directly or through a branch extension to ground the cable armour and shields. Any unused circuit breaker compartment shall be fully equipped and provided with compartment door, vertical bus bars and control terminals / wiring, etc., such that the same could be used for housing outgoing breakers in future without any modifications to the panel. The arrangement of feeders in the switchboard shall take into consideration the number and size of cables required for the feeders. For all electrical circuit breakers anti-pumping device shall be incorporated.	characteristics and braced to withstand the fault level specified. Two earth terminals shall be provided on each switch cubicle, at the back, near the floor. An earth bar of at least 25 x 6 mm GI shall be fixed to these terminals. The earth bar shall be electrically continuous and shall run the full extent of each board. Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and earth terminals of the unit. Suitable holes with bolts and lugs shall be provided at each end of earth bar of switchgear for connection to a main earthing grid of 25 x 6 mm GI bus. The earth bar shall be accessible in each cable entering compartment either directly or through a branch extension to ground the cable armour and shields. Any unused circuit breaker compartment shall be fully equipped and provided with compartment door, vertical bus bars and control terminals / wiring, etc., such that the same could be used for housing outgoing breakers in future without any modifications to the panel. The arrangement of feeders in the switchboard shall take into consideration the number and size of cables required for the feeders. Auxiliary contactor or relay shall be used to multiply contacts.
5	**Clause No 9.3.9 Page no 49**	The BMS system should allows for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to: HVAC equipment – Generators. UPS and Battery system LV metering and equipment. Fire Alarm Systems. Water Leak detection System. Lighting Control Rodent Repellent System Vesda System All Sensors Etc.	The BMS system should allow for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to: HVAC equipment – Monitor, Control, Integration, Alarm UPS and Battery system - Monitor, Control, Integration, Alarm LV metering and equipment. Monitor Fire Alarm Systems. Monitor, Control, Integration, Alarm Water Leak detection System. Monitor, Integration, Alarm Rodent Repellent System - Monitor, Integration, Alarm Vesda System- Monitor, Integration, Alarm All Sensors -Integrated Temperature and Rh Sensor- Monitor, Integration, Alarm Etc.

6	**New Clause 6.14 page no 24**	New Clause -6.14	1. At present in Server room and UPS room NON fire rated false ceiling is installed . Bidder to consider removal of this false ceiling , place at identified location given by IIT Patna in the campus and handover to IIT Patna Team . 2. At present in server room and in UPS room existing AC unit is installed . IIT Patna will remove the same . 3. At present in server room as well as in UPS room water based sprinkler system is installed . IIT Patna will remove the sprinkler and will plug the opening. 4. At present in server room as well as in UPS room smoke detectors are installed . IIT Patna will remove the same along with fire cable. 5. At present in the server room and UPS room light fitting along with switches are installed , IIT Patna will remove the same along with wires, switches and light fitting. 6. At present in the server room and UPS room and in BMS room switches and socket for electricals as well as telephone and data socket are installed , IIT Patna will remove the same . 7. Bidder to consider from inside of the existing glass faced for Server room and UPS room - Sunlight control glass film. This window film should be thin, clear that is applied on windows to block harmful ultraviolet (UV) rays from entering inside. This should helps to reduce the amount of sun exposure, Such film should reject minimum up to 78% of solar heat and should filter visible light and block up to 99% of harmful UV rays.Color of such film should be matching to existing facad and for make 3 M or equivalent should be used.

Annexure A- Gem Bid Number GEM/2024/B/4485836 and CDACP/NSM-DATACENTRE-PATNA/23-24/396				
Name of Bidder - Schneider Electricals				
Item No	**Tender Page number/Tender Clause Number**	**Tender RFP Specification/Requirement**	**Bidders Query**	**CDAC's Response**
1	28 7.4.2 Modular UPS for IT as well as NON IT Load:-	Each UPS shall be of modular architecture with Power Unit & removable sub power modules rating from 25 kW to 60 kW achieve highest system protection	Reqeust to amend the rating from (25 KW to 60 KW) to (40 KW to 60 KW)	As per tender
2	28 7.4.2 Modular UPS for IT as well as NON IT Load:-	Efficiency of UPS should be minimum 95% from 25% to 75% in double conversion mode.	Kindly include add/revise the UPS efficiency at 25% load should be minumum 96% and 50% to 75% should be minimum 97% as higher efficiency means high savings on energy cost which inturns reduces the Operational Expenditures	As per tender
3	28 7.4.2 Modular UPS for IT as well as NON IT Load:-	General Query- UPS should have feature of live swappable modules	Kindly add the following line with the mentioned point as UPS should have live swappable modules certified by UL RP 2986. The certifiacte must be provide while sharing compliance	As per tender
4	29 7.4.10 STANDARDS	IEC 62040-3 UPS PERFORMANCE, IEC 60950, CE, VDE, UL 1778 for UPS	Request you to add UL RP 2986. The Recommended Practice for Measuring Incident Energy Exposure. The UPS must have live swappable feature since hot swappable is not recommended. According to NFPA 70 E Clause no. (110.3) shows that the worker must turn off the equipment (i.e. “electrically safe work condition”) “if any of the following conditions exist”. If neither of these conditions is triggered, then the worker could perform the task.	As per tender
5	29 7.4.12 UPS Output:	System AC-AC Efficiency Greater than 96% from 25% load to 75% load in Double Conversion Mode	Kindly include add/revise the AC - AC efficiency at 50% to 75% load ->=97% which as higher efficiency means high savings on energy cost which inturns reduces the Operational Expenditures.	As per tender
6	8.2.5 Electric heaters	Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum	Unit shall be with Stainless steel which is better than Aluminum. Request to please consider	Aluminium / Stainless steel both will be accetable.
Name of Bidder - Aurionpro Limited				
Item No	**Tender Page number/Tender Clause Number**	**Tender RFP Specification/Requirement**	**Bidders Query**	**CDAC Reply**
1	GENERAL Statutary approvals		We understand that contract demand upgration if required will be carried out by Client and Same is not to be considered in bid. Request to clarify	Not in the scope of the Tender
2	Page 20 Clause No 3.6 GENERAL Power and water	Electrical power and water during construction will be provided at one location.	We pressume that power and water for construction and testing shall be provided free of cost . Request to confirm	Refer Clause no 3.6 page no 20 of ATC document.
3	GENERAL Site establishement	Site office and store	Please presume that space for site office and store will be provided free of cost with in the premisis	IIT, Patna will provide the necessary staging area
4	GENERAL Site establishement	Toilets	Please clarify whether our staff and Labour can use the existing toilets In the building	Yes. The cleanliness for the same to be maintained.
5	GENERAL Site establishement	Drinking water	Please clarify the availbility of drinking water for staff and Labour in the premisis	Yes.
6	GENERAL Site establishement	Working Hours	We understand that bidder's staff and labour can work in site premisis 24/7 including holidays	Yes. Bidder has to request the same in advance and adhere to the rules of IIT, Patna.

7	Page 20 Clause No 3.9.1 GENERAL FAT	Bidder shall provide factory test report for all products after testing each parameter of products as per their standard test procedure. • Electrical panels including • In Row unit DX based • UPS and battery	We understand that factory inspection and factory tests are not required . FAT report shall be submitted as per OEM standard test procedure	Refer Clause no 3.9 page no 20 of ATC document.
8	Page 66 SECTION V - PRICE SCHEDULE GENERAL Statutary approvals	The prices quoted should include the charges towards testing of equipments, installations and approvals from local electricity board/PWD, electrical/ civil engineering authority, pollution control board - as applicable. The official charges required for the required testing, certification, NOC etc. are to be paid by the bidder.	We understand that approval from poullution control board is not required since it is a modification work which does not involve equipment like DG sets . Request to clarify	Pollution Control Board approval is not required
9	Page 66 SECTION V - PRICE SCHEDULE GENERAL Statutary approvals	The prices quoted should include the charges towards testing of equipments, installations and approvals from local electricity board/PWD, electrical/ civil engineering authority, pollution control board - as applicable. The official charges required for the required testing, certification, NOC etc. are to be paid by the bidder.	Request to kindly exclude official charges from bidder scope.	As per Tender
10	Page 3 Clause no 3 GENERAL Design responsibility	The proposed designs and indicative drawings enclosed in the RFP document are for reference and for the purpose of bidding. The vendor so finalized would be required to make the necessary shop drawings within the layouts so as to arrive at a final scheme in line with the requirements and in accordance with the requirements of Indian standards, IEC, IS,IEEE,NBC etc. However no change whatsoever in the price schedules would be allowed after the award of the work and the price shall remain firm throughout the project and the entire works are to be executed within the quoted price schedules.	We understand that bidder is responsible for the detailed design based on the concept design we received through RFP. Variation shall be applicable in case of any changes in the input parameters ,details given in RFP and changes in site conditions. Request you to clarify	As per Tender Clause
11	Page 25 Clause No 7.3 Electrical IT UPS	UPS for IT Load with SMF batteries for 10 minutes back up time of rating 150 KVA (Module Size should be 25 KW to 60 KW)	We understand that back up of 10 minutes should be available during the commissioning of UPS , not at the end of warranty period of 2 years. Please confirm	As per Tender
12	Page 25 Clause No 7.3 Electrical Non IT UPS	1 X 75 KVA UPS for NON-IT Load – Utiliy Load with SMF batteries for 10 minutes back up time 0n 70 KVA.	We understand that back up of 10 minutes should be available during the commissioning of UPS , not at the end of warranty period of 2 years. Please confirm	As per Tender
13	Page 34 Clause 7.7 Electrical Cable tray	Stainless steel (SS) cable tray to be considered above each row of the Rack along with required Cable tray Grid above the rack and below false ceiling to be considered and provided. Refer Layout Drawing. SS Cable tray are used to run fiber and interconnecting cables.Rack Interconnecting cables mostly will be fiber, Bidder to take care utmost care as 90 Deg C bend will not be accepted.	We understand that this clause is applcable only for wiremesh cable tray laied at the top of the racks . Please confirm	Wire mesh cable tray as well as Perforated cable tray .
14	Page 34 Clause 7.7 Electrical Cable tray	Stainless steel (SS) cable tray to be considered above each row of the Rack along with required Cable tray Grid above the rack and below false ceiling to be considered and provided. Refer Layout Drawing. SS Cable tray are used to run fiber and interconnecting cables.Rack Interconnecting cables mostly will be fiber, Bidder to take care utmost care as 90 Deg C bend will not be accepted.	We will considering single layer of Stainless wire mesh cable tray of 200 mm (W) x100 mm (H) . Request to confirm	As per drawing provided
15	Page 34 Clause 7.7 Electrical Cable tray	Stainless steel (SS) cable tray to be considered above each row of the Rack along with required Cable tray Grid above the rack and below false ceiling to be considered and provided. Refer Layout Drawing. SS Cable tray are used to run fiber and interconnecting cables.Rack Interconnecting cables mostly will be fiber, Bidder to take care utmost care as 90 Deg C bend will not be accepted.	Please clarify the number of water fall drops to be considered for each rack	Four water drops per rack
16	Electrical Cable tray	Cable tray/containement for incoming fibre or networking cables	We assume that Cable tray/containement for incoming fibre or networking cables is not part of tender . Please clarify	Incomming fiber and related work is not part of scope of this tender
17	Electrical Earth pits	The earth pits shall be as per IS with proper arrangement for testing.	Request to please clarify the location of earth pits	**Refer Corrigendum and drawing**
18	Page No 21 Clause No 5 Design inputs Racks and PDU Rack	Tables given below are the details of exact load parameters. These values are given to the bidders to come out with appropriate configuration and sizing. The major sub systems of the DC infrastructure are: a) UPS along with Batteries b) Electrical Panel, Instrumentation etc. c) Raised Flooring and False Ceiling d) DX based In row units with air cooled condenser and related work e) I-BMS System f) Electrical Panels and cables g) 45 U Racks h) Illumination system i) Earthing System j) Etc.	We pressume that rack and rack PDU are not part of the tender . Request you to clarify . Request you to provide the specifications if same is in bidder scope	Rack and PDU are not part of this tender scope
19	SLD Electrical LT panel bus bar	Alumilum bus bar is mentioned in DC LT panel New . MOC for bus bar is not mentioned for other panels	We understand that we can consider Alumium bus bar for all the panels as per SLD	Yes
20	Clause No 9.4 IBMS Fire Alarm System	The system and its components shall be Underwriters Laboratories, Inc. listed, and FM APPROVED under the appropriate testing standard, for fire alarm systems and the installation shall be in compliance with the UL 10th Edition listing.	Please confirm can we consider only UL listed Fire alarm system complying NFPA standards.	Yes
21	HVAC Ventilation	Is smoke exhuast & make up air system required?	Please provide specification for smoke exhaust & makeup system in case it is required.	Not part of scope of tender
22	CIVIL Partitions	Civil architecture and preparation of data center: Interiors of the data centre (including, civil works, foundation work, raised floor, false ceiling, fire rated paint, fire rated partitions, fire rated glass partition, fire rated glass doors, fire rated glass sliding door etc.)	We understand that fire rated glass partition and fire rated paint are not applicable for this tender . Request you to confirm	Paint is applicable
23	Page No 46, Clause no 9.1 Electrical Lighting control	Motion sensor is required for lighting control.	Please clarify the type of motion sensor to be considered	360 Degree PIR (Passive Infrared)Motion Sensor /detector for Energy Saving and Ceiling Mounted

24	Page No 49, Clause no 9.3.9 Electrical Lighting control	The BMS system should allows for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to: • HVAC equipment – • Generators. • UPS and Battery system • LV metering and equipment. • Fire Alarm Systems. • Water Leak detection System. • Lighting Control • Rodent Repellent System • Vesda System • All Sensors • Etc.	Please clarify Whether we have to consider integration of lighting control with BMS by considering separate lighting control panel (KNX/Dally based)	**Integration of lighting control on BMS platform is not required. Refer corrigendum**
25	Page No 26, Clause no 9.3.9 Electrical UPS	UPS should have feature of live swappable modules.	We understand that live swappable means we can replace the individual modules in live condition when other modules are serving the load (Hot swappable) . Request to confirm	Yes
26	Page No 26, Clause no 9.3.9 Electrical Cables	All Low tension cables should be of 1.1 KV grade, All power cables from 25 Sq.mm to 400 Sq.mm should be with stranded, compact aluminium conductor, with XLPE insulated, PVC inner sheathed, galvanized steel strip armored and overall PVC sheathed conforming to IS:7098 /88. As stated in Electrical single line diagram for Cu flexible cables should be of Solid/Stranded Copper conductor, XLPE Insulated, cores laid up, PVC tape/PVC Extruded Inner sheathed for Multicore Cables, Unarmoured, extruded PVC Type ST2 Sheathed as per IS 7098 (Part 1) 1988. Cables shall comply with the latest editions of following standard, as applicable-BIS : 1554 Part 1 PVC insulated electric cables (Heavy duty),BIS: 7098 Part 2 Cross- Linked Polyethylene Insulated PVC sheathed cables, BIS : 8130 Conductors for insulated electric cables and flexible cables.1.1 KV grade cables: All LT power cables shall be 660/1100V grade, with aluminium conductor for size 10 Sq.MM and above. Power cables of sizes up to 6 Sq.mm. shall be with copper conductors, All Cables shall be externally marked at either end with the respective identification numbers by means of non-deteriorating material. Cable Markers shall be approved by Client. IS: 1554 - PVC insulated (heavy duty) electric (Part I) Cables - Part I for working voltages up to and including 1100V.IS: 1753 - Aluminium conductors for insulated cables.IS: 3961 - Recommended current ratings for (Part II) cables: Part-II PVC insulated and PVC sheathed heavy-duty cables.IS: 3975 - Mild steel wires, formed wires and tapes for armouring of cables.IS: 5831 - PVC insulation and sheath of electrical cables.IS: 7098 -Cross- linked Polyethylene insulated (Part-II) PVC sheathed cables: Part-II for working voltages from 3.3 KV upto & including 33 KV.IS: 8130 -Conductors for insulated electric cables and flexible cords.IS: 9968 - Elastomer - insulated cables, for (Part I) working voltage upto and including 1100V.	We will be considering following spacification for cables.Request to confirm **UPS input and out put cables- Single core copper PVC insulated flexible cables** **Rack power cables - 5Cx6 sqmm and 5Cx16 sqmm - PVC insulated Copper flexible cables** **Inrow units, PAC and split AC- 3.5 core Copper PVC flexible cables** **Other multi core cables- 3.5 Core A2XFY Aluminium cables**	As per SLD provided
27	HVAC Exhaust in UPS/battery room	Requrement of hydrogen sensor and exhaust fan is not mentioned in the tender.	Request you to clarify whether we have to considered hydrogen sensor and exhaust fan in UPS/battery room considered the SMF type of batteries	Timer based exhaust fan to be considered as part of scope of this tender.
28	Page NO 35 Clause No 8.1 and Page No 36 Clause no 8.2 HVAC Room temprature	Cluase No 8.1 says "The room air temperature should be maintained at 23 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. Cluase No 8. 3 says Supply cooling temperature to be maintained at 21°C or lower with an accuracy of ±2°C. at site ambient conditions.	Request you to clarify the room temparature /cold aisle temparature to be considered	Refer Clause no 8.2 and page no 36 of ATC document
29	Page No 44, Clause no 8.3 HVAC Hot aisle containement	Containment of both front and back should be done	We understand that we have to provide only hot aisle containement syatem as per the layout and specification. Please confirm	As per Tender
30	Page No 47, Clause no 9.2 IBMS Sensors	Specification of temparature sensor is not given	Request to provide the specification of temparature sensor	Integrated temperature and Rh sensor ceiling suspended with output signals of either 4 to 20 mA or 0 to 10 Volt and communciable to BMS.This should be with display.
31	Page No 47, Clause no 9.2 IBMS Sensors	Temparature and humidity sensors	We will be considering one temprature with humdity sensor in cold aisle /room . Please clarify	Two sensor for each part of server room will be required.
32	Page No 48, Clause no 9.3.5 IBMS BMS	BMS should control the operation of oxygen pumping equipment's under fire situation.	Request you to provide the specification and scope of oxygen pumping equipment	All In row and AC units
33	IBMS all IBMS systems	Integration with existing systems	Request you to clarify whether the BMS,CCTV,FAS,VESDA,RRS and WLDS are to be integrated with existing systems in buidling or these systems will be standalone. Please clarify	Standalone

34	Page No 49, Clause no 9.3.9 IBMS BMS	The BMS system should allows for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to: • HVAC equipment – • Generators. • UPS and Battery system • LV metering and equipment. • Fire Alarm Systems. • Water Leak detection System. • Lighting Control • Rodent Repellent System • Vesda System • All Sensors • Etc.	Request you to clarify the equipment and parameters to be controlled through BMS	**Refer Corrigedum**
35	Page No 49, Clause no 9.3.9 IBMS BMS	LV metering and equipment	Please clarify whether we can integrate the breaker on -off - trip status of only main DC panel incomer through potential free contacts to BMS system	Only main DC panel incommer
36	Page No 49, Clause no 9.3.9 IBMS BMS	The BMS system should allows for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to: • HVAC equipment – • Generators. • UPS and Battery system • LV metering and equipment. • Fire Alarm Systems. • Water Leak detection System. • Lighting Control • Rodent Repellent System • Vesda System • All Sensors • Etc.	We understand that generators are not part of tender scope.Please clarify	DG set are not part of scope
37	Page No 50, Clause no 9.5 IBMS CCTV	Supply, Installation, Testing and Commissioning of CCTV system along with indoor, outdoor cameras to cover entire DC area as well as outside equipment's area.	Please clarify the outdoor equipment area to be covered in CCTV	Yes
38	Page No 50, Clause no 9.5 IBMS CCTV	The CCTV system shall comprise of various types of Indoor and Outdoor cameras with 90 days storage capacity with high end recording resolution.	We will be considering motion based recording for 90 days with 20 fps. Please confirm	As per Tender
39	Page No 50, Clause no 9.5 IBMS WLDS	Application area	We understand that we have to provide WLDS only below the inrow units. Please clarify	Only Below In Row Units
40	Page No 39, Clause no 8.2.13 IBMS WLDS	The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm incase of wet floor.	Water detection kit with 1.5 meter sensing cable is mentioned along with inrow units . Should we have to considered seaparate water leak detection system along with in built water sensing kit in inrow units	Inbuild water sensing in Inrow should be with In row unit and seprate water leak detection below raised floor is required
41	Page No 51, Clause no 9.8 IBMS FSS	Supply, install, test and commission NOVEC 1230 (Fluro Ketone FK-5-1-12) based fire suppression system. The fire suppression system shall include and not be limited to gas release control panel, CCOE approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, check valve and all other accessories required to make a complete operation system meeting applicable requirements of NFPA 2011 standards and installed in compliance with all applicable requirements of the local codes and standards.	Since 3M has given the diclaration for discontinuing the manufacturing of Novec 1230 gas , We will be considering other makes with FK 5-1-12 based gas complying NFPA standards. Please clarify	Yes as per tender technical specification and terms and conditions
42	IBMS VESDA	Specification of VESDA is not provided in RFP	Since VESDA terminology belongs to one particular make (Xtralis) . We will be considering other make HSSD system complying NFPA standards.Please clarify	This should match minimum tender technical specifications, terms and conditions
43	Page No 24, Clause no 7.2 Electrical LT Panel	Panels will be as per IEC 61439.	We will be considering main DC panel of 400A incomer as per IEC 61439 where we request to accept UPS output panel and inrow panel as per IEC 60439 considering the smaller current rating and better cost effectiveness	**Refer Corrgendum**
44	Page No 43, Inrow data sheet point no 11 Electrical Electrical Inrow units	Inbuilt ATS for Dual power supply	We understand that inbuit ATS in inrow units is not required as we will be providing single feeder for ATS	Yes
45	SLD Electrical LT Panel	Panel is required to be tested at site and works	We understand that works test certificate as per OEM standard test procedure is sufficient for LT panel also.Please clarify	Yes
46	SLD Electrical LT Panel	Panel is required to be tested at site and works	Please clarify the test of panels to be carried out at site	Logic and protection
47	SLD Electrical LT Panel	Copper earth bus to be installed	Aluminium bus bar is mentioned for LT panel bus bar . Hence request you to accept Aluminium earth bus bar	Aluminium is accepted
48	SLD Electrical LT Panel	Type of MCCB	We will be considering thermal magnetic type release MCCB up to the rating of 200 A and microprocesser based MCCB for 250 and above	As per SLD provided
49	SLD Electrical Split AC	Feeder for Split AC is not provided in SLD	Request you to clarify whether we can provide the feeder for IBMS room split AC from rawpower inrow panel	Yes
50	SLD Electrical Socket for racks	Location of IEC socket above false celing	We will be mounting IEC socket on cable trays with brackets.Please clarify	Yes
51	SLD Electrical Socket for racks	IEC socket for racks	Please clarify whether we have to consider MCB along with sockets	Yes
52	SLD Electrical Socket for racks	Cabling from IEC socket to racks	We understand that cables and cable tray from IEC socket to racks is not part of the tender. Please clarify	From IEC socket cable will enter in the rack. No need of cable tray.

53	SLD Electrical Socket for racks	Qty of sockets	We will be considering 7 Nos 3 phase 5 wire 40 Amps sockets and 12 Nos of 3 phase 5 wire 63 Amps sockets as mentioned in SLD . Please confirm	As per SLD provided
54	SLD Electrical Isolation transformer	Isolation transformer is not provided in SLD	We understand that isolation transfromer is not required for the project.Please clarify	Not part of scope of tender
55	Page No 52, Clause no 2.2 CIVIL Chain link fencing	Equipment's Foundation, chain link fencing for equipment at ground floor	Please clarify the equipment to be provided with chainlink fencing	Chain link fencing is not required
56	Page No 52, Clause no 2 Electrical Isolators	Supply, Installation, Testing and Commissioning of LT panels, lighting DBs, Raw Power DBs, UPS out Put Panel, In row Panels, isolator panels etc.	Isolators are not mentioned in SLD .Hence we understand that same is not required.Please confirm	Not part of scope of tender
57	Page No 52, Clause no 2.1 Electrical Illumination	Supply, Installation, Testing and Commissioning of internal illumination system and external illumination. Internal Lux level to be 400-500 lux.	Please clarify the external area to be considered for illumination	Outdoor illumination is not part of scope of this tender
58	Testing Electrical Load banks	ISAT	Request you to clarify whether load banks to be considered for ISAT or same shall be done with actual loads	ISAT will be on actual load
59	Layout HVAC PAC	3x3TR Dx based PAC units are provided in RFP where as Layout of UPS room shows wall mounted units	Request you to please clarify the type of cooling to be considered for UPS/battery room considering the space constraint . More over Split air conditioning units are mentioned in Page no 45 Clause no 8.4	Refer clause no 8.4 page no 45 of tender document
60	Layout HVAC PAC	3x3TR Dx based PAC units are provided in RFP where as Layout of UPS room shows wall mounted units	Request you to provide specification for PAC Units for UPS and Battery room	Refer clause no 8.4 page no 45 of tender document
61	HVAC Split AC	1 X 1.5 Tr room cooling unit in BMS area	Request you to clarify wheather we have to consider redundant units for BMS room as split AC may not be suitable for 24/7 operation	Exisiting AC unit will be used as redundant unit
62	HVAC Split AC	1 X 1.5 Tr room cooling unit in BMS area	Request you to share the specification to be considered for split AC in BMS room	5 Star rated , Inverter AC for Approximate BMS room Coverage Area with indoor and outdoor unit.BLDC Rotary Compressor with Cooling Capacity as per site requirment. Copper Condenser.Turbo Coolingwith Adjustable Inverter. AC unit should deliver higher air flow with its louvre design to help cool the room faster with no hot spot in a short period. Minimum 4 Speed Fan Function. This should ensures superior comfort and convenience in all types of heat.The Super dry mode should dehumidifies the room quickly. The AC should runs on predefined higher cooling capacity while limiting the indoor fan blower at a lower speed. Multi Stage Filtration should removes allergens, odours and other harmful particles to give cool and fresh.Adjustable Mode should Saves Power and keeps Comfortable in Different Conditions by running on different cooling capacities.AC unit should be with Inner Grooved Copper Tubes , Hydrophylic Blue Fin, Anti-Fungal , Easy Clean Filter, Wide Operating Voltage Range (145V-270V) , Low Voltage Start.
63	Page No 59, Clause no 15.2 GENERAL PUE	PUE should not be more than 1.4 during linpack testing.	We understand that linpack testing is for annualised PUE . Please confirm	Linpack test is hardware burn test and carried out only during commissioing stage.
64	HVAC Inrow units	Heater and humdifier	Request you to clarify the number of inrow units with heater and humidifier feature	All Inrows
65	Additional Queries HVAC Split AC	Existing split AC unit is observed in BMS room during site visit	Requsest you to kindly clarify wherther this unit can be retained for BMS room cooling. If yes, Request you to clarify the capacity , Condition of units etc	This Unit will be retained and working in stand by mode with New unit which is part of tender scope.
66	Additional Queries HVAC Inrow units	It is observed that to cater the the IT load of 132 KW we have to consider 7 working units of 20 KW units with out any safety factors	Request you to kindly confirm whether the same is acceptable	As per tender
67	Additional Queries HVAC Inrow units	During power failure condiction, Only 5 nos of 20 KW Inrow units will be in working condition,We are unable to to verify the load condition in this scenario since details of IT loads and diversity to be considered are not available with us	We will be considering the UPS capacity for inrow units as per the schematic provided in RFP,Request you to confirm	As per tender and drawings
68	Additional Queries HVAC Out door unit Location	It was noticed during site visit that space for ODUs are available near server hall towards the front side of the building	Request you to kindly clarify wheather we can consider the ODU location of inrow units and split ACs adjuscent to server room on existing raised plat form towards the front side of the building instead of location shown in the layout	**Refer Corrgendum and drawings**
69	Additional Queries Electrical Earth pits	It was noticed during site visit that space for earth pits are available near server room towards fornt side of the building in Lawn area	Request to confirm the location	**Refer Corrgendum and drawings**
70	Additional Queries Electrical Socket for racks	We understand that bidder scope of power distribudion ends at IEC socket above false celing above racks and bidder need not consider further cabling and containement to racks	Request you to confirm	Yes
71	Additional Queries Networking Cable tray for Network /optical fibre cabling	We ynderstand that bidder need not consider any other cable trays apart from the wiremesh cable tray above racks for network/opticabl fibre cabling		Apart from SS tray there are other trays for Cables and Cu piping.

72	Additional Queries CIVIL Floor height	It is oberved duting site visit that floor to ceiling height is 3.78 m and we have to provide false ceiling of 1 meter height . It was discussed that we have to consider the door height of 2.5 meter from floor	Request you to allow us to reduce the false ceiling height by 100/200 mm if we face diffcult for fixing doors / fising for split AC below false ceiling	**Refer Corrgendum and drawings**
73	Additional Queries CIVIL Dismantling	It was observed during site visit that existing false ceiling to be removed along with light fixtures and fire alarm system	Request you to clarify whether same needs to be consdiered in bidder's scope	**Refer Corrigendum**
74	Additional Queries CIVIL Dismantling	It was observed during site visit that existing sprinkler system to be removed along with pipes and sprinklers	Request you to clarify whether same needs to be consdiered in bidder's scope	**Refer Corrgendum and drawings**
75	Additional Queries CIVIL Dismantling	It was observed during site visit that existing power, telephone and data sockets to be removed from wall	Request you to clarify whether same needs to be consdiered in bidder's scope	**Refer Corrgendum and drawings**
76	Additional Queries CIVIL Dismantling	It was observed during site visit that existing split AC s to be removed from wall	Request you to clarify whether same needs to be consdiered in bidder's scope	**Refer Corrgendum and drawings**
77	Additional Queries CIVIL Closing of glass façade	Request you to kindly clarify whether we hve to close the glass façade (to block dust and light) which is on front side of the building	Request you to kindly clarify the preferable method of blocking the glass façade if same needs to be considered in bidder's scope	**Refer Corrgendum and drawings.**
78	Additional Queries CIVIL Door shifting	It was informed during site visit that existing front door is of 1200 wide wooden doors ,Same needs to be dismanled and handed over to IIT Patna and new MS 2 hour fire rated door of 1500 mm wide and 2500 mm height needs tio be installed by dismantling the brickwall	Request to confirm	Yes
79	Additional Queries CIVIL Door shifting	It was informed during site visit that existing side door of power room is of 1200 wide wooden doors ,Same needs to be dismanled and handed over to IIT Patna and new MS 2 hour fire rated door of 1200 mm wide and 2100 mm height needs tio be installed by dismantling the brickwall	Request to confirm	Yes As per drawing provided
80	Additional Queries Electrical DC LT Panel	800 A Aluminium bus bar is mentioned in SLD as per RFP for a panel with 400A incomer	Request you to kindly accept 400A Aluminium busbar	400 Amps Al Bus Bar accepted
81	Additional Queries Electrical Incomer cable	Only incomer cable laying and termination in 400 A spare feeder available in existing panel is in bidder scope .	We understand that any kind of modification in existing panel is not part of the tender and bidder to consider only incomer cable to main DC LT panel and termination on both ends in bidder scope. Please confirm	Yes
82	Additional Queries Electrical Inrow units and inrow units	63 A TPN feeder considered for Inrow units and 200A breaker considered for inrow panels	Request you to allow us to consider cable size as per the rated load current of inrow units and inrow panel . Not as per the breaker size	Bidder to work out the same, submit the same in bid submission
83	Additional Queries Electrical Lighting and BMS DB	63 A TPN feeder considered for lighting and BMS DB	Request you to allow us to consider cable size as per the rated load current of inrow units . Not as per the breaker size	Bidder to work out the same, submit the same in bid submission
84	Additional Queries Electrical Industrial grade split AC for power room	63 A TPN feeder considered for split AC Units	Request you to allow us to consider cable size as per the rated load current of inrow units . Not as per the breaker size	Bidder to work out the same, submit the same in bid submission
85	Additional Queries Electrical Rack power cables	32A 4P MCB is considered in UPS out put panel for 40 A IEC 309 socket for racks	We understand that we have to consider 40 A 4P MCB instead of 32 A 4P MCB, Request to confirm	40 Amps 4 Pole MCB is required
86	Additional Queries Electrical Rack power cables	5 C 6 sqm cable considered for 40 A sockets	Since individual sockets loads are not available with us we are unable to crosscheck the cable size . We will be considering the cable size as per the Schematic provided. Please confirm	Yes as per SLD drawing
87	Additional Queries Electrical Rack power cables	5 C 16 sqm cable considered for 63 A sockets	Since individual sockets loads are not available with us we are unable to crosscheck the cable size . We will be considering the cable size as per the Schematic provided. Please confirm	Yes as per SLD drawing
88	Additional Queries Electrical Cable sizing	Derating factor	We are considering a derating factor of 0.8 for incomer cables and 0.9 for all other cables considering the airconditioned environement. Request you to confirm	As per Tender
89	Additional Queries 31-01-24 Electrical UPS	UPS Standards :UL 1778 for UPS,	UPS shall comply to IEC62040-1,2,3 for UPS design & Operation.Request you to exclude UL standard for UPS	As per Tender
90	Additional Queries 31-01-24 Clause no 4.10 CIVIL Fire rated glass partition	Providing and fixing of tested 120 minutes fire rated - integrity and radiation control and partial insulation (EW120) - fully glazed non-load bearing fixed glass with symmetrical (Bi-Directional) fire protection. The glass should be Contraflam Lite or equivalent 14 mm clear 120 min fire rated and partially insulated (EW120), Non Wired Toughened Interlayered glass having a sound reduction of minimum 30 dB and compliant to class 1(B)1 category of Impact Resistance as per EN 12600.The glass shall be able to withstand fire attack from both sides. The glass should be manufactured in UL & TUV audited Facility and including UL Certification. The profiles are manufactured from 1.6 mm galvanized steel sheet pressed and formed to a required profile of the dimension. These specifications are applicable for fire rated glass door, fire rated glass partition.	We understand that glass pertition as per the specification is not applicable for the tender. Request you to confirm	Yes Fire arted Glass is not given in the drawing
91	Additional Queries 31-01-24 Clause no 4.11 CIVIL Steel platform	Steel structure needs to be consider for the platform of the equipment's as Panels, ODU Unit of Inrow ,PAC etc. MS frame to be considered for installation and maintenance platform for equipments for outside part of building. The ODU unit for In row as well as for PAC needs to be installed in two tier , Bidder to consider necessary civil foundation as well as MS structure.	It was discussed during site visit that LT panels and UPS& battery etc shall be placed on 300 mm rasied floor directly.Hence we understand that steel structure is not requited for panel ,UPS,Battery inriw units etc . Please confirm	Equipments inside the rooms are directly on Raised Floor , Where as for out door equipments steel structure is required
92	Additional Queries 31-01-24 Layout CIVIL Door	Fire rated glass door to be provided for server room,power room and IBMS room	Request you to share the spcecification to be considered	As per Tender Clause no 4.10 and provided drawings.
93	Additional Queries 31-01-24 Layout CIVIL Water proofing	We understand that water proofing of any kind is not applicable for the tender .	Request you to clarify	Not part of scope of Tender
94	Additional Queries 31-01-24 Layout CIVIL Floor finish	It was disussed during site visit that existing flooring shall be retained	Please confirm	Floring inside the room will be as it is used
95	Additional Queries 31-01-24 Layout Electrical LT panel	Comprtmentalisation	Panels with ACB/MCCB are of compartmentalised in construction And Non-compartmentalized for MCB/MPCB feeders.Request you to confirm	As per CPRI design.

96	Additional Queries 31-01-24 Clause 5.1.2 Electrical UPS	All serviceable components to be from front. Rear space upto 200mm can be provided only for ventilation purpose :-	Request you to accept rear space upto 500mm	Refer Drawing - Rear side space is issue ,so cable termination should be from front.
97	Additional Queries 31-01-24 Clause 5.1.12 Electrical UPS	Phase sequence correction : Required	Request you to accept phase sequence protection instead of phase sequence correction	As per Tender
98	Additional Queries 31-01-24 Clause 5.1.13-10.11 Electrical UPS	1500 events mandatory	Request you to accept 900 events instead of 1500 events, However for UPS data log is important & we can fetch this for year.	Acceptable.
99	Additional Queries 31-01-24 Clause 5.1.13-10.11 Electrical Non IT UPS	Module Size should be 25KW or 30 KW– 3 numbers working and 1 standby module in same frame,	For Non IT load - Utilty load pls accept power module capacity of 20KW - 30 KW	As per tender

Name of Bidder - Nevaeh Technology Pvt. Ltd.

Item No	Tender Page number/Tender Clause Number	Tender RFP Specification/Requirement	Bidders Query	CDAC Reply
1	SECTION II, Page No.-6, Clause-3.3		We request you to revise the clause as "The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last **Seven years**. Each of the data centres should be with minimum of UPS feeding power of 100 KVA (excluding redundancy) means supplied, installed, tested and commissioned and minimum feeding cooling load of **30 Tons** (**With a provision to expand up to 40 Tons**) means supplied, installed, tested and commissioned. UPS and cooling to be considered only for server area and along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client."	**Refer Corrigendum**
2	SECTION II, Page No.-6, Clause-3.3.1		We request to revise the clause as "The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (In ROW, PAC, PAHU etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data center must have minimum cooling load of **30 Tons."**	As per tender

Name of Bidder -Omega Electricals and Automation				
Item No	**Tender Page number/Tender Clause Number**	**Tender RFP Specification/Requirement**	**Bidders Query**	**CDAC Reply**
1	18 6.1.1	All cooling equipment selection to be done based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE n=20) standard. The cooling systems should perform efficiently at variable load conditions. The overall cooling solution should be designed to achieve better cooling and low operating cost. The room air temperature should be maintained at 23 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. The cooling system in the server rack area should be designed as per layout design provided 11 in Layout Drawings. Heating and humidifier to maintain correct operating environment throughout the data centre needs to be considered. Relative humidity to be maintained in the data center will be from 45% to 55%. DX Based In Row Unit- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet,inlet filter, EC fans, Inverter Scroll Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Condensate pump, humidifier,Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In row-based solution improves energy efficiency and cooling ability. Direct Expansion (DX) InRow unit draws air directly from the hot aisle, allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. Each Cooling unit should have net sensible cooling capacity of minimum 20 kW based on the returning air condition of 36°C +/- 2 Deg C dry bulb, defined Relative Humidity and 21°C +/- 2 Deg. C. dry bulb supply air temperature and each in row unit should deliver minimum CMH of 5500 . Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and	Please make it 4800 CMH per cooling unit as our cooling machine can meet the requirement i.e 131 kW total IT load with 4800 CMH each machine	**Refer Corrigendum**
	20 6.1.5	Cooling Coil- Cooling coil needs to be designed for high-sensible heat ratios, the coil is constructed with copper tubes, raised-lance-type aluminum fins, and 18-gauge galvanized steel end plates. Coil headers are equipped with anti-drip shields in the event of condensation. The condensate pan is thermal formed non-ferrous material, and is sloped for positive drainage to provide higher indoor air quality.	Tender specs supports the single OEM, "Coil headers are equipped with anti-drip shields" is not required instead we can go for heater in cooling untis to avoid any condensation on coils. Also it will act as a artificial load during low load condition.	Anti drip shield are required
	20 6.1.6	Electric heaters-Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm. These elements are low watt density, wired for single-phase and loaded equally on all three phases, and electrically and thermally protected by both automatic and manual reset thermal cut outs.	Tender specs supports the single OEM, Electric heaters: 2kW heating capacity for heating function, or post-heating function, in combination with Dehumidification function	Single stage heater will also be accepted but minimum technical specifications needs to be compiled.
2	20 6.1.7	Filters-Filtration of conditioned air is very important to maintaining the clean, particle-free environment required inside Data Center. Filters should be easily replaceable from the unit. Filter efficiency should be greater-than 20% as ASHRAE 52.1.Filters are washable type and needs to meet HF-1 standards (as per ASHRAE 52.2).	Tender specs supports the single OEM, request to please consider minimum 4 nos fans per Cooling unit for most of the OEM's to participate, also with 4 nos fans we can achieve the required cooling ouput per unit i.e 20 kW , moreover these fans are hot swppable in live operation mode.	Filter should be as per tender technical specifications.For number of fans CFM/CMH with redundancy to be matched as per tender technical specifications.
3	21 6.1.9	The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards. Minimum 8 FAN assemblies per unit are required. Fans needs to be easily replaceable while the unit is in operation.	Request to please consider "Variable Speed Fans shall be variable speed capable of modulating from minimum 30% to 100%" for smooth operation of Cooling machine & uniform cold air distribution	**Refer Corrigendum**

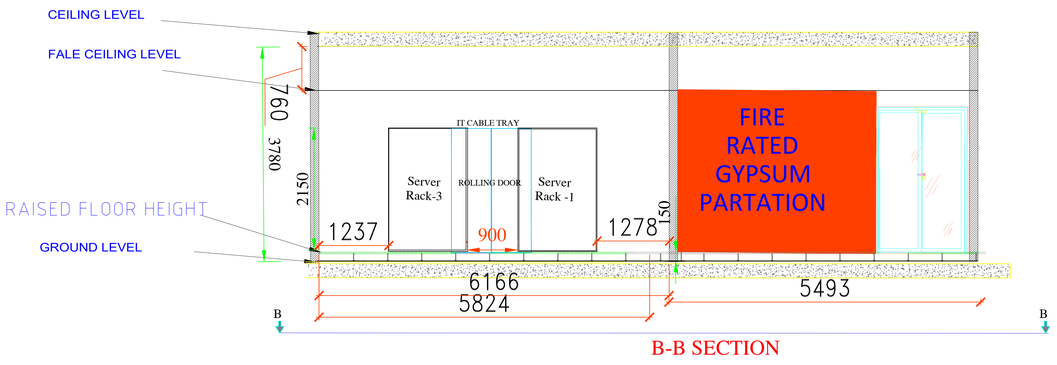
4	21 6.1.10	Condenser shall be air-cooled type, suitable for outdoor installation and shall be suitable for operating at high ambient and at low ambient as per site ambient temperatures. Condenser shall be in copper tube & aluminum fins construction. The condenser fan/s shall be of axial type with variable voltage electric motor complete with IP-54 or greater protection. Motor shall be speed controlled to ensure a stable operation for varying ambient. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. Each In Row Circuit to have its independent set of condenser coil. The condenser should be equipped with fan speed controller for the speed variation based on the condensing temperature & the speed variation should be steeples. Condenser unit should be with small foot print unit and top discharge condenser will be recommended. Condenser with compressor inside is also recommended requirement as keeping compressor in the ODU unit (i.e. away from data center) will ease during routine maintenance as well as shut down maintenance activity and it lowers the sound level in Data Center. Copper piping with insulation tube of elastomeric, nitrile foam between each sets of outdoor & indoor unit. Piping to be properly supported by MS clamp. All transmission wiring between indoor to outdoor units should be kept in PVC conduit. Maximum distance between indoor and outdoor unit to be considered as per site conditions.	Tender specs supports the single OEM, request to please conside the compresoor inside the Indoor unit for easy maintenance & enhanced life cylce .	Compressor either inside inrow unit or in ODU unit will be accepted.
5	21 6.1.12 & 6.1.13	Humidifier-. The humidifier shall be capable of providing continuous auto modulation in steam generation as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. This needs to be factory piped and wired, with cylinder and an automatic solid state control circuit. The humidification system shall automatically condition the passing air to a user-specified humidity setpoint. The reheat system, shall automatically work in conjunction with the condensate management system to temper the air to match the user-specified temperature and humidity setpoint. De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil.	Tender specs supports the single OEM, Ultrasonic humidifier with 0.5 kg/hr.	As per tender
6	22 6.1.14	The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm incase of wet floor. A microprocessor shall continuously monitor operation of In ROW unit continuously digitally display temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset. Microprocessor to control and display the functions as Room Temp temperature,Humidity ,Speed of the delivery fans,Timing of compressors with automatic rotation, Alarm signals , Cool fail,Air filter clogged, Return air sensor fault, Supply air sensor fault, Rack temperature sensor fault,High discharge pressure,Low suction pressure,Fan fault etc.	Tender specs supports the single OEM, request to please consider Cooling & Rack health monitoring independent montoring These parameters can be monitored on CMC dashboard - Rack Temperature, humidity , Alams These parameters canbe monitored on LCP dashboard - Fan speed, fan fault, cooling failure, air filter clogged, return air sensor fault , supply air sensor fault , HP alarm , LP alarm	Acceptable.
7	25 7.3 Serial no-1	UPS for IT Load with SMF batteries for 10 minutes back up time of rating 150 KVA (Module Size should be 25 KW to 60 KW)	Kindly confirm the frame size of UPS do we need to consider 150 KVA or 200 KVA for future expenstions	As per tender
8	25 7.3 Serial no-2	1 X 75 KVA UPS for NON-IT Load – Utiliy Load with SMF batteries for 10 minutes back up time 0n 70 KVA. (Module Size should be 25KW or 30 KW– 3 numbers working and 1 standby module in same frame) Note- IF Harmonices distoration are more in NON IT load as in INROW machines (NO machine as per IEEE-519) - Bidder needs to consider appropriate derations in the NON IT UPS.	Kindly confirm the frame size of UPS do we need to consider 75 KVA or 100 KVA for future expenstions	As per tender

Name of Bidder -Rittal India Pvt. Ltd.				
Item No	**Tender Page number/Tender Clause Number**	**Tender RFP Specification/Requirement**	**Bidders Query**	**CDAC Reply**
1	18 6.1.1	All cooling equipment selection to be done based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE n=20) standard. The cooling systems should perform efficiently at variable load conditions. The overall cooling solution should be designed to achieve better cooling and low operating cost. The room air temperature should be maintained at 23 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. The cooling system in the server rack area should be designed as per layout design provided 11 in Layout Drawings. Heating and humidifier to maintain correct operating environment throughout the data centre needs to be considered. Relative humidity to be maintained in the data center will be from 45% to 55%. DX Based In Row Unit- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet,inlet filter, EC fans, Inverter Scroll Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless steel construction, Condensate pump, humidifier,Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In row-based solution improves energy efficiency and cooling ability. Direct Expansion (DX) InRow unit draws air directly from the hot aisle, allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. Each Cooling unit should have net sensible cooling capacity of minimum 20 kW based on the returning air condition of 36°C +/- 2 Deg C dry bulb, defined Relative Humidity and 21°C +/- 2 Deg. C. dry bulb supply air temperature and each in row unit should deliver minimum CMH of 5500 . Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and	Please make it 4800 CMH per cooling unit as our cooling machine can meet the requirement i.e 131 kW total IT load with 4800 CMH each machine	**Refer Corrigendum**
2	20 6.1.5	Cooling Coil- Cooling coil needs to be designed for high-sensible heat ratios, the coil is constructed with copper tubes, raised-lance-type aluminum fins, and 18-gauge galvanized steel end plates. Coil headers are equipped with anti-drip shields in the event of condensation. The condensate pan is thermal formed non-ferrous material, and is sloped for positive drainage to provide higher indoor air quality.	Tender specs supports the single OEM, "Coil headers are equipped with anti-drip shields" is not required instead we can go for heater in cooling untis to avoid any condensation on coils. Also it will act as a artificial load during low load condition.	Anti drip shield are required.
3	20 6.1.6	Electric heaters-Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm. These elements are low watt density, wired for single-phase and loaded equally on all three phases, and electrically and thermally protected by both automatic and manual reset thermal cut outs.	Tender specs supports the single OEM, Electric heaters: 2kW heating capacity for heating function, or post-heating function, in combination with Dehumidification function	Single stage heater will also be accepted but minimum technical specifications needs to be compiled.
4	20 6.1.7	Filters-Filtration of conditioned air is very important to maintaining the clean, particle-free environment required inside Data Center. Filters should be easily replaceable from the unit. Filter efficiency should be greater-than 20% as ASHRAE 52.1.Filters are washable type and needs to meet HF-1 standards (as per ASHRAE 52.2).	Tender specs supports the single OEM, request to please consider minimum 4 nos fans per Cooling unit for most of the OEM's to participate, also with 4 nos fans we can achieve the required cooling ouput per unit i.e 20 kW , moreover these fans are hot swppable in live operation mode.	Filter should be as per tender technical specifications.For number of fans CFM/CMH with redundancy to be matched as per tender technical specifications.
5	21 6.1.9	The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards. Minimum 8 FAN assemblies per unit are required. Fans needs to be easily replaceable while the unit is in operation.	Request to please consider "Variable Speed Fans shall be variable speed capable of modulating from minimum 30% to 100%" for smooth operation of Cooling machine & uniform cold air distribution	**Refer Corrigendum**

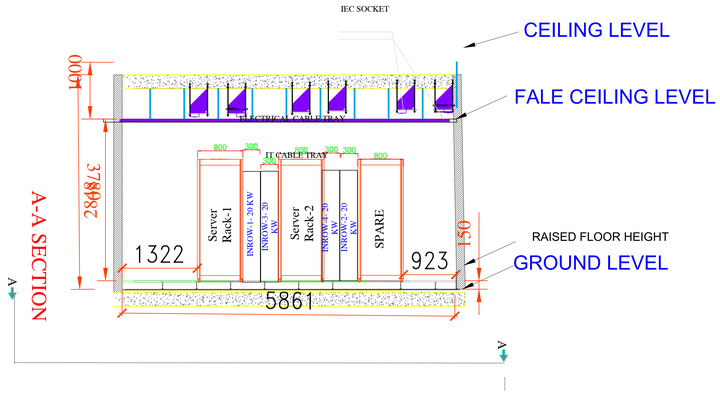
6	21 6.1.10	Condenser shall be air-cooled type, suitable for outdoor installation and shall be suitable for operating at high ambient and at low ambient as per site ambient temperatures. Condenser shall be in copper tube & aluminum fins construction. The condenser fan/s shall be of axial type with variable voltage electric motor complete with IP-54 or greater protection. Motor shall be speed controlled to ensure a stable operation for varying ambient. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. Each In Row Circuit to have its independent set of condenser coil. The condenser should be equipped with fan speed controller for the speed variation based on the condensing temperature & the speed variation should be steeples. Condenser unit should be with small foot print unit and top discharge condenser will be recommended. Condenser with compressor inside is also recommended requirement as keeping compressor in the ODU unit (i.e. away from data center) will ease during routine maintenance as well as shut down maintenance activity and it lowers the sound level in Data Center. Copper piping with insulation tube of elastomeric, nitrile foam between each sets of outdoor & indoor unit. Piping to be properly supported by MS clamp. All transmission wiring between indoor to outdoor units should be kept in PVC conduit. Maximum distance between indoor and outdoor unit to be considered as per site conditions.	Tender specs supports the single OEM, request to please conside the compresoor inside the Indoor unit for easy maintenance & enhanced life cylce .	Compressor either inside inrow unit or in ODU unit will be accepted.
7	21 6.1.12 & 6.1.13	Humidifier-. The humidifier shall be capable of providing continuous auto modulation in steam generation as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. This needs to be factory piped and wired, with cylinder and an automatic solid state control circuit. The humidification system shall automatically condition the passing air to a user-specified humidity setpoint. The reheat system, shall automatically work in conjunction with the condensate management system to temper the air to match the user-specified temperature and humidity setpoint. De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil.	Tender specs supports the single OEM, Ultrasonic humidifier with 0.5 kg/hr.	As per tender
8	22 6.1.14	The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm incase of wet floor. A microprocessor shall continuously monitor operation of In ROW unit continuously digitally display temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset. Microprocessor to control and display the functions as Room Temp temperature,Humidity ,Speed of the delivery fans,Timing of compressors with automatic rotation, Alarm signals , Cool fail,Air filter clogged, Return air sensor fault, Supply air sensor fault, Rack temperature sensor fault,High discharge pressure,Low suction pressure,Fan fault etc.	Tender specs supports the single OEM, request to please consider Cooling & Rack health monitoring independent montoring These parameters can be monitored on CMC dashboard - Rack Temperature, humidity , Alams These parameters canbe monitored on LCP dashboard - Fan speed, fan fault, cooling failure, air filter clogged, return air sensor fault , supply air sensor fault , HP alarm , LP alarm	Acceptable

Name of Bidder - WIZERTECH INFORMATICS PVT. LIMITED

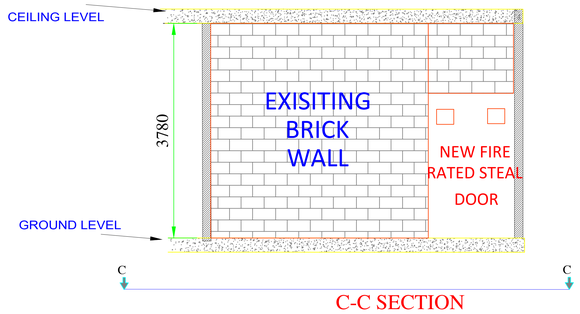
1	Section-II / Pg- 6 of 88 / Clause – 3.3 , Eligibility Criteria	The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India **in last Three years**. "	Request to kindly amend the clause to ….**'in last five years'**, for greater participation.	**Refer Corrigendum**



B-B SECTION



A-A SECTION



C-C SECTION

NATIONAL SUPERCOMPUTING MISSION
R&D | INFRASTRUCTURE | APPLICATIONS | HRD

CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

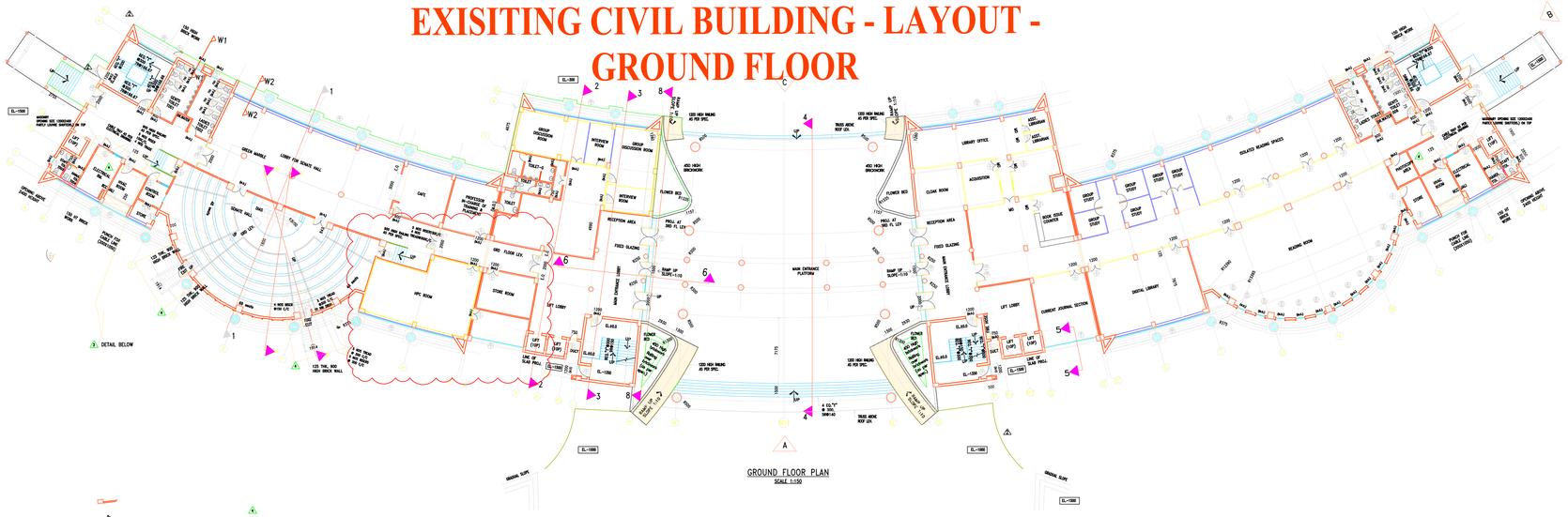
All Sections-R2

Indian Institute of Technology, Patna

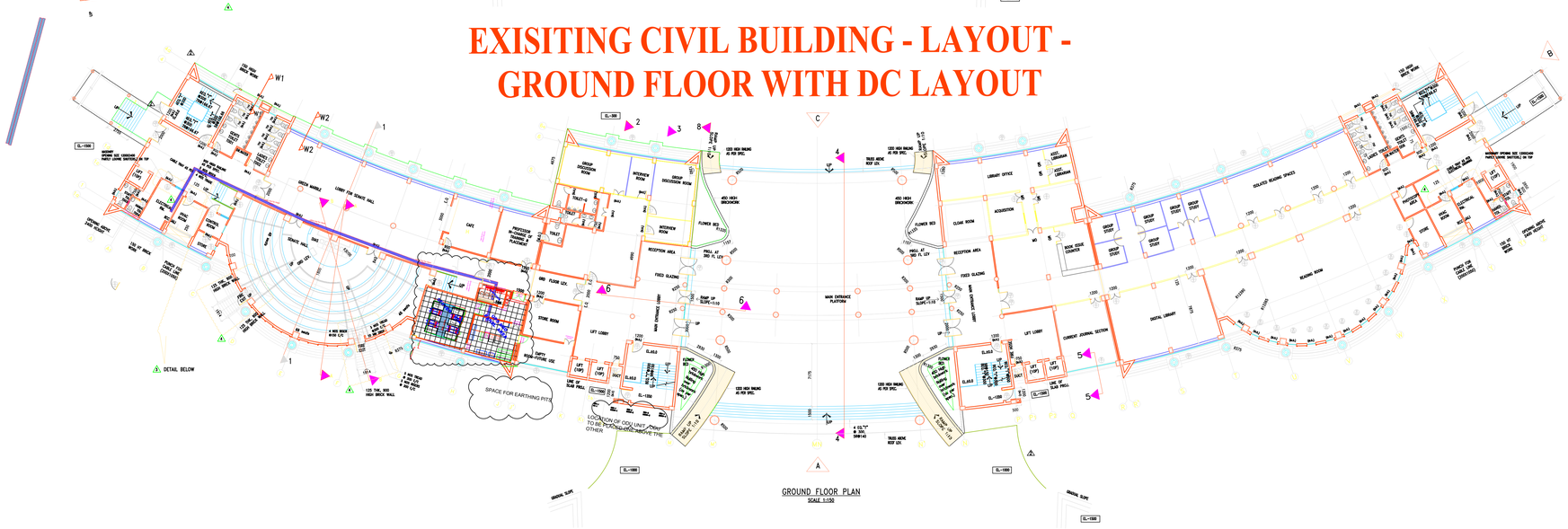
Date	
DRAWN	
CKD	
APPROVED	

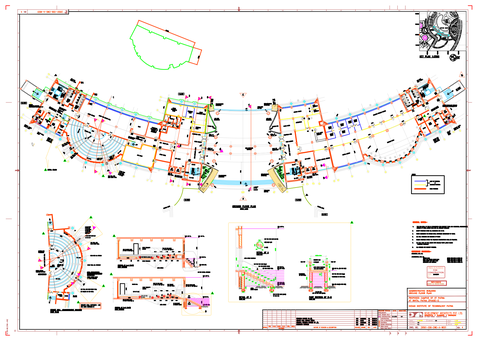
REV	DESCRIPTION	DATE
R0	ALL SECTIONS	31/01/2024

EXISITING CIVIL BUILDING - LAYOUT - GROUND FLOOR



EXISITING CIVIL BUILDING - LAYOUT - GROUND FLOOR WITH DC LAYOUT





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सी डैक CDAC
CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

Building Layout - Ground Floor - Existing and New Requirement-R2

Indian Institute of Technology, Patna

Date
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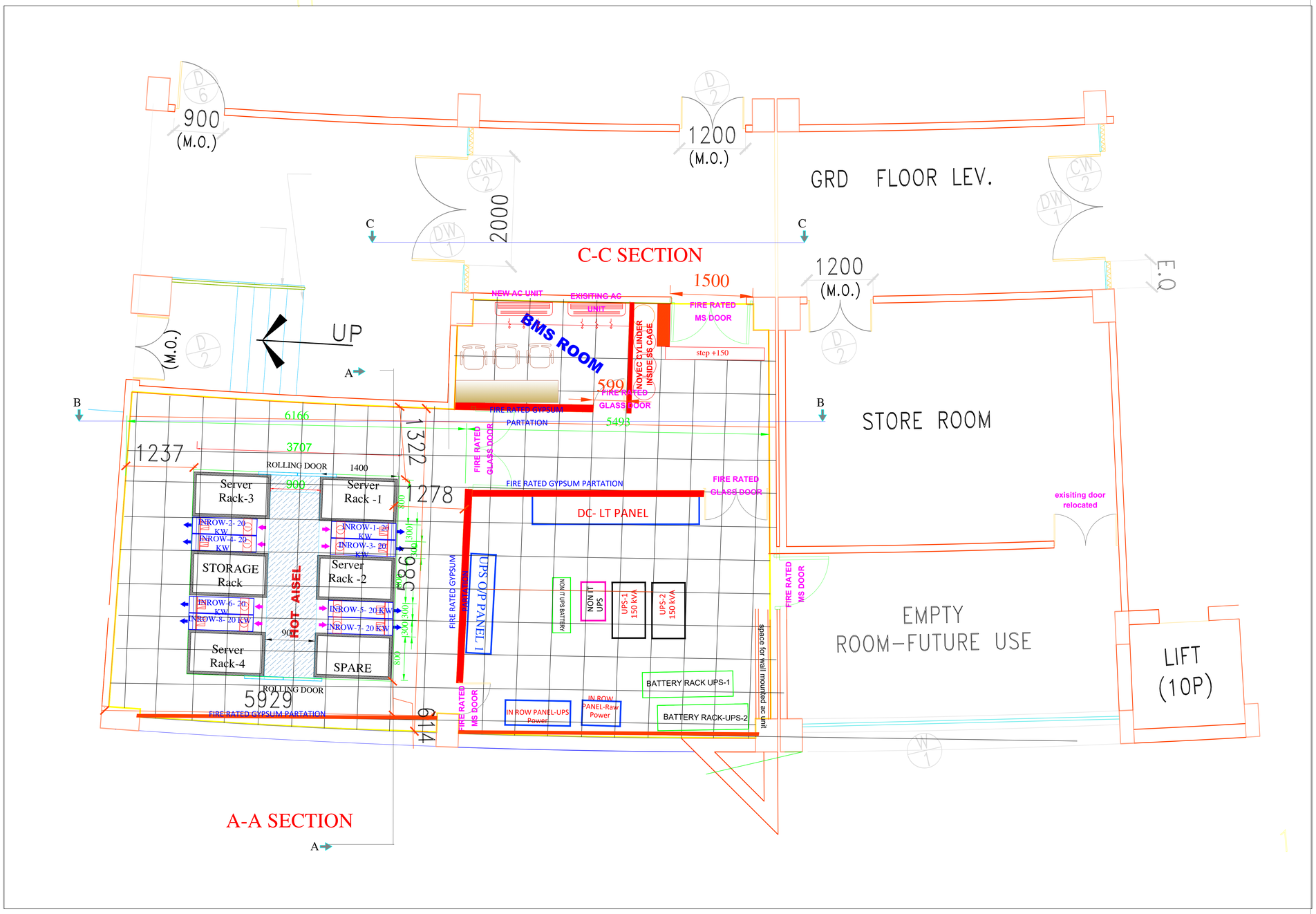
CKD
APPROVED

REV	DESCRIPTION	DATE
	existing + dc layout - ground floor	31/01/24



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DC LAYOUT-R2

Indian Institute of Technology, Patna

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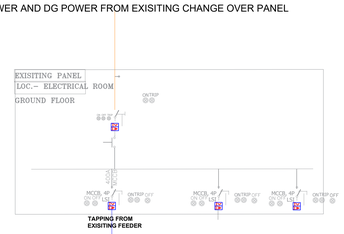
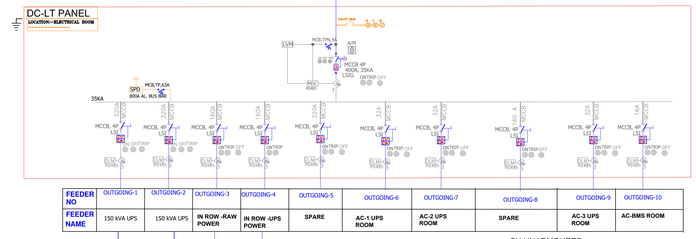
REV	DESCRIPTION	DATE
R0	DC LAYOUT	31/01/2024

EB POWER AND DG POWER FROM EXISITING CHANGE OVER PANEL



3.5 C, 2 X 240 SQ MM ,AL A2XFY CABLE



FEEDER NO	OUTGOING-1	OUTGOING-2	OUTGOING-3	OUTGOING-4	OUTGOING-5	OUTGOING-6	OUTGOING-7	OUTGOING-8	OUTGOING-9	OUTGOING-10
FEEDER NAME	150 kVA UPS	150 kVA UPS	IN ROW -RAW POWER	IN ROW -UPS POWER	SPARE	AC-1 UPS ROOM	AC-2 UPS ROOM	SPARE	AC-3 UPS ROOM	AC-BMS ROOM

CU UNARMOURED

CU UNARMOURED

CU UNARMOURED

UPS-150 KVA

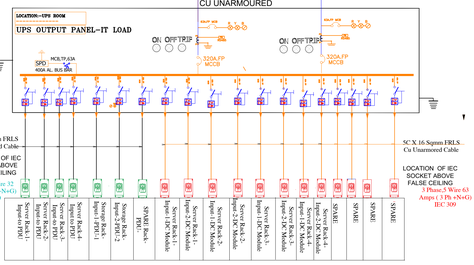
Modular UPS with 1 module of same rating as stand by

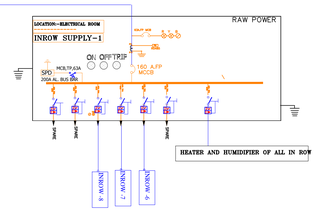
CU UNARMOURED

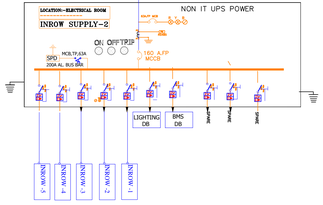
UPS-150 KVA

Modular UPS with 1 module of same rating as stand by

CU UNARMOURED







UPS-75 KVA Module size - 25 / 30 KW with 3 working and 1 stand by

NOTES:

The panels will be built to relevant IEC specification

Unless otherwise stated and or where applicable :

Construction :

1. The panels will be dust and vermin proof with gaskets of the doors Installed on the panel and not on door. The compartmentalized construction is required with extendable bus bars. The entire assembly must go through 7 tank process and will be oven baked .
2. Outdoor installation will be with IP55 enclosure
3. Base frame of at-least 4" made out of steel sections is to be provided.
4. Panel will have :
   Top Entry /Bottom Entry
   Floor Mounted Installation/Wall Mounted Installation
5. Bus bar system supports will be CPRI or equal test laboratory approved.
6. All panel compartments shall have identification etched on Aluminum strip.
7. All MCB DB will have each MCB identification
8. Stands should be provided for the installation of switch board matching to height of the false floor.
9. All VFDs shall have an active-front-end design
10. All UPSs shall have an active-front-end design
11.

1. MCCBs will be atleast 35 kA or as specified In SLD.
2. MCBs will be atleast 10 kA short circuit withstand of the curve to suit
3. ALL protections will be coordinated
4. The range of the instruments be such that the readings will shown the mid-range of the instrument.
5. The load manager will be installed with communication port and win95 or similar graphic OS based software.
6. All ACBs will be draw out type with static relays provided for over-current, earth fault.
   For DG set protection restricted earth fault protection is required.
7. MCCB to have following :
   Shunt trip , fault indications, Electronics trip mechanism.
8. All Panel Should Have Tvss Protection

Earthing :

1. All doors will have flying earth.
2. Copper earth bus is to be installed.
3. Where applicable UPS system, VS system and Raw power earth shall be separate. All the earth bus installed on suitable insulators

Drawings and Tests :

1. Shop drawings are required to be submitted for the review and approval
2. Test certificates for all components and the panel's routine tests are required to be provided in triplicate
3. Panel is required to be tested at site and works

Components :

LEGENDS

	ONAN 11KV/433V STEPDOWN TRANSFORMER
	AIR COOLED K-20 400/400V ISOLATION TRANSFORMER
	ELECTRICALLY OPERATED DRAWOUT (EDO) TYPE ACB WITH O/L & S/C RELEASE (LSI).
	ELECTRICALLY OPERATED DRAWOUT (EDO) TYPE ACB WITH O/L, S/C & E/F RELEASE (LSIG).
	MANUALLY OPERATED DRAWOUT (MDO) TYPE ACB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED DRAWOUT (MDO) TP+N(100%) TYPE ACB WITH O/L, S/C & E/F RELEASE (LSIG).
	MANUALLY OPERATED DRAWOUT (MDO) TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED MICROPROCESSOR BASED FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSIG).
	MANUALLY OPERATED FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MOE (MOTOR OPERATED) FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED FIXED TYPE MCCB WITH O/L, S/C & E/F RELEASE (LSIG).
	MOTOR PROTECTION CIRCUIT BREAKER (MPCB)
	MINIATURE CIRCUIT BREAKER (MCB)
	RESIDUAL CURRENT CIRCUIT BREAKER (RCCB)
	LOAD BREAK SWITCH
	CHANGEOVER SWITCH
	CURRENT TRANSFORMER (CT) RESIN CAST
	POTENTIAL TRANSFORMER (PT)
DLM	DIGITAL LOAD MONITOR - EM6436 INTEGRATED BASIC POWER & ENERGY PARAMETERS
MDC	MAXIMUM DEMAND CONTROLLER - EM6400
kWH	BASIC ENERGY METER - A,kW,kWH
LVM	LINE VOLTAGE MONITOR & CONTROL FOR OVER, UNDER VOLTAGE, SINGLE PHASE & PHASE REVERSAL PROTECTION
ON OFF TRIP	ON-OFF-TRIP INDICATING LAMPS
	R,Y,B (RED,YELLOW,BLUE) INDICATING LAMPS
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	AUTO MANUAL SELECTOR SWITCH
M	ALARM - HOOTER / BUZZER
TFR	TRANSFORMER
MSB	MAIN SWITCH BOARD
MCC	MOTOR CONTROL CENTRE
	12 ANNUNCIATION PANEL WITH HOOTER
	TNC SWITCH WITH SPRING RETURN TO NEUTRAL AUTO / MANUAL SELECTOR SWITCH
	ONAN 11KV/433V STEPDOWN TRANSFORMER WITH OLTC
	AIR COOLED K-20 400/400V ISOLATION TRANSFORMER
	UNINTERRUPTED POWER SUPPLY (UPS)
	MOTORISED LOAD BREAK CHANGEOVER SWITCH (ATS)
	ATS

ABBREVIATIONS

LSIG	L : OVER CURRENT WITH TIMER DELAY S : SHORT CIRCUIT CURRENT WITH TIMER DELAY I : CONTINUOS SHORT CIRCUIT G : GROUND FAULT CURRENT WITH TIME DELAY

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CDAC
CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

Electrical SLD-R2

Indian Institute of Technology, Patna

REV	DESCRIPTION	DATE
R0	SLD	31/01/2024

Date
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INFRASTRUCTURE | APPLICATIONS | R&D | HRD

Centre for Development of Advanced Computing

A Scientific Society of Ministry of Electronics & Information Technology,

Government of India

Innovation Park, PANCHAVATI, Pashan Road, Pune - 411008

Tel: +91-20-25868086 / 25503673-675, Fax: +91-20-25694004

www.cdac.in / mmg@cdac.in

Additional Terms Conditions & detailed scope etc. to be read with GeM Bid Document & will be binding on the prospective bidders.

Gem Bid & CDACP/NSM-DATACENTRE-PATNA/23-24/396

CDAC, Pune invites `ONLINE' bids for Design, Site Preparation, Supply, Installation, Testing, Commissioning, and AMC services of Basic Infrastructure for the establishment of a Data Centre at Indian Institute of Technology Patna, Bihar, Patna, Bihar 801106.

Name of the Institute:	Centre for Development of Advanced Computing, Pune 411007.
Place of Supply, Installation & Commissioning, Support etc.	Indian Institute of Technology Patna, Bihta, Patna, Bihar 801106. Contact Details: Dr. Snehasis Daschakraborty, 9523726835/ Prof. Som Tripathy, 8084717331. (snehasis@iitp.ac.in / som@iitp.ac.in).
Site Visit	January 23, 2024 - 1000 hrs onwards.
Date & Time of Pre-bid meeting	23 January 2024 - 1400 hrs at site. (The link to join online meeting will beforinformed upon request.) clarifications etc., if any) write to mmg@cdac.in

Instruction for Online Bid Submission:

The bidders are required to submit soft copies of their bids electronically on the GeM Portal. More information useful for submitting online bids on the GeM Portal may be obtained at: https:// Government e Marketplace (GeM) | National Public Procurement Portal, Government of India (gem.gov.in). For any queries at: helpdesk-gem[at]gov[dot]in Toll Free Numbers (Inbound): Call 1800-419-3436 / 1800-102-3436 (9:00 am - 10:00 pm Mon to Sat) Helpdesk Outbound No's :0755-6681401, 0755-6685120, 011-69095625, 011-69095640 Railway Helpline: 011-44022666 Defence Helpline: 0755-6681450 Helpdesk Walk-In Address: 2nd Floor, Jeevan Tara Building, 5-Sansad Marg, Near Patel Chowk, New Delhi-110001. (9:00am-06:00pm Mon to Fri) For Seller related tutorials visit https://gem.gov.in/training/videos/sellers.

SECTION I – INVITATION OF BIDS

1 Introduction

This RFP is being floated to select the most appropriate vendor to build & operate the Data Center for a period of two years. The model of the proposed Data Center (DC) should be capable of enhancing capacities by incrementally augmenting the infrastructure. The monitoring of the proposed DC is planned through an Integrated Building Management System (IBMS) and therefore, the equipment's to be installed in the proposed Data Centre should be BMS compliant. As a part of this project, C-DAC invites on-line bids from eligible bidders for supply, installation, commissioning and AMC Services of Data Centre Solutions, as per the requirements stipulated in this document, at the Locations given below.

Indian Institute of Technology Patna, Bihta, Patna, Bihar 801106

2 Contact information

Materials Management Group (MMG)
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchavati Pashan Road,
Pune - 411008, Maharashtra India
E-mail: mmg@cdac.in

3 Two Bid (ePacket) System:

The bids must be uploaded on-line through GeM portal, as per GeM portal / policy

3.1 e-Packet No. 1: TECHNICAL BID (pdf format)

3.1.1 Section-I

a. **Annexure G**: The contents must be organized & submitted as per the Annexure G with proper page no containing the required information/data etc.

b. Covering Letter, as per **Annexure – A.**

c. Authorization letter (on bidder's letterhead) issued by the competent authority of bidder, authorizing the signatory to sign on behalf of the bidder, as per **Annexure – B.**

d. The Undertaking on bidder's letterhead, towards EMD as per format given in **ANNEXURE-F**

3.1.2 Section-II:

a. A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, in India as applicable.

b. A copy of GST registration certificate.

c. Copies of at least one purchase orders or contracts completed and successful installation and completion reports in the name of bidder from the end client / end user, during last three years for Data Centre work, as per para. 3.3 of Section II. Self-declarations will not be entertained.

d. Copy of at least one purchase order from the end client/ end user for data center facility management / O & M activities completed / ongoing as per eligibility para. No 3.3.1 of Section III.

e. The self-certified copies of audited balance sheets or the certificate/s from a Chartered Accountant for last three financial years indicating the annual sales turnover.

f. A photo copy of the commercial bid actually submitted **without prices** (prices masked) and copy of commercial terms and conditions (in detail) as included in the commercial bid. C-DAC reserves the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.

g. Manufacturer authorization certificate as per **Annexure-C** for, UPS and batteries, LT panels and associated component, In Row, BMS Software, etc., issued by respective OEMs.

h. The copy of registration certificate or a declaration in compliance with the provisions stipulated in office memorandum F/No/6/18/2019-PPD dated 23 July 2020 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI or Latest.

i. Certificates from respective OEMs declaring the country of OEM, country of manufacture and percentage of local contents for UPS and batteries, LT panels and associated components, In Row, BMS Software, etc. (Refer order No. P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI.) or Latest notification.

j. All the necessary documents in support of eligibility criteria

3.1.3 **Section-III:**

a. The executive summary of the bid submitted.

b. Duly filled Technical Bid (covering the details of solution, detailed bill of material, bill of quantities, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)

c. The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.

d. Design Basic Report along with annual average Power Usage Effectiveness (PUE) calculations for 25%, 50%, 75% and 100 % of IT load.

e. Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same only for In row based cooling. Applicable derations while selecting the DX based In Row units and bidder to submit selection of the product considering site ambient conditions as per ASHRAE N=20.

f. Technical Compliance matrix against all details requested as per Para. 9 of Section IV.

g. The printed catalogue / leaflet/brochures published by the principal manufacturer of the items quoted to be submitted along with the Technical Bid.

h. Legal / statutory permissions required, if any.

3.2 **e-Packet 2: FINANCIAL BID :**

The Financial Bid complete in all respects with all details filled in the `Name of the Bidder' column with name, designation and contact no. as per BOQ.xls format given in GeM Portal.

Note:
All the documents listed in e-packet-1 (Section-I, II & III) and e-packet-2 must be arranged in the flow / in sequence as mentioned as per **Annexure-G** strictly.
C-DAC reserves the right to reject the bid, if any of the above listed documents are not submitted.

4 Pre-Bid Meeting – Date/ Time/ Venue / Online:

The pre-bid meeting will be held as given in schedule to sort out/resolve queries raised by the prospective bidders regarding the GeM Bid Document scope, conditions, terms & conditions etc. The prospective bidders requiring any clarification of the bidding document may send their queries in writing through e-mail in the format given below (word format). C-DAC, Pune will respond to these queries during the pre-bid meeting. The queries/doubt/clarifications etc. must be sent at least two days prior to the date of pre-bid meeting.

Name of the bidder:			
Sr.	**Section / Page and Clause Reference**	**Query from bidder**	**C-DAC Response**
1			
2			

5 Last Date of submission of bids:

Last date for submission of e-bids through GeM portal shall be as per dates/ time given in GeM Bid Schedule

6 Opening of on-line e-bids

The technical e-bids will be opened as per through the GeM Portal as per the schedule given**.**

7 Opening of commercial e-bids:

Commercial e-bids of the qualified bidders only will be opened. The decision of C-DAC's bid evaluation committee in this regard will be final and binding on bidders. C-DAC's bid evaluation committee will be authorised to take appropriate decision on minor deviations, if any.

The date, time and venue of opening of commercial bids will be informed later as per GeM portal/policy to the qualified bidder. The financial bids will be opened `on-line' through GeM portal/GeM portal/app.

The bidder's name, bid prices and other appropriate details will be displayed after the opening of the commercial bids.

(END OF SECTION I)

SECTION II – INSTRUCTIONS TO BIDDERS (ITB)

1 Locations for Supply, Installation, Commissioning, Warranty Services & AMC Services

The entire data centre solutions as described in Schedule of Requirements must be supplied, installed, commissioned & supported at :

Indian Institute of Technology Patna, Bihta, Patna, Bihar 801106 - details as per the GeM Bid Document Schedule.

2 Order Placements & Payment by

The orders will be placed and payments shall be released by
Centre for Development of Advanced Computing (C-DAC),
Innovation Park, Panchavati, Pashan
Pune 411008, Maharashtra, INDIA

3 Eligibility Criteria

Only the bidders complying with following eligibility criteria will qualify for opening of commercial bids and for further processing.

3.1 The bidder must submit all the documents listed at para 3 Section – I above, along with the technical bid.

3.2 The bidder should be an entity registered in India under appropriate Indian Laws. Certificate for the same should be submitted along with the bid.

3.3 The bidder must have successfully executed at end client sites at least 1 numbers of data centres in India in last Three years. Each of the data centres should be with minimum of UPS feeding power of 100 KVA (excluding redundancy) means supplied, installed, tested and commissioned and minimum feeding cooling load of 35 Tons (excluding redundancy) means supplied, installed, tested and commissioned. UPS and cooling to be considered only for server area and along with Fire- fighting and suppression systems with high end integration of building management system and all the allied works required for successful installation & completion of the Data Centre. This order should be on the name of bidder issued by the end client.

3.3.1 The bidder should have undertaken/ completed the activities of providing on-site support and facility management / O & M services to at least one data centre. The scope of the activity should cover operation and maintenance of Electrical Systems, Cooling systems (In ROW, PAC, PAHU etc.) UPS and Battery, IBMS etc. Bidder to provide the documentary evidence that minimum three technical manpower had deployed at site and maintaining electrical system and cooling system. Such Data center must have minimum cooling load of 40 Tons.

3.3.2 A summary of the relevant project as stipulated above implemented covering all the details must be enclosed with the Technical Bid.

3.4 Bidder should have minimum turnover of Rs. 5.0 Crores for each of the last three financial years.

3.5 If the bidder is not a principal manufacturer of Data Centre components, the undertaking/s (in original) from the respective OEMs/principal manufacturers (on the letterhead), as per format given in **Annexure-C** must be submitted for the components such as UPS and battery, LT panels and associated component, In Row, PAC, BMS Software etc. (in e-packet – 1- Section-II).

3.6 The principal manufacturers/ original equipment manufacturer (OEM) of Data Centre components viz. UPS, In Row should have service center in the respective state of site location. Documentary evidence for the same to be provided.

3.7 The bidder must submit all the documents as per Document Checklist – **Annexure-G**, with appropriate page nos for the same. The flow of the submitted documents must be in the same order.

3.8 The bidder must not be blacklisted by any Central / State Govt. Organizations of India as on date of submission of the bids. A certificate or undertaking to this effect must be submitted (Annexure – A).

3.9 The bidder must comply with the provisions of Office Memorandum: F/No/6/18/2019-PPD dated 23rd July, 2020, issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, GoI, or Latest Notification.

3.10 The solution offered must comply with the provisions of Order No P-45021/2/2017-PP (BE-II). Dated 4th June, 2020 issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW-MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI, or Latest Notification.

Note: The bidder should provide sufficient documentary evidence to support the eligibility criteria and exemptions mentioned. C-DAC reserves the right to reject any bid not fulfilling the eligibility criteria.

4 Exemptions

If in the view of bidder, any exemption / relaxation is applicable to them from any of the eligibility requirements, under any Rules / process/ Guidelines/ Directives of Government of India, bidder may submit their claim for the applicable exemption /relaxation, quoting the valid Rule/ process/ Guidelines/ Directives. In this case the bidder must submit necessary and sufficient documents along with the technical bid, in support of his claim. The decision about granting the exemption/ relaxation will be taken by the bid evaluation committee which is empowered to grant exemption/relaxation & as per declared on the GeM portal.

5 Local Conditions

It will be incumbent upon each bidder to fully acquaint himself with the local conditions and other relevant factors at the proposed Data Centre site which would have any effect on the performance of the contract and / or the cost. The Bidder is expected to make a site visit to the proposed Data Centre facility to apprise them self and obtain all information that may be necessary for preparing the bid and entering into contract.

Failure to obtain the information necessary for preparing the bid and/or failure to perform activities that may be necessary for the providing services before entering into contract, will in no way relieve the successful bidder from the responsibility of performing any work in accordance with the GeM Bid Document. It will be imperative for each bidder to diligently be informed of all legal conditions and factors which may have any effect on the execution of the contract as described in the bidding documents. C-DAC Pune shall not entertain any request for clarifications from the bidder regarding such conditions. It is the responsibility of the bidder that such factors have properly been investigated and considered while submitting the bid proposals and that no claim whatsoever including those for financial adjustment to the contract awarded under the bidding documents will be entertained by C-DAC Pune and that neither any change in the time schedule of the contract nor any financial adjustments arising thereof shall be permitted by the C-DAC Pune on account of failure of the bidder to appraise himself of local laws and site conditions or otherwise.

6 C-DAC Right to amend / cancel

6.1 At any time prior to the deadline for submission of bids, C-DAC may, for any reason, whether on its own initiative or in response to the clarification request by a prospective bidder, modify the bid document.

6.2 The amendments to the GeM Bid Documents, if any, will be notified by release of Corrigendum Notice on the GeM portal / www.cdac.in against this GeM Bid Document. The amendments/ modifications will be binding on the bidders.

6.3 C-DAC at its discretion may extend the deadline for the submission of bids if it thinks necessary to do so or if the bid document undergoes changes during the bidding period, in order to give prospective bidders time to take into consideration the amendments while preparing their bids.

6.4 C-DAC reserves the right to cancel the entire RFP without assigning any reasons thereof

7 Precautions while preparing the Bids

Bidder should avoid, as far as possible, corrections, overwriting, erasures or postscripts in the bid documents. In case however, any corrections, overwriting, erasures or postscripts have to be made in the bids, they should be supported by dated signatures of the same authorized person signing the bid documents. In case of discrepancies and/ or calculation errors, if any, the lower of the unit prices and/or amounts shall only be considered for comparison of bids. Only Single technical solution to be submitted.

8 Earnest Money Deposit (EMD)

8.1 The bidder must submit the undertaking towards Earnest Money Deposit (EMD / bid security), as per format given in **Annexure-F subject** to the conditions stipulated therein

9 Period of validity of bids

9.1 Bids shall be valid for minimum 180 days from the date of submission. A bid valid for a shorter period shall stand rejected.

9.2 C-DAC may ask for the bidder's consent to extend the period of validity. Such request and the response shall be made in writing only. The bidder is free not to accept such request. A bidder agreeing to the request for extension will not be permitted to modify their bid.

10 Submission of Bids- Online

The Bid documents shall be neatly arranged. They should not contain any terms and conditions, printed or otherwise, which are not applicable to the Bid. The conditional bid will be summarily rejected. Insertions, postscripts, additions and alterations shall not be recognized, unless confirmed by bidder's signature.

11 Late Bids

C-DAC shall not be responsible and liable for the delay in receiving the bid for whatsoever reason. C-DAC will not be responsible for any issues arising/pertaining with the GEM Portal for non-submission, failure in submission of bids on-line. Bidders are advised to submit e-bids well in advance of the last date and time of submission so the bids. C-DAC will not be responsible for failure in submission/upload of bids for non-working of the on-line portal at last day/hours of submissions of bids.

12 Evaluation of Bids

The bids will be evaluated in two steps.

12.1 The bids will be examined based on eligibility criteria stipulated at para 3, Section – II of this document, to check the eligibility of the bidders. The technical bids of only the eligible bidders will be evaluated based on technical requirements stipulated in the RFP.

12.2 Only the bidders, whose technical bid is found to meet the requirements as specified above will qualify for opening of the commercial bid and will be informed about the date and time of the opening of the commercial bid though the GeM portal as per the GeM policies.

12.3 The decision of the TEC with respect to complete technical evaluation is final and binding on all the bidders.

12.4 During evaluation of the bids C-DAC at its discretion may ask the Bidder for clarification of its Bid. The request for clarification and the response shall be in writing, and no change in the prices is permitted. If required C-DAC may invite the Bidders for technical presentation on the solution offered. During the process of evaluation of bids, if any discrepancies are observed in the bid submitted, the bidders may be given an opportunity to clarify on same. If in the view of bidder, any change in quantity, make or model is required or any additional items are required, for clearing the said discrepancy, the bidder has to arrange for said change and/or addition of material without any increase in the prices quoted.

12.5 If the information provided by the bidder is found to be incorrect/misleading at any stage/time during the GeM bidding Process, C-DAC reserves the right to reject all such incomplete bids.

12.6 Only technical bids receiving a score greater than or equal to a cut-off score of 70 marks out of maximum 100 marks will be processed further.

Sr. No	Evaluation Factor Points	
1	Technical Ability	
	Evaluate this factor based on review of the technical proposals.	
	Qualifications based on eligibility criteria as Turn Over, experience in similar project as defined in GeM Bid Document	5
	Understanding of the project based on Technical documents and drawing. Justify the Strengths that make the bidder is Technically Superior. Bidder has understood objective of the project.	10
	Innovativeness -Any value-added solution without changes in the specifications	5
	Proposed Project Plan Quality and methodology should be in line with Requirements. Does the bidder address the timeliness which are relevance to the GeM Bid Document Requirement specially to the Data Center Project. Deployment of quality and experienced technical manpower at site including Project manager and experts in the field of Electrical, Mechanical, I- BMS, Controls and Automation. Bidder to indicate number of such man power getting deployed at site and submit the resume of such expertise.	10
	Risks and Added Value Assessment	5
	Proposed Operation and Maintenance Plan in line with GeM Bid Document Requirement	5
	Subtotal -	**40**
2	Past Performance	
	Evaluate this factor based on Past Experience of Work Carried out either with CDAC or other similar work experience with other clients by reference check. Experience in delivering the Data centre and building construction in-line with timelines stipulated for this GeM Bid Document shall be given weightage.	
	Subtotal – Past Performance	**20**
3	Financial Ability and Risk Ranking	
	Evaluate this factor based on finical report/ balance sheet, Turn Over.	
	Subtotal-	**10**
4	Presentation	
	Presentation by the bidder along with the Key management team, Key Technical team Staff, holding owner/employee position in the organization. Presentation should cover bidders in depth understanding of the project for the Electrical , Mechanical, I - BMS, Civil etc. related work, execution Competency and Project execution Plan for this project with timelines(Critical Path timeline), Human Resource Demographics and Deployment for this project (Manpower Deployment Chart), Testimonials & Site ref, Approvals capability, List of Completed and Ongoing Projects, Tools & technology etc. The person responsible for the supervision of the contract performance shall be present during this presentation. The proposed Senior Executive are also expected to be the part of this presentation and must, at a minimum, answer questions directed to him/her during the question-and- answer session. In case of a Consortium, all Senior Executive of members of the Consortium Firm must be also present during the presentation	
	Sub Total -	**30**
	Total	100

13 Comparison of Bids

13.1 Only the technically qualified bids as per terms and conditions stipulated in this document shall be considered for opening and evaluation of price bid.

13.2 The total price including the applicable GST amounts, along with the comprehensive warranty support and Operation & maintenance charges for first two years as per price bid format will be considered for the purpose of comparison of bids and for calculating the L1 bidder(@rates quoted by the bidder or tariff rates, whichever are less), as per the GeM portal policies, as appeared and calculated on the GeM portal.

13.3 The date for opening of price bids will be communicated to the qualified bidders through the GeM portal.

14 Award of Contract

C-DAC reserves the right to award the contract to the qualified bidder whose technical bid has been accepted and determined as the lowest evaluated price bid, as declared by the GeM portal after Reverse Auction, if any.

14.1 However, C-DAC reserves the right and has sole discretion to reject the lowest evaluated bid.

14.2 If more than one bidder happens to quote the same lowest price, C-DAC reserves the right to place the order with the bidder who has installed a Data Centre with more IT Electrical load at single site. The decision of C-DAC shall be final for awarding the contract.

15 Purchaser's Right to amend / cancel

15.1 C-DAC reserves the right to amend the eligibility criteria, commercial terms & conditions, Scope of Supply, quantities, technical specifications etc. The same shall be published on the Portals.

15.2 C-DAC reserves the right to cancel the entire or partially GeM Bid without assigning any reasons thereof.

15.3 C-DAC reserves the right to reject the bid submitted by the lowest evaluated bidder.

(End of Section - II)

SECTION III – SPECIAL CONDITIONS OF CONTRACT

1 Prices

a. The prices quoted shall remain firm and no price escalation will be permitted till completion of order.

b. The prices quoted must be inclusive of packing & forwarding, freight, insurance, loading, unloading charges /entry tax/road permit charges and allied charges till destination at site.

c. The group-wise prices must be quoted for all the items as per format given in **Section – V**.

d. Over and above the comprehensive warranty for first two years the successful bidder is required to quote for the following services:

i. Operation and Maintenance for first two years.

Before the placement of order, the successful bidder must submit the detailed Bill of Material, giving price for each individual line item, keeping the total price quoted un-changed. The order will be placed on the basis of this BoM. The supplier must ensure that their invoice exactly matches this BoM, so as to avoid any payment complications

2 Taxes and Duties:

Bidder must indicate applicable GST amounts separately. The bidder should exercise utmost care to quote the correct amounts of GST on each item. Any revision in statutory tax /duty structure as on date of supply/ invoice, shall be considered, as applicable.

2.1 In case of any error/ oversight in GST amount quoted by the bidder, the bidder will not be permitted to rectify the error/oversight. The orders/ contract will be placed with the GST amounts quoted by the bidder or actual applicable amount (as on placement of order), whichever is **LOWER.** The difference amounts payable, if any, between the quoted GST amount and applicable amount shall be borne by the bidder.

2.2 Notwithstanding the para above, if the GST is not quoted separately and the bid is silent whether GST is included or excluded in price, for the purpose of evaluation of bids, the prices shall be taken as quoted with GST. As the contract/order is generated through the GeM portal the same will be as per the quoted, calculated prices. The GST applicable, if any will be borne by the bidder/contractor

3 Project Timeline

All the items covered in the Schedule of Requirements (**Section – IV**) must be supplied, installed and commissioned within 5 months (Twenty weeks) from the date of award of Contract / placement of order.

4 Payments (In INR only)

a. 70% amount of the cost of UPS and batteries, LT Panels, In Row, PAC, Filled NOVEC Cylinder etc. will be released within 30 days of on receipt of these components at site along with tax invoice and against physical verification and acknowledgement by C-DAC and/ or end user - with 30 days credit period.

b. 20% amount of the cost of UPS and batteries, LT Panels, In Row, PAC, Filled NOVEC Cylinder etc. and 90% cost of the remaining supplied items and 90% charges towards installation and commissioning of the system will be released on successful installation, commissioning of the solution. This portion of payment shall be subject to acceptance and submission of Integrated System Acceptance Test (ISAT) report to C-DAC. In case of delay in integration and commissioning of the DC with HPC system for the reasons attributed to C-DAC beyond 60 days, this portion of payment will be released against submission of bank guarantee of equivalent amount. This Bank Guarantee will be released on successful completion of installation, commissioning and ISAT of the solution.

c. Balance 10% payment above charges will be released on successful installation & commissioning of solution against submission of PBG. The PBG must be submitted within 30 days from the date of successful installation(s) and ISAT.

d. The proportionate payments towards Operation and Maintenance charges for first two years will be released on post quarterly basis within 15 days on submission of acceptance and site reports etc with invoice.

e. The penalties - if any, towards SLA will be deducted from the quarterly payments payable.

f. The applicable TDS will be deducted.

g. The payments shall be remitted through NEFT/RTGS only.

Note: All the payments are subject to submission of the valid and complete tax invoices.

5 Security Deposit (SD)

The successful bidder will be required to furnish the Security Deposit in INR equivalent to 5% of the Contract/Order value (excluding taxes) within 21 days of award of Contract / receipt of Order(s). The Security Deposit should be submitted in the form of Demand Draft drawn in favor of C-DAC payable at Pune or in the form of Bank Guarantee in the name of C-DAC, Pune. The Bank Guarantee submitted towards Security Deposit should be issued by a Scheduled Commercial Bank and must be valid for a period of 6 months. The Security Deposit will be returned within 30 days upon completion of installation, commissioning and ISAT, and on submission of Performance Security.

6 Performance Security

The successful bidder will be required to furnish the Performance Security towards the Data Centre Solutions supplied, in the form of a Bank Guarantee in INR equivalent to 3% of the invoice amount (except for O & M charges and excluding taxes), as per the format attached to this document. This bank guarantee should be submitted along with the invoice after successful installation and commissioning of the Data Centre solution. The Bank Guarantee should be from a

Scheduled Commercial bank and shall remain valid for the period of 25 months from the date of installation and ISAT. The PBG must be negotiable at a branch of issuing bank in Pune.

C-DAC reserves the right to invoke the Performance Bank Guarantee(s) submitted by bidder, in case of the following:

a. The Item/Components fail to achieve the performance as stipulated in this document or
b. The bidder fails to provide the comprehensive warranty and other services in scheduled time frame, as stipulated in this document or
c. The bidder delays to provide the warranty services as stipulated in this document.

7 Completeness Responsibility

The bidders may please note that this is a contract on 'Turn-key' basis. Notwithstanding the scope of work, engineering, supply and services stated in bid document, any equipment or material, engineering or technical services which are not specifically mentioned under the scope of supply of the bidder and which are not expressly excluded there from but which – in view of the bidder - are necessary for the required performance of the datacenter solution in accordance with the RFP specifications are treated to be included in the bid and has to be implicitly performed by bidder. In no case, the bidder will be permitted to increase the prices quoted.

8 Comprehensive Warranty

The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. The supplier further warrants that all Goods supplied under this contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the Purchaser's specifications) or from any act or omission of the supplier. The warranty should be comprehensive on site, repair/replacement basis free of cost.

Note: - Supplier has to do the AMC / PM of all the supplied equipment as per the standard schedule with no additional charges to C-DAC. Any consumables required shall be paid by CDAC. The supplier has to take prior approval from C-DAC before using any consumables.

All the equipment and components supplied must have **two years** onsite comprehensive warranty from date of successful installation, commissioning and signing of ISAT.

SLA and managed service scope as per **Annexure - H.**

9 Post warranty AMC (OPTIONAL)

The bidder should quote for post warranty AMC services towards the integrated datacenter solution/sub-systems supplied and installed. The AMC charges should be for 3rd year, 4th year and 5th year from the date of successful installation and ISAT of datacenter solution at respective locations. The AMC charges per year should be quoted as per price format given in Section V of this document and **must not be more than 7% of the cost of capital items supplied. An undertaking to the effect must be submitted by the bidder towards the same.**

The post AMC charges will be binding on the bidder. C-DAC/IIT Patna reserves the right to enter or not into the AMC after the end of warranty period.

10 Penalties

CDAC reserves the right to levy penalties for each site, as given below.

Sr. No	Parameters	Penalty
A	Penalty for Delayed Deliveries and installation	0.5% of order value per week for delay in installation and commissioning beyond schedule. If the delay is more than 10 weeks, C-DAC reserves the right to cancel the Contract/ Order. In case of in ordinate delay on the part of bidder in completing the work and cancellation of Purchase order, C-DAC will arrange to complete unfinished work through suitable contactor and expenses incurred by C-DAC in doing of such work shall be recovered from the bidder. Any delay because of CDAC, conditions arising out of Force Majeure will not be considered while calculating the delay period for penalties. i.e. total 5% of maximum penalty shall be levied against Delayed Deliveries and installation
B	Penalty if uptime of Data Centre components. Measured on quarterly basis is (as per calendar year)	Penalty for downtime shall be levied as given below in B.1, B.2, B.3 which will be over and above the penalty mention above in para-A.
1	Less than 98.5% but more than 97.5% in a quarter	Penalty @0.2% of the order value per quarter.
2	Less than 97.5%	Penalty @1% of the order value per quarter.
3	Less than 95%	C-DAC reserves the right to terminate the contract and invoke the performance bank guarantee.
	Capping	The maximum penalty as stipulated in Para A and B above put together will be capped to 10% of the order value.

The detailed mechanism / method for arriving at the measurable parameters mentioned in table above is covered in the **Service Level Agreement (SLA) as per Annexure –H,** to be signed before award of contract/ release of Order.

11 Force Majeure

C-DAC may consider relaxing the penalty and delivery requirements, as specified in this document, if and to the extent that, the delay in performance or other failure to perform its obligations under the contract is the result of an Force Majeure. Force Majeure is defined as an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods,

storms etc.), acts of states / state agencies, the direct and indirect consequences of wars (declared or undeclared), Pandemic, hostilities, national emergencies, civil commotion and strikes at successful Bidder's premises or any other act beyond control of the bidder.

12 Arbitration

In case any dispute arises between the C-DAC and successful bidder with respect to this RFP, including its interpretation, implementation or alleged material breach of any of its provisions both the Parties hereto shall endeavor to settle such dispute amicably. If the Parties fail to bring about an amicable settlement within a period of 30 (thirty) days, dispute shall be referred to the sole arbitrator mutually appointed by both parties. If the sole arbitrator is not appointed mutually by both the parties then the District Court Pune shall have exclusive jurisdiction for appointment of sole arbitrator through court. Arbitration proceedings shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 and Rules made there under, or any legislative amendment or modification made thereto. The venue of the arbitration shall be Pune. The award given by the arbitrator shall be final and binding on the Parties. The language of arbitration shall be English. The common cost of the arbitration proceedings shall initially be borne equally by the Parties and finally by the Party against whom the award is passed. Any other costs or expenses incurred by a Party in relation to the arbitration proceedings shall ultimately be borne by the Party as the arbitrator may decide. Courts in Pune only shall have the exclusive jurisdiction to try, entertain and decide the matters which are not covered under the Arbitration and conciliation Act.

13 Risk and Ownership

All risks, responsibilities and liabilities in respect of goods delivered at site shall remain with selected bidder till they are successfully installed and commissioned at site and taken over by end users. Part deliveries shall not be treated as deliveries. Only full deliveries of all items ordered will be considered as delivery. The ownership of the items delivered at site, shall be of C-DAC Pune on successful installation of items.

14 Indemnity

The successful bidder shall indemnify, protect and save C-DAC Pune from/against all claims, losses, costs, damages, expenses, action suits and other proceeding, resulting from/arising out of:

1. Infringement of any law pertaining to intellectual property, patent, trademarks, copyrights etc. by the bidder or
2. Such other statutory infringements in respect of all the equipment's supplied by successful bidder, or
3. Caused due to any act/omission/performance/under or non or part performance/failure of the bidder.

15 Assignment

Selected bidder/ Party shall not assign, delegate or otherwise deal with any of its rights or obligation to other parties under this Contract, without prior approval of C-DAC.

16 Severability

If any provision of this Contract is determined to be invalid or unenforceable, it will be deemed to be modified to the minimum extent necessary to be valid and enforceable. If it cannot be so modified, it will be deleted and the deletion will not affect the validity or enforceability of any other provision.

17 Termination

Validity of purchase order/rate contract will remain till fulfillment of all obligations (including but not limited to providing comprehensive warranty / support till completion of two years from acceptance of the entire integrated solution as a whole) by the successful bidder.

In case of the delays in providing the stipulated services, and /or defect/delay/under or non-performance pertaining to the services / products supplied by the bidder, C-DAC Pune will give written notice to the bidder directing to set the things right within 30 days of notice. If bidder fails to comply with the requirements, C-DAC Pune shall have the right to terminate the contract and / or cancel the order/s. The successful bidder agrees and accepts that he shall be liable to pay damages claimed by C-DAC, in the event of termination of contract / cancellation of order, as detailed in this RFP. The successful bidder may terminate the contract by at least 30 days' written notice, only in the event of non-payment of undisputed invoices beyond 90 days from the due date or in the case of delay or default by the Buyer/IIT Patna in providing encumbrances free site fronts or right to access site or approach road to site. Except this situation, the successful bidder shall have no right of termination.

"C-DAC Pune will release the due amount payable to successful bidder towards the material and / or services provided till the date of termination, those are accepted by C-DAC Pune. However, the amount towards penalty, if any will be deducted from the payable amounts."

C-DAC reserves the right to terminate the contract / cancel order with or without cause/ reason, by giving 90 days' notice to the successful bidder.

18 Limitation of Liability

The liability of the Bidder / Contractor arising out of breach of any terms/conditions of the GeM Bid Document / contract/work order and addendums/amendments thereto, misconduct, willful default will be limited to the total contract value. However, liability of the bidder in case of death/injury/damage caused to the personnel/property due to/arising out of/incidental to any act/omission/default/deficiency of bidder/contractor will be at actual. In no event shall either Party, its officers, directors, or employees be liable for any form of incidental, consequential, indirect, special or punitive damages of any kind

19 Disclaimer

The purpose of this RFP is to provide the bidder(s) with information to assist the formulation of their proposals. This RFP does not claim to contain all the information each bidder may require. Each bidder should conduct his own investigations and analysis and should check the accuracy, reliability and completeness of the information in this RFP and where necessary obtain

independent advice. C-DAC Pune makes no representation or warranty and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this RFP.

20 Jurisdiction

The disputes, legal matters, court matters, if any shall be subject to Pune jurisdiction only.

21 Corrupt or Fraudulent Practices

It is expected that the bidders who wish to bid for this project have highest standards of ethics.

C-DAC Pune will reject bid if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices while competing for this contract.

C-DAC Pune may declare a vendor ineligible, either indefinitely or for a stated duration, to be awarded a contract if it at any time determines that the vendor has engaged in corrupt and fraudulent practices during the award / execution of contract.

22 Interpretation of the clauses in the GeM Bid Document/ Contract Document

In case of any ambiguity/ dispute in the interpretation of any of the clauses in this GeM Bid Document, the interpretation of the clauses by Director General, C-DAC shall be final and binding on all parties.

(End of Section- III)

SECTION IV – SCHEDULE OF REQUIREMENT

This Section covers the general and technical requirements of Data Centre components.

1 Data Centers on Turn-key Basis

The Data Centre is required to be built on 'Turn-key' basis. The successful bidder should build the entire data center infrastructure which includes civil works, interiors, environmental controls like humidity, temperature etc., security (including access/ CCTV / monitoring equipment), electrical systems, power systems, In Row, Piping, Fire alarm and suppression, BMS etc. as specified. The responsibility towards required material/items/equipment's, work, man power etc. rests with the successful bidder. The overall requirements and available information/ data/documents are included in this Section. The bidders are advised to go through same and visit the sites before working out the details in this perspective and submit the solution document complete in all respects.

2 Background

Under National Super Computing mission (NSM) Phase-3 at Indian Institute of Technology Patna, , Bihar 801106, implementing agency C-DAC is going to build data center for housing HPC Cluster of min. 838 TF capacities which includes server racks as well as storage rack.

3 General Requirements:

The general requirements applicable to the data centres are given below. Other than these requirements, depending on the site conditions, the bidder may propose appropriate changes in other requirements. However, the responsibility towards successful installation and commissioning and smooth running of data centres rests with bidder only.

3.1 The solution shall comprise of supply, installation, testing, commissioning training and handing over of all materials, equipment, hardware, software, appliances and necessary labour to commission said system complete with all the required components strictly as per the latest IS, IEC, IEEE, ASHRAE, ASHRAE TC9.9 2017, NBC etc. codes.

3.2 Also, the scope includes the supply, installation & commissioning of any material or equipment including civil works that are not specifically mentioned in the specifications and design details but are required for successful commissioning of the project.

3.3 The vendor shall provide detailed design, documentation, make, and model, efficiency including user, system and operation manuals along with the necessary diagrams, design drawings and details bifurcation of Bill of Quantity (BOQ) along with details description. Design drawing should include but not limited to Single Line Diagram, Lighting drawing, , equipment sizing and selection along product selection calculations etc. with clear sectional drawings for server and utility room, interior, raised flooring, false ceiling, fire rated glass partitions, complete BMS system required for data centre etc.

3.4 The vendor shall take the necessary clearance / approval of the drawings, design, quality of material, make and model of the quoted material etc. prior to the execution of the project

3.5 The Data Centre should be complete in all respects.

3.6 Electrical power and water during construction will be provided at one location. Client i.e. IIT Patna shall not provide any accommodation for the contractor and his staff including labor.

3.7 The scope of installation, configuration, integration and commissioning shall mean to install and configure all components and subsystems integrating the Building Management System with the required components, integrating the entire facility and make the system operational as per scope of work.

3.8 To assess the efficiency of the data centres the power usage effectiveness (PUE) will be computed as

3.8.1 $$PUE = \frac{\text{Total Power (IT + NON IT)}}{\text{IT power}}$$

3.9 The acceptance test shall cover the following scope:

3.9.1 Factory Test Reports

Bidder shall provide factory test report for all products after testing each parameter of products as per their standard test procedure.

- Electrical panels including
- In Row unit DX based
- UPS and battery

4 Design of Data Centre

The proposed designs and indicative dr a w i ng s enclosed in the RFP document are for reference and for the purpose of bidding. The vendor so finalized would be required to make the necessary shop drawings within the layouts so as to arrive at a final scheme in line with the requirements and in accordance with the requirements of Indian standards, IEC, IS,IEEE,NBC etc. However no change whatsoever in the price schedules would be allowed after the award of the work and the price shall remain firm throughout the project and the entire works are to be executed within the quoted price schedules.

The shop drawings during execution should include the following, but is not limited to,

a) Floor plan with design layout and detailed drawings, showing necessary sections etc.

b) Layout of raised floor and false ceiling layout

c) Electrical diagrams (including UPS, SLD, Lighting, Earthing, Equipment Layout, Power Distribution etc.)

d) Cooling system layout with (Equipment Layout, Schematic etc.)

e) Fire detection and suppression plan/ layout

f) Access Control Plan

g) Surveillance camera placement plan

h) Environment monitoring system placement plan

5 Design Inputs

Tables given below are the details of exact load parameters. These values are given to the bidders to come out with appropriate configuration and sizing. The major sub systems of the DC infrastructure are:

a) UPS along with Batteries

b) Electrical Panel, Instrumentation etc.

c) Raised Flooring and False Ceiling

d) DX based In row units with air cooled condenser and related work

e) I-BMS System

f) Electrical Panels and cables

g) 45 U Racks

h) Illumination system

i) Earthing System

j) Etc.

The specifications and requirement of the entire solution is stipulated in the RFP with respect to the design and solution, certain indicative inputs like layout, SLD etc. are provided. Bidder may follow the indicative inputs provided in this RFP or come out with innovative design which is optimal and cost effective without violating any of the specifications given.

5.1 The envisaged IT load for data center: 132 KW max.

Sr. No	Description	Power in Kw/Rack	Qty.
1	Server Rack-1 -CPU	28.13	1
2	Server Rack-2 -CPU	28.13	1
3	Server Rack-3 -CPU	29.23	1
4	Server Rack -4-CPU+GPU	28.13	1
5	Storage rack-1	10	1
6	Spare Rack	8	1

6 Requirements towards Civil/Interior work

6.1 Civil architecture and preparation of data center: Interiors of the data centre (including, civil works, foundation work, raised floor, false ceiling, fire rated paint, fire rated partitions, fire rated glass partition, fire rated glass doors, fire rated glass sliding door etc.)

6.2 METAL GRID CEILING: The drop ceiling shall be provided with Armstrong Lay in (Hot dipped galvanized steel) metal ceiling system 600 x 600 x 5 mm with standard 2.5 mm dia (16% open

space) and fleece with NRC (Non Directional Visual) of 70 & CAC 36 (CAC is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces) to be laid on Armstrong grid system. The modular ceiling sheets with necessary fittings should be done up aesthetically to integrate with the lighting.

6.3 Raised flooring: Suitable raised false flooring as per prevailing standards should be provided as per site requirements. The entire Access floor system shall be made from high density cementatious board and provide Class O as per BS 476 PART 6 for Fire propagation index and Class 1 as per BS 476 Part 7. Fire Ratings tested as per CIRC 91/61 or BS 476 Part 6 & 7 fire resistance up to 60 min as per NFPA. System should have antistatic property and air leakage resistance. The system shall be able to withstand a minimum UDL of 2500 kg per sq meter and a point load of minimum 600 kg. and rolling load of minimum of 300 Kg.

6.4 Panel should meet the below requirements:

6.4.1 The panel shall be coated with epoxy coating on the exposed surface. Have an infill of light weight cementitious material. Insulated against heat and noise transfer. Panels shall be finished with High Performance Anti-Static Laminate. Panels will remain flat through and stable unaffected by humidity or fluctuation in temperature throughout its normal working life. Panels will provide for impact resistance top surfaces minimal deflection, corrosion resistance properties and shall not be combustible or aid surface spread of flame. Panels will be insulated against heat and noise transfer. Panels will be 600 x 600mm and fully interchangeable with each other within the range of a specified layout. Panels shall rest on the grid formed by the stringers which are bolted on to the pedestals. Panels shall be finished with anti-static 0.9 mm Laminate and thick plastic edge material that is self-extinguishing and will be PVC free. Panel should withstand a Concentrated Load of minimum 600 Kg applied on area 25mm x 25mm in the centre of the panel which is placed on four steel blocks without deflecting more than 2.5mm and without setting permanently more than 0.20mm

6.4.2 Pedestal installed to support the panel will be suitable to achieve a finished floor height of 300mm. Pedestal design will confirm speedy assembly and removal for relocation and maintenance. Pedestal base to be permanently secured to position on the sub-floor. Pedestal assembly will provide for easy adjustment of leveling and accurately align panels to ensure lateral restrain. Pedestals will support an axial load of minimum 1500 Kgs, without permanent deflection and an ultimate load of 2500 Kgs. Pedestal head will be designed to avoid any rattle or squeaks.
Pedestal should have GI Base plate of suitable dimensions, GI Pipe, check nut for level adjustment, threaded stud with GI pedestal head, all screws etc.

6.4.3 Understructure (US) system consists of stringers to form a grid of 600 x 600mm. These stringers are locked into the pedestal head and run both ways. The US system will provide adequate solid, rigid and quiet support for access floor panels. The US system will provide a minimum clear, uninterrupted height of 300 mm between the bottom of the floor and bottom of the access floor for electrical conducting and wiring The stringer shall be hot dipped galvanized steel cold roll construction specially designed to stabilize lateral stability and to support the panels on all sides for alignment. The channels shall have counter sunk holes at both ends to accommodate bolting of the same to the pedestal head assembly. Earthing point connections are to be part of standard design. The longitudinal ribs and flaps in the lower part should be designed to increase flexion resistance. The grid formed by the pedestal and stringer assembly will receive the floor panel.

6.4.4 Bidder to consider to providing 2 nos. 2-point panel remover, lead, lift, steps for 300mm raised floor etc.

6.5 Fire Rated Steel Door-two hours- Two hours fire rated double skin steel door constructed from 1.25mm thick galvanized steel sheet formed to provide a 46mm thick fully flush door shell with lock seam joints at stile edges and the internal construction of the door should be specially designed Honey Comb structure with reinforcements at top, bottom and stile surround. The door frames and door shutters should be primed with Zinc-Phosphate Staving Primer and finished with Polyurethane Aliphatic grade or epoxy paint as per approved manufacturer specifications. Door if used for Emergency purpose is required to be with Panic bar. The Fire Doors are to be fully insulated and shall be tested as per IS: 3809-1979, ISO: 834-1975, IS: 3614 (PART-II)- 1992 and BS 476 (PART- 20 & 22)- 1987 under live fire conditions, The wired glass is to comply with both BS 476: PART 22 and BS 6206 relating to fire resistant and impact performance.

6.6 Fire rated Partition/ Walls: Partition walls within the data centers should have 2-hour fire rated. Suitable smoke seals should be used. Fire line boards should conform to IS:2095 – 1996-Part-I. Providing and fixing minimum 132MM thick FIRE RATED gypsum board partitions with 2 Nos. x 15mm thick fire line board on both sides of 72mm GI floor channel and 70mm Square MS Pipe stud as per specifications, including cost of chasing for electrical conduits. This item includes all tools, tackles, material, labor, fixture adhesives sealants etc. for the complete work.

6.7 Opening for the Cables or other utility services which are coming inside the building needs to be sealed by Fire resistance board system, water-soluble fire-retardant solutions, fire expanding foam etc. having minimum of 2 hours' fire rating when tested in accordance with BS 476 part 20 and UL 1479 for horizontal and vertical openings in RCC slabs, Beams, walls, Brick masonry or Gypsum partitions for passing service shafts. The service lines could be of various types like electrical cables, cable trays or metal pipes etc. The foam shall have Acoustic property as per DIN 4109 and Smoke and Air Seal. The Foam should have the feature of Re penetrability for future maintenance or repair activities. Fire soluble cable coating Should be suitable for protecting against spread of flame on timber panels and tested as per IEC 332-part 3 standard for reduced spread of flame & tested as per FM Class 3971. It should have no derating effect on cables, free from fiber, asbestos, odorless and solvent free, flexible when dry after application.

6.8 Room Signage and fire evacuation map. Providing & fixing Aluminium Modular Signage using Aluminium Alloy 6063 extrusion with Anodising (The thickness of the anodization is typically 30 microns. The integrity of the anodize coating is tested to meet the international specifications ISO 2143-1981.) With lifetime Warranty in normal working condition.

6.9 INSULATION ON ROOF AND FLOOR SLAB: Supply and installation of external thermal insulation class-"O" closed cell elastomeric nitrile rubber insulation with Aluminum foil recommended as per the approved shop drawings/ specifications. Minimum 13 mm thick for floor and ceiling insulation is required.

6.10 Providing and fixing of tested 120 minutes fire rated - integrity and radiation control and partial insulation (EW120) - fully glazed non-load bearing fixed glass with symmetrical (Bi-Directional) fire protection. The glass should be Contraflam Lite or equivalent 14 mm clear 120 min fire rated and partially insulated (EW120), Non-Wired Toughened Interlayered glass having a sound reduction of minimum 30 dB and compliant to class 1(B)1 category of Impact Resistance as per EN 12600.The glass shall be able to withstand fire attack from both sides. The glass should be manufactured in UL & TUV audited Facility and including UL Certification. The profiles are

manufactured from 1.6 mm galvanized steel sheet pressed and formed to a required profile of the dimension. These specifications are applicable for fire rated glass door, fire rated glass partition.

6.11 Steel structure needs to be considered for the platform of the equipment's as Panels, ODU Unit of Inrow, PAC etc. MS frame to be considered for installation and maintenance platform for equipments for outside part of building. The ODU unit for In row as well as for PAC needs to be installed in two tier, Bidder to consider necessary civil foundation as well as MS structure.

6.12 HOUSE KEEPING: The vendor is responsible for keeping the site clean and deep cleaning by removing all the debris etc. everyday, using adequate covering/tarpuline sheets etc to cover the any areas required (client property etc.). All cleaning equipment's like heavy duty vacuum cleaners etc to be according to the approval.

6.13 Power Cable entry in each rack will be from Top and from above ceiling, Bidder need to consider boxing arrangement or cable manager or cable trunking system so that entire data center installation should look aesthetically good.

7 Requirements towards Electrical Work

7.1 The existing LT panel presently in ground floor in the electrical room . From present LT panel 4 pole MCCB of rating 400 Amps , 35 KA will be used as power input to the DC LT Panel .

7.2 Design, Supply, installation, testing and commissioning of all LT panels. Panels will be as per IEC 61439. Panels feeders should have rated capacity of Load manager with RS 485 communication port. This should compactable for BMS system to know the energy consumption. Bidder to submit License certificate of LT panels as per IEC 61439. Selection of switchgear should be as per IEC 60947. All the panels should be with Transient Voltage Surge Suppressor (TVSS). For selecting the source fault level bidder to consider value of transient reactance (Xd') as per IS -1180 for transformer rating and sub transient reactance (Xd") for alternator output at common bus at synchronization panel as per ISO 8528 Part 1 to 10. Typical Electrical SLD drawing along with Panel, UPS and Battery room layout drawing is provided for minimum requirement. The switchboard shall be totally enclosed, metal clad, sheet steel fabricated, compartmentalized, dead front type, dust and vermin-proof, freestanding, floor mounting type. It shall be of unit construction suitable for splitting into sections for shipping to site and to be correctly re-erected on prepared foundations without skilled supervision. The individual shipping section length shall not preferably exceed 2 metres. End busbar fishplates shall be provided. The switchgear shall be easily extensible on either side by the addition of vertical sections. The switchboard shall be fabricated preferably from cold rolled sheet steel of minimum thickness 14/16 gauge. The height of the switchboard shall be constant throughout its length, Adequate lifting facilities such as hooks for ease of handling on site shall be provided. These hooks when removed shall not leave any openings in the switchgear. Front access shall be available to all components in each cubicle, which require adjustment, maintenance or replacement. Checking and removal of components shall be possible without disturbing adjacent equipment. All auxiliary equipment shall be easily accessible. Setting of relays shall be possible without de-energizing other equipment. Each unit of switchgear shall have necessary interior barriers to form separate compartments for buses, switching devices entering cable connection etc. All barriers shall be manufactured from non-inflammable material, preferably of sheet steel. The arrangement of the feeders shall ensure that operating handle of the switch / breaker shall be above 300 mm but below 1800 mm from ground level. Horizontal busbar chambers shall be at the top of the board. Busbars shall be completely shrouded to prevent metal pieces falling on the busbar during maintenance. The busbars shall be of aluminium with

continuous rating as given in the SLD. All busbars and their main current carrying connections shall have preferably the same sectional area throughout their length. The busbars shall be colour coded. The busbar sizes shall be determined taking into consideration the continuous rating without exceeding the final temperature of 45 Deg. C over maximum ambient temperature and the fault level specified. The busbars shall be supported by insulators on non-carbonizing material resistant to acid and alkali and having non-hygroscopic characteristics and braced to withstand the fault level specified. Two earth terminals shall be provided on each switch cubicle, at the back, near the floor. An earth bar of at least 25 x 6 mm GI shall be fixed to these terminals. The earth bar shall be electrically continuous and shall run the full extent of each board. Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and earth terminals of the unit. Suitable holes with bolts and lugs shall be provided at each end of earth bar of switchgear for connection to a main earthing grid of 25 x 6 mm GI bus. The earth bar shall be accessible in each cable entering compartment either directly or through a branch extension to ground the cable armour and shields. Any unused circuit breaker compartment shall be fully equipped and provided with compartment door, vertical bus bars and control terminals / wiring, etc., such that the same could be used for housing outgoing breakers in future without any modifications to the panel. The arrangement of feeders in the switchboard shall take into consideration the number and size of cables required for the feeders. For all electrical circuit breakers anti-pumping device shall be incorporated. The breaker shall be provided with minimum 6NO + 6NC auxiliary contacts. 20% auxiliary contacts (Min. 3 NO + 3 NC) shall be provided. All spare contacts shall be wired upto terminal blocks. Auxiliary contactor or relay shall be used to multiply contacts.

7.3 Modular UPS for IT as well as NON IT Load:-

Sr.No.	Description	Qty	Location
1	UPS for IT Load with SMF batteries for 10 minutes back up time of rating 150 KVA (Module Size should be 25 KW to 60 KW)	2	UPS and Panel Room
2	1 X 75 KVA UPS for NON-IT Load – Utiliy Load with SMF batteries for 10 minutes back up time 0n 70 KVA. (Module Size should be 25KW or 30 KW– 3 numbers working and 1 standby module in same frame) Note- IF Harmonices distoration are more in NON IT load as in INROW machines (NO machine as per IEEE-519) - Bidder needs to consider appropriate derations in the NON IT UPS.	1	UPS and Panel Room

7.3.1 The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission critical, electronic equipment load.

7.3.2 Each UPS Frame shall be sized for kW =kVA @40 Deg C load i.e. Unity Output power Factor with no derating at 40 Deg C. Design of UPS should be Insulated-gate bipolar transistor (IGBT) rectifier and 3 level IGBT inverter switching with double conversion as per IEC 62040-3 operating modes. Inverter Switching Frequency shall be ≥18 kHz to keep the noise minimum. Inverter shall be PWM controlled using DSP logic. Analog control shall not be acceptable. Each UPS shall be of modular architecture with Power Unit & removable sub power modules rating from 25 kW to 60 kW achieve highest system protection. Failure of any sub power module in individual UPS Frame shall not lead to entire Frame Capacity down but only the failed sub power module capacity shall go down. i.e. In case of Failure of any one Sub Power module, rest of the available power module in the frame shall continue to operate in normal double conversion mode of operation with reduced capacity. This shall also be applicable to all UPS's operating in parallel configuration. The UPS shall be housed in a freestanding cabinet with casters and shall contain Static Bypass and maintenance Bypass isolator. Each UPS should have phase sequence detection. Steady state voltage regulations will be within 1% of nominal output voltage, linear load harmonics distortion should be less than 3% and non-liner load harmonics distortion should be less than 5%. UPS should be capable of 100% unbalanced load. Efficiency of UPS should be minimum 95% from 25% to 75% in double conversion mode. Noise generated by UPS under normal steady state condition should not be more than 70 DB as per ISO 7779. UPS should be ROHS / Energy Star complied product. Cable termination will be from bottom. All serviceable components to be from front. Rear space upto 200mm can be provided only for ventilation purpose UPS display should show the battery status monitoring, UPS mode, Alarm (Audio and visible), Events etc. The UPS communication capability should be able to integrate into any industry standard Building Management System (BMS). Adequate protections for UPS, for rectifier, bypass, battery, battery against overload, short circuit, battery over charging, battery over discharging, transients, surges (as per IEEE 587) etc. needs to be considered as per IEC 62040-1. Built in SNMP card, MODBUS TCP IP, Dry contacts card to be standard feature in UPS. UPS should be with KW=KVA. UPS should have feature of live swappable modules. For battery sizing bidder to consider power of 0.9. The UPS shall be have self-regulating and self-protection against conditions as over voltage, Powerline surges, Undervoltage and overcurrent induced by the mains, Sudden changes in the output load and short circuits at the output, Transient, surges, voltage spikes shall be suppressed and shall be removed from the output of UPS

7.3.3 Critical Cards within UPS which are directly exposed to air should be conformally coated to protect the UPS from Moisture and Conductive dust. IP rating of Min IP 20.

7.3.4 Parallel operation: it must be possible the connection of minimum 4 units of same size to set up a distributed parallel system, in order to increase system capacity or achieve system redundancy. Parallel control logic must ensure a high load sharing accuracy (less than 5% of nominal power) and no single points of failure. That is a distributed control design must be implemented (no master/slave architecture), so that any failure in one equipment won't impact operation of the whole parallel system. Parallel control connections must provide high noise rejection

7.3.5 UPS to Battery Inter connecting cables; Links; Racks and standard accessories Connections to the Incoming terminals will be provided and take the load from Outgoing terminals of the UPS. All other equipment necessary to operate the UPS is in the scope of the Vendor.

7.3.6 The UPS shall be housed in freestanding cabinets. The mechanical structure of the UPS shall be sufficiently strong and rigid to withstand handling and installation operations. The sheet

metal elements in the structure shall be protected against corrosion by a suitable treatment, such as zinc electroplating, bi-chromating, epoxy paint, or an equivalent.

7.3.7 The UPS shall be designed for forced air cooling. Air inlets shall be provided from the front. Air exhaust shall be from the top portion of the unit or from back side with maximum space available up to 200mm.

7.3.8 The type of battery shall be Sealed Maintenance-free (SMF) type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case DC circuit breakers in each battery rack.

7.3.9 STANDARDS - Product should confirm to below minimum applicable standards

IEC 62040-3 UPS PERFORMANCE,

IEC 60950, CE, VDE,

UL 1778 for UPS,

7.3.10 UPS Input:

AC input nominal voltage	340/380/400/415/440/460 VAC, three phase 50 Hzs, 5 wire (L1+L2+L3+N+G)
AC input voltage window	340V to 460V (@ 400V)
Input frequency range	49-51Hz
Input Power Factor	> 0.99 at 100% load
Input Current Distortion	< 4% at 100% load

7.3.11 UPS Output:

AC Output Nominal Output	(Customer configurable)-380VAC, 400VAC or 415VAC, three phase five wire, 50 Hz
AC output voltage distortion	Max. 2% @ 100% linear load, Max. 5% @ 100% non-linear Load
AC output voltage regulation (Static)	+/-1%
Voltage Transient Response	+/- 8% maximum for 100% load step
Voltage Transient Recovery	within < 50ms recovery time
Output Voltage Harmonic Distortion	<2% THD maximum for a 100% linear load <5% THD maximum for a 100% non-linear load
Overload Rating- Online	125% - 1 minute; 150% - 60 Sec
System AC-AC Efficiency	Greater than 95% from 25% load to 75% load in Double Conversion Mode
Output Power Factor Rating	unity power factor KVA=kW @ 40 Deg C without any de rating from 0.8 lagging to 0.9 leading

Output frequency	50 +/- 1Hz tracking
Output connectors	Three phases: Hardwire 5-wire (3 Phase + N + G)

7.3.12 ENVIRONMENTAL

Operating Ambient Temperature	+ 20 to +30°C
Relative Humidity	0 to 95% non-condensing
Operating altitude	
Audible noise	<70 dbA
Conformal coating PCBs	Required
Phase sequence correction	Required.

7.3.13 Bidder to submit GTP for UPS in below format for IT as well as NON-IT UPS

Sr. No	Description	Requirement	Vendor to Specify for IT and NOT IT UPS
1	MODEL	please specify	
1.1	TECHNOLOGY	IGBT Rectifier & IGBT Inverter, Microprocessor based, true online double conversion, Online Transformer free Technology, Modular Technology	
1.2	Inverter	IGBT	
1.3	Rectifier	IGBT	
1.4	Max. Permissible Non-linear loads	100%	
1.5	Max. unbalanced load	100%	
2	PHYSICAL Dimension & Weight		
2.1	Construction	Compact. Modular design	
2.2	UPS Floor Space		
2.2	Ventilation	Specify	
2.3	UPS Dimension & weight		
	Length in MM	Specify	
	Width in MM	Specify	

	Height in MM	Specify	
	Weight in kgs	Specify	
2.4	Li Ion Battery Bank (Dimension and weight)		
	Length in MM	Specify	
	Width in MM	Specify	
	Height in MM	Specify	
	Weight in kgs	Specify	
	Accessibility (front & back with clear Dimension to be specified)	Specify	
	Cable connection Bottom for Input & Output.	Specify	
	Parallel Configuration upto no of Module.	Specify	
	Minmum Input circuit breaker required to be specified	Specify	
3	INPUT		
3.1	Voltage	380V -400V- 415V -433V	
3.2	Voltage range	340 to 460V	
3.3	Frequency	50 Hz	
3.4	Frequency range	+/- 5 Hz	
3.5	Ripple content	<1% with battery connected	
3.7	Input Power Factor		
	100%	0.99	
	75%	0.99	
	50%	0.99	
	25%	0.98	
3.8	Current Harmonic on source		
	100%	<3%	
	75%	<5%	
	50%	<5%	
	25%	<10%	
3.9	Maximum current with out Battery Charging	Amps	
4	OUTPUT		
4.1	Voltage	380/ 400/ 415 V	
4.2	KW=KVA		

4.3	Voltage regulation		
	Balanced	+/- 1%, 3 Ph. + N	
	Un Balanced	+/- 3%, 3 Ph. + N	
4.4	Power Factor	0.8lag - unity- 0.98 lead (Derating of UPS not acceptable in this range)	
4.5	Frequency	50Hz	
4.6	Frequency range	+/- 0.5 Hz	
4.7	Frequency synch. range	0.25 to 3 Hz	
4.8	Transient output voltage variation for 100% block loading	+/-5%	
4.9	Recovery time for 100% block load	< 50 mill second (ms)	
4.11	Wave form	Sinusoidal	
4.12	Total Voltage Distortion out put side		
	Linear load	< 2 %	
	Non-Linear load	< 5 %	
4.13	Crest Factor	3:1	
4.14	Phase Displacement		
	a) Balanced load	120 +/- 1°	
	b) 100 % Unbalanced load	120 +/- 3°	
4.15	Inverter Efficiency		
	c) 100 %	Specify	
4.16	Overall Efficiency for UPS		
	b) 50 %	95%	
	c) 75 %	95%	
	d) 100 %	95%	
4.17	Efficiency of UPS in Battery Operations		
	b) 50 %		
	c) 75 %		
	d) 100 %		
4.18	Overload		
	a) 125 %	10 minutes	
	b) 150 %	10 Sec	
4.19	Short circuit Capability	Vendor to Specify	

5	BUILT IN STATIC BYPASS	Required but not used for IT load in operation	
5.1	Inverter and Static Bypass change over time	Specify	
5.2	Fuse @ static bypass	No as per IEEE standards.	
5.3	Short circuit Capability	Vendor to Specify	
5.4	Overload	Specify	
5.5	Transfer time	Less than 5 milli secs.	
5.6	Manual Bypass inside ups only (input/output)	Required	
6	DC CHARACTERISTIC		
	Battery backup to be calculated at unity pf.		
6.1	VAH	Specify	
6.1	DC bus voltage	Specify	
6.2	DC Current	Specify	
6.3	No. of cells with AH	Specify	
6.4	battery voltage	Specify	
6.5	End. Cell voltage	Specify	
6.6	Float voltage	specify	
6.7	DC current at 100% load	specify	
6.8	Charging current	specify	
6.9	Charging time		
6.1	True autonomy / measurement	Software on SNMP & UPS monitor panel	
6.11	Temp. compensated charger	Required/ Mandatory	
6.12	Automatic battery load test	Required/ Mandatory	
6.13	Batt. Breaker with protection	Required/ Mandatory	
	Required Battery Back Up	10 Minutes	
7	PROTECTION		
7.1	Overload (O/L)	Required	
7.2	Short circuit (SC)	Required	
7.3	Input low voltage	Required	

7.4	Output over voltage	Required	
7.5	Battery over charging	Required	
7.6	Battery over discharging	Required	
7.7	IP Protection		
7.8	DC over current Protection		
8	ENVIRONMENTAL		
8.1	Ambient temperature range	0 to 40° C	
8.1	Relative humidity	95 % RH	
8.2	Max. operating altitude	0 M above MSL	
	without derating		
8.3	Acoustic Noise	65db (Specify)	
9	AUDIO / VISUAL DISPLAY		
9.1	Over load	Required	
9.2	Short circuit	Required	
9.3	Input low voltage	Required	
9.4	Input over voltage	Required	
9.5	Battery over discharging	Required	
9.6	Battery on load	Required	
9.7	Battery low	Required	
9.8	Fuse failure	Required	
9.9	Fan failure	Required	
9.1	Inverter failure	Required	
9.11	DC over voltage	Required	
10	VISUAL DISPLAY		
10.1	Input/Output voltage	Required	
10.2	Output current.	Required	
10.3	Input/ Output frequency	Required	
10.4	Output power in KVA and KW	Required	
10.5	Output load power factor	Required	
10.6	Output load crest factor	Required	
10.7	battery DC voltage	Required	

10.8	Charging current	Required	
10.9	Dis-Charging Current	Required	
10.1	Autonomy Time	Required	
10.11	Event logs	1500 events mandatory	
11	OTHERS		
11.2	Software with LAN connect	Required	
11.3	Auto paging	Required	
11.4	SNMP compatibility	Required	
11.5	Diagnostic system	Required	
11.6	Single line mimic diagram	Required	
11.7	Telemonitoring with software	Required- Mandatory	
11.8	Capablity to parallel 6 similar ups systems	required	
11.9	ventilation	forced air cooling with integral fans	
11.1	Opertating temperature	0-40deg.C	
11.11	Battery management	required	
11.12	Power Transfer Mode	auto systems (during fault condition)	
12	Colour		
13	Online Thermal Dissipation in Btu/Hr		
	at 100 %		
	at 75 %		
	at 50 %		
	at 25 %		

7.4 AC wiring circuit: Main circuit Point wiring should be surface or concealed conduit system. Conduit wiring shall be as per IS-732. Conduits and conduit accessories shall be galvanized and shall conform to IS-2667, 1988. Conduit ends shall be free from sharp edges or burrs. The ends of all conduits shall be reamed and neatly bushed with Bakelite bushings. In order to minimize condensation or sweating inside the conduit system, all outlets shall be properly drained and ventilated in such manner so as to prevent entry of insects. Conduit pipes shall be fixed by 22 gauge ribbed G.I. saddles on 25 x 3 mm G.I. (Galvanized Iron) saddle bars in an approved manner at intervals of not more than 50 cms. Saddle shall be fixed on either side of couplers, bends or similar fittings, at a distance of 30 mm from the centre of such fittings. Existing point wiring before using needs to be checked and if technically found ok can be considered for use.

7.5 Lighting fixtures: -Lighting wiring between JB(Junction Box) and lighting fixtures shall be done by PVC insulated 3-core (phase neutral and earth) unarmored cable. All joints of conductors in

Switch boards / JB's / Fittings shall be made only by means of approved Mechanical connectors (nylon / PVC connectors). Bare or twist joints are not permitted anywhere in the wiring system. Fixtures shall be firmly supported from the structures, support clamps etc. They may be bolted or welded to the steel work or metal inserts. In case of concrete structures, where metal inserts are not available, fixtures will be fixed to or supported from concrete surfaces with the help of anchor fastener, in such cases special care shall be taken to see that anchoring is firm. All LED fixtures shall be with high power factor, low harmonic (THD< 10%) (THD= Total Harmonics Distortion) and minimum 100 lumens/watt. All exisiting light fixture needs to be replaced.

7.6 Earthing and Earthing Pits: All Electrical Equipment must be efficiently double earthed in accordance with the requirement of IS-3043/IEEE 80 and relevant regulations of Electrical. The earth pits shall be as per IS with proper arrangement for testing. Maintenance free earth pits to be used. All Earthing conductors shall be hot dip galvanized / electrolytic grade base copper conductor. The main earthing rings shall be done as per practice laid in Indian Standard. All electrical equipment shall be connected to the earth bus at two points except the lighting fittings and junction boxes. All hardware for bolted joints shall be galvanized and the size of the bolt shall not be more than quarter of the size of earth conductor. Tinned copper lugs shall be provided where round earthing conductors are used. The 415V neutral shall be solidly earthed by means of two separate and distinct connections to earth. The earth pits shall be interconnected between themselves and the main earthing grid to form an earthing ring. All joints in the main earthing conductors shall be welded. Terminal joints on the equipment shall be bolted. Removable test links shall be provided near the earth pits to facilitate testing of earth pits. Where the earthing terminal diameter provided on equipment is larger than quarter of the size of the earth conductor, connection shall be made using a wider flag welded to the conductor. The equipment to be earthed shall be connected to a common earth grid of power system. The number of earth pits will depend upon soil resistivity and the voltage of the system. The earth pit together with the electrode shall be constructed as per IS-3043-1987. The potential difference between neutral and earth should be less than 3 V. A bolted assembly link shall be provided in the connection between earth electrode and the main earth conductor. Existing Earth pits can not be used all should be new one. Equipotential earthing inside the data center needs to be considered with grid below raised flooring of 2 X 2 meter of 25 X 3 mm Cu strip and all end corners after covering complete room needs to be grounded. Pedstal /stringers, Rack body to be grounded to this grid sothat flooring and equipment's are at equal potential.

7.7 Stainless steel (SS) cable tray to be considered above each row of the Rack along with required Cable tray Grid above the rack and below false ceiling to be considered and provided. Refer Layout Drawing. SS Cable tray are used to run fiber and interconnecting cables.Rack Interconnecting cables mostly will be fiber, Bidder to take care utmost care as 90 Deg C bend will not be accepted.

All cable Trays up to 300mm shall be perforated type & above 300mm ladder type trays shall be used for power cables . The Trays shall be pre-fabricated hot-dipped galvanized. Cold galvanizing at site is acceptable only for touch-ups. The Trays shall have suitable provision for clamping at an interval of 500 mm. The Earthing Strip for the earthing ring shall be run along the side of the Tray. The connection between individual equipment to the ring shall be by bracing or with lugs. The bending of trays shall be smooth and the curvature sufficient for each bending of cables in it. Pre-fabricated accessories such as Tees, bends, risers, couplers, reducers, etc. shall be used at all junction & branches. Cutting & welding of trays at site is not permissible. Similarly, the trays shall not be welded on the supports but bolted only. Electrical Cable Tray routing shall be co-

ordinated by Vendor at site to check fouling with pipes, equipment, light fittings, HVAC, etc. before fixing the trays.

7.8 All Low tension cables should be of 1.1 KV grade, All power cables from 25 Sq.mm to 400 Sq.mm should be with stranded, compact aluminium conductor, with XLPE insulated, PVC inner sheathed, galvanized steel strip armored and overall PVC sheathed conforming to IS:7098 /88. As stated in Electrical single line diagram for Cu flexible cables should be of Solid/Stranded Copper conductor, XLPE Insulated, cores laid up, PVC tape/PVC Extruded Inner sheathed for Multicore Cables, Unarmoured, extruded PVC Type ST2 Sheathed as per IS 7098 (Part 1) 1988. Cables shall comply with the latest editions of following standard, as applicable-BIS : 1554 Part 1 PVC insulated electric cables (Heavy duty),BIS: 7098 Part 2 Cross- Linked Polyethylene Insulated PVC sheathed cables, BIS : 8130 Conductors for insulated electric cables and flexible cables.1.1 KV grade cables: All LT power cables shall be 660/1100V grade, with aluminium conductor for size 10 Sq.MM and above. Power cables of sizes up to 6 Sq.mm. shall be with copper conductors, All Cables shall be externally marked at either end with the respective identification numbers by means of non-deteriorating material. Cable Markers shall be approved by Client. IS: 1554 - PVC insulated (heavy duty) electric (Part I) Cables - Part I for working voltages up to and including 1100V.IS: 1753 - Aluminium conductors for insulated cables.IS: 3961 -Recommended current ratings for (Part II) cables: Part-II PVC insulated and PVC sheathed heavy-duty cables.IS: 3975 - Mild steel wires, formed wires and tapes for armouring of cables.IS: 5831 - PVC insulation and sheath of electrical cables.IS: 7098 -Cross-linked Polyethylene insulated (Part-II) PVC sheathed cables: Part-II for working voltages from 3.3 KV upto & including 33 KV.IS: 8130 -Conductors for insulated electric cables and flexible cords.IS: 9968 - Elastomer - insulated cables, for (Part I) working voltage upto and including 1100V.

8 Requirements towards Heating, ventilation, and air conditioning work

8.1 All cooling equipment selection to be done based on American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE n=20) standard. The cooling systems should perform efficiently at variable load conditions. The overall cooling solution should be designed to achieve better cooling and low operating cost. The room air temperature should be maintained at 23 +/- 2 Deg. C and humidity as per ASHRAE TC 9.9 2017 guidelines. The cooling system in the server rack area should be designed as per layout design provided in Layout Drawings. Heating and humidifier to maintain correct operating environment throughout the data centre needs to be considered. Relative humidity to be maintained in the data center will be from 45% to 55%.

8.2 Row Unit- Supply, installation, testing and commissioning of self-contained direct expansion type In Row units suitable for operation on R410a/R407C refrigerant & should have advanced microprocessor based. In row units should consists of cabinet, inlet filter, EC fans, Inverter Scroll Compressor, Direct Expansion Cooling Coil, Heater banks to maintain humidity inside the space, condensate drain pan of stainless-steel construction, Condensate pump, humidifier, Microprocessor panel, programmable control complete with LCD display. The unit shall be suitable for operation on 415 V, 50 Hz, AC supply. The controller unit should also be capable of starting the standby unit in case the temperature is not able to achieve with the working units. For Basis of Design Bidder to consider site ambient data along with below maintained parameters. The Row based cooling unit should get coupled with IT racks and supply cold air very close to IT load and remove hot air closely from IT load. Unit's airflow should be horizontal and should provide uniform air distribution over the entire face of the coil. The In

row-based solution improves energy efficiency and cooling ability. Direct Expansion (DX) InRow unit draws air directly from the hot aisle, allowing the unit to take advantage of higher heat transfer efficiency due to higher temperature differences. It can then discharge room-temperature air directly in front of the servers it is cooling. Placing the unit in the row enables the unit to operate at higher return and supply air temperatures, yielding 100% sensible capacity. This significantly need to reduce higher humidification. The modular design of the InRow unit allows it to be easily added in the row as the demand for cooling increases. Containing the hot aisle further reduces any chance of hot and cold air streams mixing. Each Cooling unit should have net sensible cooling capacity of minimum 20 kW based on the returning air condition of 38°C +/- 2 Deg C dry bulb, defined Relative Humidity and 21°C +/- 2 Deg. C. dry bulb supply air temperature and each in row unit should deliver minimum CMH of 5500 . Total CFM (cubic feet per minute) of each unit should be adequate to maintain the rack temperature The unit shall be configured to provide air flow/pattern to provide uniform airflow over the entire height of the rack. A variable capacity compressor with inverter which permits staples adaptation of the output in partial-load operation. EC fan /variable speed should be used for maximum efficiency and minimum power cost. The system should remain in operation in case fan replacement is required. Cooling system should come with monitoring and control panel. Supply cooling temperature to be maintained at 21°C or lower with an accuracy of ±2°C. at site ambient conditions. Equipment Parameters

Equipment air inlet	21 DegC +/- 2 Deg & 50% RH
Machine configuration	Front discharge
Actual Capacity	As provided
Flow Direction	Front discharge
Machine Capacity control	Return Air
Compressor type	Inverter Scroll Compressor
Evaporator Fan	Backward curve blades with Electronically commutated (EC) motor
Humidification & De-humidification : In built feature of humidification & dehumidification	In built feature of humidification & dehumidification
Filters	Filter to be provided on the Package unit, having 95% efficiency down to 5 Microns
Outdoor unit	1 per dedicated circuit / In Row, with copper tubes & aluminum fins with fan speed controller & anti-corrosive coating.

8.2.1 The frame of the units is constructed of 16-gauge formed steel for maximum strength. The cabinet is serviceable from the front and rear. All exterior panels and corner posts on the frame are powder coated for durability and an attractive finish. The front and rear exterior panels are constructed of 18 gauge perforated steel with 80% open free area. All panels, which include a key latch for safety and security, allow easy access and removal. The footprint of 300 mm is required. Units shall include casters and leveling feet to allow ease of installation in the row and provide a means to level the equipment with adjacent IT racks.

8.2.2 Inverter Scroll Compressor The compressor shall be of the high efficiency scroll design operating with R410A / R407C refrigerant and 415V/3~/50 Hz supply. The compressors should be "scroll type" operating with R410A /R407C and power supply of 400-460V/3ph/50 Hz. The compressors are provided with integrated thermal overload protection. The compressor motor control driver is provided with integral electronic protection against over temperature, over current, over or under-voltage with absence of one or more phases. Compressors, the humidifier shall be isolated from the air flow in the version with downward flow machines. The compressor shall be charged with mineral oil and designed for operation on environment friendly refrigerantR410a /R407C.The machine should be inbuilt with the liquid receiver & pressure relief valve, Liquid line solenoid Valve, NRV for better performance of the machine.- The refrigeration system shall be of the Single/ Multiple circuit direct expansion type and incorporate hermetic scroll compressors, complete with crankcase heaters. The refrigerant circuit comprises of Liquid receiver inbuilt in the indoor unit ,Electronically-controlled expansion valve (EEV),Solenoid valve for shutting off the refrigerant liquid, Refrigerant liquid flow indicator, Solid cartridge Freon filter, Safety valve, High pressure safety pressure switch with manual reset, Low pressure switch with automatic reset, Copper refrigerant pipes with anti-condensation insulation on the suction line, Pipe taps on suction and delivery side and charging valve on liquid side, Each Compressor / refrigerant circuit to have its own independent Evaporator coil and Condenser coil.

8.2.3 Condensate Pump - : A condensate pump is factory wired and piped internally to the condensate drain pan. Within the condensate pump, there should be dual position float. The first position is used for condensate pump control and the other float generates a condensate pump failure alarm to prevent condensate pan overflow.

8.2.4 Cooling Coil- Cooling coil needs to be designed for high-sensible heat ratios, the coil is constructed with copper tubes, raised-lance-type aluminum fins, and 18-gauge galvanized steel end plates. Coil headers are equipped with anti-drip shields in the event of condensation. The condensate pan is thermal formed non-ferrous material, and is sloped for positive drainage to provide higher indoor air quality.

8.2.5 Electric heaters-Each packaged In Row unit shall be provided with multi stage heating elements constructed from aluminum. Electric heaters shall be of the low temperature totally enclosed strip type fitted with radiation fins . If overheating occurs, a safety thermostat should cuts off the voltage supply to the heaters and triggers an alarm. These elements are low watt density, wired for single-phase and loaded equally on all three phases, and electrically and thermally protected by both automatic and manual reset thermal cut outs.

8.2.6 Filters-Filtration of conditioned air is very important to maintaining the clean, particle-free environment required inside Data Center. Filters should be easily replaceable from the unit. Filter efficiency should be greater-than 20% as ASHRAE 52.1. Filters are washable type and needs to meet HF-1 standards (as per ASHRAE 52.2).

8.2.7 In row unit should have both bottom as well as top entry of refrigent pipes.

8.2.8 The unit should be equipped with variable speed, electrically commutated (EC), to allow for varying heat load. Variable Speed Fans shall be variable speed capable of modulating from minimum 20% to 100%. Each fan assembly shall consist of integral fan finger guards.. Fans needs to be easily replaceable while the unit is in operation.

8.2.9 Condenser shall be air-cooled type, suitable for outdoor installation and shall be suitable for operating at high ambient and at low ambient as per site ambient temperatures. Condenser shall be in copper tube & aluminum fins construction. The condenser fan/s shall be of axial type with variable voltage electric motor complete with IP-54 or greater protection. Motor shall be speed controlled to ensure a stable operation for varying ambient.. The condenser shall be complete with provisions for refrigerant piping connections, shut off valves and any other standard accessories necessary with the equipment supplied. Each In Row Circuit to have its independent set of condenser coil. The condenser should be equipped with fan speed controller for the speed variation based on the condensing temperature & the speed variation should be steeples. Condenser unit should be with small foot print unit and top discharge condenser will be recommended. Condenser with compressor inside is also recommended requirement as keeping compressor in the ODU unit (i.e. away from data center) will ease during routine maintenance as well as shut down maintenance activity and it lowers the sound level in Data Center. Copper piping with insulation tube of elastomeric, nitrile foam between each sets of outdoor & indoor unit. Piping to be properly supported by MS clamp. All transmission wiring between indoor to outdoor units should be kept in PVC conduit. Maximum distance between indoor and outdoor unit to be considered as per site conditions.

8.2.10 Electronic Expansion Valve (EEV) The unit should have Electronic Expansion Valve and should be capable of responding to the varying load conditions.. It should be able to provide advantages as Fast, high precision adjustment of refrigerant flow,Fast arrival of the unit at steady-state conditions, Superheating value remains constant in variable thermal load conditions, Efficient operating conditions of the compressor, especially in the presence of low room temperatures etc.

8.2.11 Humidifier-. The humidifier shall be capable of providing continuous auto modulation in steam generation as per the steam requirement per hour. The humidifier shall be fully serviceable with replaceable electrodes. This needs to be factory piped and wired, with cylinder and an automatic solid state control circuit. The humidification system shall automatically condition the passing air to a user-specified humidity setpoint. The reheat system, shall automatically work in conjunction with the condensate management system to temper the air to match the user-specified temperature and humidity setpoint.

8.2.12 De-humidification cycle shall operate by keeping the airflow constant but with the help of EEV to reduce the ADP of the coil.

8.2.13 The system shall be provided with relevant water detection kit which shall have sensors with wire of minimum 1.5mtrs and each of the sensor must be capable to detect individually any water below the false floor near the unit, the sensor must be connected to the unit microprocessor thus enabling the controller to give an alarm incase of wet floor.

8.2.14 A microprocessor shall continuously monitor operation of In ROW unit continuously digitally display temperature and room relative humidity, alarm on system malfunction and simultaneously display problem. When more than one malfunction occurs, flash fault in sequence with room temperature, remember alarm even when malfunction cleared, and continue to flash fault until reset. Microprocessor to control and display the functions as Room Temp temperature, Humidity, Speed of the delivery fans, Timing of compressors with automatic rotation, Alarm signals, Cool fail, Air filter clogged, Return air sensor fault, Supply air sensor fault, Rack temperature sensor fault, High discharge pressure, Low suction pressure, Fan fault etc.

8.2.15 All In Row Unit should monitor on BMS system to collect critical information of connected devices, temperature, humidity etc.

8.2.16 Bidder to submit the GTP for In row

In Row GTP				
S.No.	**DESCRIPTION**	**UNIT**	**Technical requirements**	**Supplier Details**
DESIGN CONDITIONS				
1	Required Capacity	KW (TR)	.....	
2	Airflow	CFM (Minimum)	.....	
3	Return air temperature	Deg C	.....	
4	Return air RH	%	30 to 40	
5	ESP	Pa	50	
6	Supply air temperature	Deg C	21+/-1	
7	Supply air RH	%	50 +/-5 %	
8	Type of In ROW	(DIRECT	DX	

		EXPANSION - DX)		
9	Discharge Type of In ROW	(FRONT /TOP/BOTTOM)	.....	
10	False Flooring height if any - NOT Required	mm		
11	Site Ambient Temperature	Deg C	.....	
UNIT DETAILS				
1	Make of Proposed unit	-	Required	
2	Model of Unit Proposed	-	Required	
3	Total Cooling Capacity	TR	Required	
4	Sensible Cooling Capacity	TR	Required	
5	Unit Size (L x D x H)	mm	Required	
6	Unit weight	kg	Required	
7	Unit Power Consumption	kW	Required	
8	Dual refrigeratin circuits	Yes/No	Required	
9	Noise levels at 1.5m distance from unit	dbA	Required	
UNIT CASING DETAILS				
1	Single / Double skin	mm	Required	
2	Outer Casing material	-	Required	
3	Outer Casing thickness	mm	Required	
4	Inner Casing material	-	Required	
5	Inner Casing thickness	mm	Required	
6	Insulation material - thickness / Density	mm	Required	
7	Drain Pan Material & Thickness.		Required	
8	Drain Connection Dia	mm	Required	
9	Access Door Location	Front / Back /Side	Required	
EXPANSION VALVE				
1	Make	-	Required	
3	Dual Power supply. (RAW + UPS)	Yes/No	Required	
COOLING COIL				
1	Type	-	Required	
2	Face Area	Sqft	Required	
3	Face Velocity	FPM	Required	
4	No of evaporator per unit	Nos.	Required	
5	Tube Material	-	Required	
6	Tube OD and Thickness	mm	Required	
7	Fin Material & Thickness	mm	Required	
8	Fin Spacing	FPI	Required	
9	Type of treatment for Fins	-	Required	
10	Coil air inlet temperature (DB	Deg C	Required	

	&RH)			
11	Coil air outlet temperature (DB &RH)	Deg C	Required	
12	Total Cooling capacity	kW	Required	
13	Sensible Cooling capacity	kW	Required	
EVAPORATOR FAN				
1	Type of Fan	-	Required	
2	Fan make	-	Required	
3	Discharge type	-	Required	
4	No of evaporator per unit	Nos.	Required	
5	No. of fans per evaporator	Nos.	Required	
6	Total No of fans per unit	Nos.	Required	
7	Fan Dia	mm	Required	
8	Fan Operating Speed	Rpm	Required	
10	Airflow per unit	CFM	Required	
11	Internal pressure drop	Pa	Required	
12	Blower ESP	Pa	Required	
13	Total Static Pressure	Pa	Required	
14	Fan static efficiency	%	Required	
15	Fan Total efficiency	%	Required	
16	Power Consumption each fan	kW	Required	
17	Power Consumption of Unit	kW	Required	
18	Type of Drive	Direct / Belt	Required	
19	Type and make of Bearing	-	Required	
20	Material of casing	-	Required	
23	Fan placement	In cabinet	Required	
24	Fan Statically & Dynamically Balanced	Yes/No	Required	
25	Fan performance curve to be submitted for approval	Yes/No	Required	
FAN MOTOR				
1	Manufacturer / Make	-	Required	
2	Type of Motor	-	Required	
3	Motor Rating	kW	Required	
5	Operating Speed	Rpm	Required	
6	IP Protection	-	Required	
7	Motor winding Insulation class	-	Required	
9	Connected load	kW	Required	
10	Electrical Supply	V/ph/Hz	Required	
COMPRESSOR				
1	Manufacturer / Make	-	Required	
2	Model	-	Required	
3	Qty.	Nos.	Required	
4	Type of compressor	Inverter Scroll	Fixed Scroll	
5	Refrigerant	-	Required	
6	Phase/V/Hz	-	Required	

8	Crankcase Heater	Yes/No	Required	
9	Modulation Range	%	Required	
CONDENSER				
1	Make	-	Required	
2	Model	-	Required	
3	Casing Material & thickness	mm	Required	
5	Outdoor Unit Dimensions W x D x H	mm	Required	
6	Operating weight- ODU	Kg	Required	
7	No. of fans/condenser	Nos.	Required	
8	Operating voltage	Volts	Required	
9	Noise level at 1m – dBA.	Dba.	Required	
10	No. of condensers per machine (Indoor Unit)	Nos.	Required	
11	Phase/V/Hz	-	Required	
FILTER SECTION				
1	Manufacturer	-	Required	
2	Filter media	-	Required	
3	Type of filter	-	Required	
4	Airflow per filter	CFM	Required	
5	Air Face Velocity across filter	m/sec.	Required	
6	Size of filter	mm	Required	
7	Quantity of filter	Nos.	Required	
8	Pressure drop-Clean	Pa	Required	
9	Pressure drop-Clogged	Pa	Required	
10	Performance as per ASHRAE Test Std.52, 76	-	Required	
11	a) Efficiency	%	Required	
12	b) Dust holding capacity	-	Required	
13	Material of construction	-	Required	
14	a) Filter frame	-	Required	
HUMIDIFIER				
1	Manufacturer	-	Required	
2	Type of Humidifier	-	Required	
3	Capacity	kg/hr	Required	
4	Input Power	kW	Required	
5	Settings	Amps	Required	
6	Electrical Characteristics		Required	
7	Humidifier Inlet pipe Connection - Dia	mm.	Required	
HEATER				
1	Manufacturer	-	Required	
2	Type of Heater	-	Required	
3	Capacity	kW	Required	
SUMMARY OF POWER CONSUMPTION				
1	Compressor	KW	Required	

2	Evaporator Fan	KW	Required	
3	Condenser	KW	Required	
4	Max. of Heater/Humidifier	KW	Required	
5	Total (Including Heater/Humidifier)	KW	Required	
6	Total (Excluding Heater/Humidifier)	KW	Required	
7	Specific Power Consumption (At Design Conditions)	Ikw/TR	Required	
8	Specific Power Consumption shall be submitted for the following operating conditions: 1) 100% load on cooling coil 2) 80% load on cooling coil 3) 60% load on cooling coil 4) 30% load on cooling coil	Yes/No	Required	
ELECTRICAL				
1	Unit Total connected power	KW	Required	
2	Full Load current FLA	Amps	Required	
3	Starting current	Amps	Required	
4	Locked rotor current on full load	Amps	Required	
5	Required MCB / MCCB Rating		Required	
6	Isolation for Incoming	Yes/No	Required	
7	MCB/ MPCB for critical components like Compressor, Fan,Heater, Humidifier	Yes/No	Required	
8	Terminal strip for all connection with cable marking	Yes/No	Required	
9	Single phase converter	Yes/No	Required	
10	Low voltage / high voltage cut off	Yes/No	Required	
11	Inbuilt ATS for Dual power supply	Yes/No	Required	
12	High speed harmonic distortion	%	Required	
13	Low speed harmonic distortion	%	Required	
MICROPROCESSOR CONTROLLER				
1	Microprocessor Based	Yes/No	Required	
2	P/PI/PID Logic	Yes/No	Required	
4	Return air humidity sensor	Yes/No	Required	
5	Auto restart after a power failure	Yes/No	Required	
6	Sequencing of Multiple units	Yes/No	Required	

7	Interlock with Damper	Yes/No	Required	
8	List of Trip signal	Yes/No	Required	
9	List of alarm	Yes/No	Required	
10	Display of Various modes of operation (cooling, heating, humidifying and de-humidifying),	Yes/No	Required	
11	Date, time and unit identification display	Yes/No	Required	
12	Visual system alarm indication (along with mutable audio alarm as well)	Yes/No	Required	
16	Records total run hours for all main components	Yes/No	Required	
17	Monitoring card should be able to support any one of the protocol (Modbus)	Yes/No	Required	
18	Each unit Controller should be capable of control, monitoring, sharing set points and alarms	Yes/No	Required	
19	Control logic to be submitted for approval	Yes/No	Required	

8.3 Thermal Containment should be provided for best in class. Containment of both front and back should be done. In row Cooling unit should supply cold air in front of rack and suck hot from rear end of it from hot aisle.

8.3.1 HOT AISLE CONTAINMENT SYSTEM- The Hot aisle containment has a series of panels, door frames and doors, and air blocks to enclose a hot aisle zone which contains IT equipment. The hot aisle zone is the space between two rows of IT equipment racks with cold air being supplied in the room and the IT equipment exhausts hot air return in the hot aisle.. The cool air is supplied to the IT equipment while the IT equipment exhaust air is pushed inside the Containment and returned to the cooling unit. By preventing mixing of cool supply air and hot exhaust air, this self-contained configuration is capable of supporting heat density loads .

8.3.2 HORIZONTAL CEILING PANELS- Ceiling panels are with 4.0 mm thick Lexan clear panels which has removable option with the help of wing nuts. Minimum Light Transmission per ASTM D1003 varying between 84% - 87% Ceiling panels are designed to be supported by the frames of the IT Equipment racks. Ceiling Panel frames sizes are suitable to match up with rack, row width, and hot aisle widths. The ceiling system are designed to permit removal of the ceiling panel from within the contained zone without the use of tools for service access to the space above the containment. Lexan sheet has good fire behavior characteristics. Lexan sheet does not contribute significantly to the spread of fire or to the generation of toxic gases. Toggle down top panels are provided with magnetic latches at the place of fire suppression nozzle.

8.3.3 DOOR FRAMES AND DOORS- Aluminum extruded profile-based door frames and doors shall be provided to establish air containment at the end of two rows of racks with clear opening at aisle entry/exit. The door frame system matches the height of the rack-based equipment and match the design width of the contained aisle. Extruded aluminum frame is with "IS 1060 H2" standard Doors are with sliding mechanism, to permit access into the contained aisle for maintenance or servicing. Standard door operation shall not interfere with access or service on any rack or rack-based equipment. Doors are with Lexan panels for clear visibility of aisle with proper handles for door operation with automatic door closure .system. Doors will have door stopper in order to avoid door closing during material movement or service.

8.3.4 FRAMES AND COMPONENTS SEALS-Foam Rubber gaskets are installed at containment joints to minimize open gaps between containment system components, such as door frames, ceiling and filler panels, and IT Equipment racks and rack-based equipment. Metallic filler panels are provided for uneven height of rack with proper sealing with gasket. Polyamide brushes are provided at bottom of door to avoid air leakagePowder Coating and Finish - Powder coat is with Nano ceramic pre-treatment process using a zirconium coat. The Powder coating process is ROHS compliant. Powder coating thickness will be 80 to 120 microns

8.4 Split Air Conditioning Unit is UPS and Battery Room -The environmental control system should be a High performance factory assembled split air-conditioning unit. It should be wall mounted, optimized for maximum cooling capacity and high Airflow rate to match sensible load in technology room . This unit should be designed for service from the front of the unit.

8.4.1 The Air-cooled High Performance Split AC unit shall be designed as per following conditions:

- Inside Design condition :24 Deg C ±2 Deg C and Max 50% RH
- Ambient air design temperature :As per Site
- Net Cooling Capacity : 11 KW

Net Sensiable Cooling Capacity : 9.9 KW

Number of Units required ; 3 Nos (2 Working and 1 Stand By)

- Air Quantity :2800 CMH or more
- Filters Efficiency :90% efficiency down to 10 Microns.
- Type of load :High sensible heat load (Sensible heat factor above 0.90)

8.4.2 The refrigeration system should consist of a R407C based Scroll compressor, hydrophilic coated evaporator coil, condenser coil, thermostatic expansion valve(Capillary Tube type expansion device is not acceptable) and filter drier. The compressor should have a suction gas cooled motor, vibration isolators, internal thermal overloads, manual reset high pressure switch, low pressure and high pressure transducer. The unit should be equipped with a direct drive electronically commutated radical fan with high efficiency and high reliability. The unit are designed with draw-thru airflow having fans in downstream of the coil.

8.4.3 The exterior steel panels should be custom powder coated to protect against corrosion. The wall constructed side, bottom and rear panels separated with insulation from the airstream. The unit should be provided with perforated inlet and outlet panels and same should have more than 65% open area.

8.4.4 The unit should be equipped with one set of HDPE air-filter having filtration efficiency of 90% down to 10 micron and same to be located within the cabinet and accessible from the front of the unit. The filter can be washed repeatedly.

8.4.5 The condenser should be with fan modulation kit. Condenser should be able to work -10 deg C to 45 deg C ambient temperature without triping. The condenser frame should be made up of a sturdy G.I. structure. The protection level of the outdoor unit should be IP54. The air-cooled condenser coil is constructed of mechanically expanded copper tubes in enhanced surface aluminum fin with Hydrophilic coating.

8.4.6 Unit should be controlled by intelligent control board. The control board should be microprocessor based. The controller should allow setting and monitoring of the room parameters. The controller allows setting and monitoring of the following space parameters:

- Return Temperature set-point
- Actual Room temperature
- Indoor Fan speed Range
- Mode of Operation
- Unit Number
- Active Alarm

8.4.7 The controller should give warnings / alarms.

8.4.8 The controller should capable of sequencing and auto rotation of units , automatic restart after power restores etc.

8.4.9 The control board should provide an RS485 port, and the standard protocol should be MODBUS. This should be standard feature of the product

The bidder is required to do NSM Branding on the front door and side panel of the solution as per the specification (Specifications / drawings will be provided by C-DAC).

9 Requirements towards IBMS work

9.1 Supply and implement physical security (access controls including biometric), Motion sensors etc.

Motion sensor is required for lighting control.

The basic function of access door control is as below.

a) Access control system (ACS) is to be deployed to allow entry for the authorized personnel only and restrict unauthorized people from entering nominated areas of premises. Access privileges to be configured as per the access data stored in Access Door Controllers (ADC). These privileges define the right of access card holder to enter the predefined area upon presenting the card at readers.

b) It shall support distributed architecture with central monitoring and control. If communication to the central control fails, the ACS shall continue providing access based on the predefined security configuration. Until communication is restored, all event logs and alarms shall be stored locally for minimum six months (based on ADC capacity). These events shall be sent to the central control when the communication is regained.

c) It shall have multiple supervised inputs. The dynamic status of each input shall be continuously monitored and each change should be reported immediately.

d) It shall provide programmable inputs, i.e. the ability to apply a variety of conditions to the way in which these inputs are monitored. These conditions shall be expressed in definite terms. It shall be able to produce and communicate various types of outputs (Audible sirens, relay switching etc.) based on the above definition. These outputs shall be standard in terms and shall be interfaced as inputs to other Building Management System. ACS communications should support RS232/ RS485/ TCP/IP. All data over the network between the ADC and the Server end shall be encrypted. All ACS software/firmware upgrades shall be downloadable through the network to the ADC. Access control system is required for all the Doors in Server area , UPS area.

9.2 Supply and implement environmental Controls and other sensors(Air conditioners, humidity controls, etc.)

a) Humidity Sensor: The humidity sensor shall be in an independent housing or be combined with the room /duct type temperature sensor in the common housing as per application requirement. The sensor should be electronic type with capacitive sensing element. Relative Humidity (RH) sensors shall be of standard 0-10 VDC or 4-20 mA type, well protected against solid and liquid contaminants with a permeable coating. Range of 0-100% RH. Accuracy: +/- 3%Operating temperature range of 0 to 50 °C. Stainless steel sheath construction complete with integral shroud to enable specified operation in air streams of up to 10 m/sec. Maintenance of Sensor to be by a simple field method such as solvent or mild detergent solution washing, to remove anticipated airborne contaminants. Maximum sensor non-linearity of ±3% RH with defined curve.

b) Temperature sensor:

9.3 BMS System: - The proposed software shall be independent software platform for monitoring the parameters of Mechanical systems, Electrical systems, Dry Cooler , In Row Units, DG Sets, various sensors etc. system as applicable. The BMS shall monitor the parameters of the data centre mechanical equipment to maintain environmental conditions, such as temperature, pressure, and humidity, within acceptable limits and at optimal energy efficiency. The operation of the system is governed by the Sequence of Operation (SOO), which is based on the mechanical system design. A graphical user interface (GUI) or Human Machine Interface (HMI) needs to provided as a visual representation of local conditions, equipment overrides, set point adjustments, historical trends, and alarms conditions at the equipment level. The BMS also functions to notify the proper recipients, onsite or offsite, in the event of abnormal operation, and archive historical data for use in troubleshooting and analysing system operation.BMS

software must have web client and should be able to access from any standard Web browser (Chrome, Firefox, Edge, Internet Explorer etc.) without any plugins and shall be supplied with minimum inbuilt 5 licences. BMS Software patches update and Version updates to be considered as part of scope during Warranty and AMC Period. BMS should have minimum 3-year historical data storage capacity. BMS software should have activity/auditing functionality so that each user action can be tracked based on login.

9.3.1 The Integrated Control Platform shall support encrypted password authentication for all web services whether serving or consuming.

9.3.2 Supply, Installation, Testing and Commissioning of BMS System which includes Main Building Automation Graphic Software, BMS Machine, DDC Controllers with necessary Panels, Field Sensors, Third Party Integrations as PAC , Load Manager, Integration with fire alarm panel, Monitoring and control of cooling units , monitoring and controlling of pump and valve operations etc,

9.3.3 The BMS IO summary bidder to prepare and submit with the BID.. This summary shall define the actual Digital/Analogue Input/output points and soft points to be considered for the functioning of the BMS. The Actual soft points shall be considered during the detail design stage based on the actual parameters selected and the mapping points. Bidder shall work out the Servers configuration and storage calculation based on the requirements as stipulated in this document considering inputs and the exact count of IO, Soft points .

9.3.4 Bidder to consider soft IOs for Rack DC rectifier system minimum 50 nos. per rack..

9.3.5 BMS should control the operation of oxygen pumping equipment's under fire situation.

9.3.6 Architecture of BMS system shall be of:

- Management Level (BMS Servers/Software)
- Control Level (DDC Controllers)
- Field Level (Field Sensors)
- BMS should have capability to show real time PUE, trends and record historical data of PUE.
- BMS should generate event notifications over emails, data for events based on which uptime and downtime will be calculated.
- BMS should generate alarm signal and tripping signal at abnormal situations. This should be software generated and any one can be utilized for giving tripping command for shutting down some servers or all.

9.3.7 There should be real-time reporting of

- Component wise and aggregate power consumption
- Temperature and relative humidity in the data centre and UPS room.
- Instantaneous PUE, hourly PUE, daily PUE, monthly PUE and annual PUE.
- Alarm indicators for component failures.
- GUI with SLD, P *ID, Equipment's visuals etc.

9.3.8 There should be real-time monitoring and logging of all parameters of the data centre as per ASHRAE/TGG 2009 Real time energy consumption measurements in data centres guidelines (best practical). There should be facilities for periodic reports (including uptime reports) of all aspects of the data Centre. All the required hardware and software eco-system including storage (High end PC, 2 X 32" LCD HD Monitor, Key Board, Mouse etc.) has to be supplied by the bidder.

9.3.9 The BMS system should allows for the monitoring, control, interrogation, alarm handling and routing for the following equipment's but not limited to:

- HVAC equipment –
- Generators.
- UPS and Battery system
- LV metering and equipment.
- Fire Alarm Systems.
- Water Leak detection System.
- Lighting Control
- Rodent Repellent System
- Vesda System
- All Sensors
- Etc.

9.4 Supply and Implement fire alarm system –

The system and its components shall be Underwriters Laboratories, Inc. listed, and FM APPROVED under the appropriate testing standard, for fire alarm systems and the installation shall be in compliance with the UL 10th Edition listing. The fire alarm system shall comply with requirements of NFPA 72 (National Fire Alarm and Signaling Code). The system shall be electrically supervised and monitor the integrity of all conductors.

When a fire alarm condition is detected and reported by one of the system indicating the affected devices, the following functions shall immediately occur:

- The System Alarm LED to be flashed.
- Built in Agent release circuit with release / Abort module of same make.
- System output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm should be executed, and the associated system outputs (notification appliances and/or relays) to be activated.
- The audio portion of the system should sound the proper audio signal (consisting of tone, voice, or tone and voice) to the appropriate zones.
- Zone identification should be available on BMS system.

The publications listed below are part of this specification.

National Fire Protection Association (NFPA) - USA:

No. 70	National Electric Code (NEC)
No. 72-1996	National Fire Alarm Code

No. 90A	Air Conditioning Systems
No. 92A	Smoke Control Systems
No. 92B	Smoke Management Systems in Large Areas
No. 101	Life Safety Code

9.5 Supply and Implement Video Surveillance systems:

The surveillance system shall be designed and developed to the following standards: NFPA-70 (National Electric Code), National Electrical Safety Code (NESC), CE Compliant, UL ISO/IEC 27001 etc.- Supply, Installation, Testing and Commissioning of CCTV system along with indoor, outdoor cameras to cover entire DC area as well as outside equipment's area. The complete security system shall provide "smart monitoring" where the reliance on human monitoring is minimized. All security alarm activations shall be brought to the attention of the BMS room and, where specified, live, and recorded images of the event are to be presented to the BMS control room automatically. The objective will be to provide High degree of Electronic surveillance system to the DC area and outside utility. The purpose is to monitor & servile the entire area for unwanted incidents. The objective is also to restrict unauthorized personnel entry & exit through critical areas and facilitate effective people management. Strategically placed video surveillance cameras help to enhance security by providing motion based/continuous monitoring of all parts of premises. The CCTV system shall comprise of various types of Indoor and Outdoor cameras with 90 days storage capacity with high end recording resolution. Camera should be with true day and night IR lens and suitable IP rated for indoor and outdoor applications.

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9.6 Supply and implement Rodent Repellent System:

The objective is to protect the entire premises viz. server area, utility area etc., all the voids against rodents. The purpose is to keep the rodents away from the floor by generating very variable high frequency sound waves which are not audible to human ear but irritate rodents. The objective is to protect all the cables below floor, above ceiling & room void from damage caused by rodents. The system proposed is to protect all the equipment's, areas with relevant type of high frequency sound producing device called satellites or transducers. Once powered up these transducers produce very high frequency variable sound waves continuously which irritate the rodents and are forced to evacuate the place. The devices can be tested periodically by means of a test switch provided on Main console.

9.7 Supply and implementing Water Leak Detection system:

It should include electronic alarm modules, water sensing cable, graphic display map, and auxiliary equipment. The system has to be capable of automatically detecting the presence of water at any point across the length of sensing cable. The system should alarm and locate the point of liquid contact on the digital display. This system should capable of communicating to BMS.

9.8 Supply and implementing NOVEC 1230:

Supply, install, test and commission NOVEC 1230 (Fluro Ketone FK-5-1-12) based fire suppression system. The fire suppression system shall include and not be limited to gas release control panel, CCOE approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, check valve and all other accessories required to make a complete operation system meeting applicable requirements of NFPA 2011 standards and installed in compliance with all applicable requirements of the local codes and standards.

10 Indicative Design Schematic

Minimum rating of components at site ambient conditions (considering deration factors, taking in to account utilization of 90% under peak load) along with rating is as shown in below table.

Sr. No.	Name of Components	Rating for each unit	Qty.	Redundancy
1	DX based Inrow with Air cooler condenser unit for Data Center Area	20KW	8	N+1
2	2 X 150 KVA UPS with 10 minutes SMF battery back for IT load	150 KVA	2	N+N
3	1 X 75 KVA UPS with 10 minutes SMF battery back for NON-IT load. UPS should be with module of size 25KW or 30 KW– 3 numbers working and 1 standby in same frame. Battery back up on 70 KVA for 10 minutes.	75 KVA	1	
4	IBMS System			
5	Electrical LT Panels, IEC Socket, Cables etc.			
6	1 X 1.5 Tr room cooling unit in BMS area		1	
7	3 X 3 T DX Based AC in UPS area	3T	3	N+1

11 Below is the list of minimum components/systems (BOQ) bidder should consider in the offering.

Sr. No.	Description
1	Civil
1.1	Supply, Installation, Testing and Commissioning of Raised Flooring System as per specification and drawings give in this document. Bidder to refer the layout for calculating the quantity.

Sr. No.	Description
1.2	Supply, Installation, Testing and Commissioning of False Ceiling System as per specification and drawings given in this document. Bidder to refer the layout for calculating the quantity.
1.3	Supply, Installation, Testing and Commissioning of two hour fire rated glass Doors.
1.4	Supply, Installation, Testing and Commissioning of fire rated expandable foam, water soluble cable coating etc.
1.5	Supply, Installation, Testing and Commissioning of 2 hour fire rated MS door along with all accessories.
1.6	Any other missing civil components that's includes but not limited to opening, cut out and re closure, steel structure for Equipment's foundations and base frame, etc.
1.7	Supply, Installation, Testing and Commissioning of INSULATION ON ROOF AND FLOOR SLAB,
1.8	Supply and Installation of Room Signage and fire evacuation map.
1.9	Supply and Installation of fire resistance solutions etc.
2.0	In BMS room bidder to consider chair and computer table for BMS person (1 computer table and 3 revolving chairs with handles). As shown in layout drawing
2.1	Supply, fabrication, installation of Steel for equipment platform, equipment base stand maintenance stand , pipe railing , maintenance platform , etc.
2.2	Equipment's Foundation, chain link fencing for equipment at ground floor
2.3	**Electrical System-** Bidder to refer the layout and electrical SLD for calculating the quantity.
2	Supply, Installation, Testing and Commissioning of LT panels, lighting DBs, Raw Power DBs, UPS out Put Panel, In row Panels, isolator panels etc.
2.1	Supply, Installation, Testing and Commissioning of internal illumination system and external illumination. Internal Lux level to be 400-500 lux.
2.2	Supply, Installation, Testing and Commissioning cables and End terminations.
2.3	Supply, Installation, Testing and Commissioning of IEC sockets, Cable trays for IT fiber/communications, NON-IT Power Cables as well supporting hangers etc. as per layout.
2.4	Supply, Installation, Testing and Commissioning of perforated type Cable Trays, SS cable trays etc. along with Cover and supporting hangers as per Standard Engineering Practices.
2.5	Supply, Installation, Testing and Commissioning EARTH ELECTRODES AND EARTH STRIPS
2.6	Supply, Installation of First Aid Box, Shock treatment Chart, Emergency Fire evacuation

Sr. No.	Description
	Map, Shock Treatment Chart, Rubber Mat etc.
2.7	Supply, Installation, Testing and Commissioning of 2 X 150 KVA UPS along with DC and AC Cabling and individual battery bank for back up time of 10 minutes. The type of battery shall be SMF type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case circuit breakers in each battery rack.
2.8	Supply, Installation, Testing and Commissioning of 1 X 75 KVA UPS along with DC and AC Cabling and individual battery bank for back up time of 10 minutes. The type of battery shall be SMF type. Each UPS should have separate battery bank. Battery protection shall be provided by thermal-magnetic molded-case circuit breakers in each battery rack.
3	**Cooling System**
3.1	Supply, Installation, Testing and Commissioning of In Rows system along with air cooled condenser unit and associated piping and valves and as per specifications given. As per Layout drawing.
3.2	Supply Installation and testing and commissioning of inverter based AC units -1 nos. in the BMS room of rating 1 T each.
3.3	Supply, Installation, Testing and Commissioning of AC system along with ODU unit and associated piping and valves and as per specifications given. As per Layout drawing in UPS room of 3 X 3 Tons
5	IBMS-
5.1	IBMS – Integrated building management system should cover but not limited to, NOVEC Gas base fire suppression system, Fire alarm, Access control, Water leak Detector, Rodent Repellent, CCTV, VESDA System etc., various types of sensors etc., software, communication protocol, field Devices along with Direct digital control (DDC) , etc.
5.2	Supply, Installation, Testing and Commissioning of Intelligent Addressable Fire Alarm System (FM Approved/ UL Listed) which includes Intelligent Addressable Fire Alarm Panel, FM approved Analogue Addressable Heat Type Smoke Detector, Analogue Addressable Multi Criteria Type Smoke Detector with Inbuit Isolator Base, Addressable Manual Call Point, Sounder (85 Db), Response Indicator (For False Floor Areas), Addressable Control module for activating sounder , Gas release Panel , Access Control De-Activation, Short Circuit Isolator Module, Addressable Monitor Modules, 2 core x 1.5 sq.mm twisted pair shielded multi strand Armored FRLS cable etc.
5.3	Supply, Installation, Testing and Commissioning of Access control system which includes software, card and biometric reader, electromagnetic lock, exit push button , FRLS Cables etc.
5.4	Supply, Installation, Testing and Commissioning of CCTV system along with indoor, outdoor camera, Network Video Recorder (NVR) should have **expandable facility and after connecting all the cameras**, there should be provision of adding additional

Sr. No.	Description
	4 cameras for future expansion and H.264 ,Video codec, Multiple Fisheye Dewarp Support, Multiple Video Search Modes, hard-drive bay design provides for a storage capacity of up to 24TBs,Support HDMI, Display Port, VGA and DVI Simultaneous Output, Graphics Decoder, USB support ,Audio Jack, Network interface-10/100/1000Mbps Ethernet (RJ-45) x2,Protocols IPv4,TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, SMTP, FTP, DHCP, NTP, DNS, DDNS, IP Filter, Redundant PowerPC, LVD, FCC, VCCI, C-Tick. NVR Should store Data for 4 Months. Vendors to give their Calculation. software, client work station Processor - Intel Core i-7 OS - Latest RAM - 8 GB Memory - 1 TB HDD Graphic Card - 1GB NVIDIA Quadro 600 Graphics capability: VGA, with at least 32k colors Network: 100/1000 Mb Ethernet network card Resolution
5.5	Supply, Installation, Testing and Commissioning of Rodent Repellant System
5.6	Supply, Installation, Testing and Commissioning of Water Leak System
5.7	Supply, Installation, Testing and Commissioning of BMS System which includes Main Building Automation Graphic Software, BMS Machine, DDC Controllers with necessary Panels, Field Sensors, Third Party Integrations as In Row , Load Manager, Integration with fire alarm panel, Monitoring and control of cooling units , DC modules in Racks etc,
5.8	Supply, Installation, Testing and Commissioning Fire Suppression System (Novec 1230 Based - For Server Room, Electrical Room and Battery Room) this should include Cylinder and valve assembly with solenoid actuator and Accessories, NOVEC Gas, manifold, valves, piping's, Nozzles, Abort switch, manual release switch etc. Bidders to submit the Gas concentration considered along with details calculation of volume calculation as ceiling void, floor void, room void etc. Modular Gas suppression systems are not accepted.

12 Refer annexure for all drawings

- Annexure A- Ground Floor Layout - Existing and Revised
- Annexure B-DC layout
- Annexure C-Sections
- Annexure D-Electrical SLD

13 Applicable Standards but Not Limited to

Installation and materials shall also confirm to latest amendments of

a. Indian Electricity Rules
b. Indian Factories Act
c. National Electric Code
d. Petroleum rules
e. Quality and Safety Standards

Sr. No.	Code Number	Description
1	IS 2309	Protection of buildings and allied structures against lightning.
2	IS 3043 /IEEE 80	Code of practice for earthing.
3	IS 5216	Safety procedure and practices in Electrical work.
4	IS 3106	Code of practice for selection, installation and maintenance of fuses (Voltage not
5	IS 1646	Code of practice for fire safety of buildings (general) Electrical installation.
6	IS 9921	Alternating Current Dis connectors above 1000 V.
7	IS 2551	Danger notice plates.
8	IS 1248	Electrical indicating instruments.
9	IS 722	AC Electric meters.
10	IS 3156	Voltage transformers.
11	IS 10118	Installation and maintenance of switchgear.
12	IS 398 /IEC 1089-1991	ACSR conductors
13	IS 7098	Cross linked polyethylene insulated PVC sheathed cables up to 33 KV
14	IS 12943	Brass glands for PVC cables
15	IEC 99-4	Gapless Surge Arrestors
16	IS-900	Code of practice for Installation and Maintenance of Induction Motors
17	IS-1255 -1983	Codes of practice for Installation and Maintenance of Power Cables up to and including 33 KV Rating.
18	IS-732 1989	Code of practice for Electrical Wiring Installation. (System Voltage not exceeding660 Volt).
19	IS-1913	General and Safety Requirements for Luminaries.
20	IS-1646	Code of Practice for Fire Safety of Building (General) Electrical Installation.
21	IS 8130	Conductors for insulated electrical cables and flexible cords.
22	IS 3975	Specification for mild steel wires, strips and tapes for armouring of cables
23	IS-2667	Specification for Fittings for Rigid Steel Conduits for Electrical Wiring.
24	IS 3615	Glossary of terms used in Refrigeration and Air-conditioning.

Sr. No.	Code Number	Description
25	IS 325	Three phase induction motor.
26	IS 1239	Mild steel tubes, tubular and other wrought steel fittings.
27	IS 639	Steel pipe flanges.
28	IS 277	Galvanized sheet steel.
29	IS 5831	Specification for PVC insulation sheath for electric cables.
30	IS 655	Metal air ducts.
31	IS 732	Code of practice for electrical wiring and fittings for buildings.
32	IS 900	Code of practice for installation and maintenance of induction motors.
33	IS 1248	Direct acting electrical indicating instruments.
34	IS 6392	Steel pipe flanges.
35	IS 1367	Technical supply conditions for threaded steel fasteners.
36	IS:10462	Thickness of the PVC outer sheath
37	IS 4894	Centrifugal fan.
38	IS 1554	PVC insulated (heavy duty) electrical cables for working voltages up to and including 1100 V.
39	IS 659	Air-conditioning safety code.
40	IS 616	Mechanical refrigeration safety code.
41	IS: 1554 -	PVC insulated (heavy duty) electric (Part I) Cables - Part I for working voltages up to and including 1100V.
42	IS: 1753 -	Aluminum conductors for insulated cables.
43	IS: 3961 -	Recommended current ratings for (Part II) cables: Part-II PVC insulated and PVC sheathed heavy-duty cables.
44	IS: 3975 -	Mild steel wires, formed wires and tapes for armouring of cables
45	IS: 5831 -	PVC insulation and sheath of electrical cables.
46	IEEE 519:1992	Harmonics
47	IS 277	Galvanized Steel Sheet (Plain and corrugated).
48	IS 655	Metal Air Ducts.
49	IS 737	Wrought Aluminum and Aluminum Alloy sheet and strip for general engineering purposes.

Sr. No.	Code Number	Description
50	UL 181	Factory – Made Air ducts and connectors.
51	UL 555	Fire Dampers.
52	ASHRAE 70	Method of testing for rating the performance of Air Outlets and inlets.
53	BS 649	Diesel Engines for general purpose.
54	BS 2613	Rotating Electrical Machinery.
55	IS 4722	Electrical performance of rotating electrical machinery.
56	IS 4728	Terminal markings for rotating electrical machines.
57	IS 4729	Measurement of vibrations of rotating electrical machines.
58	IEC60034	Rotating Electrical Machines
59	IEC60034.1	Rotating Electrical Machines Part1: Rating and Performance
60	IEC60947	Low Voltage Switchgear and Control Gear
61	ISO 8528 Part 1 to 10:	Reciprocating Internal Combustion engine Driven Alternating current Generating Sets
62	IS-375	Marking and arrangement for switchgear bus bars, main connection and auxiliary wiring.
63	IS-722 Part – I	AC Electricity Meters
64		Part - I General requirements and tests
65	IS-1248	Direct acting indicating analogue electrical measuring instruments and their accessories.
66	IS-1822	AC Motor starters, of voltage not exceeding 1000 volts.
67	IS-2147 IS-2208	Degrees of protection provided by enclosures for low voltage switchgear and control gear.
68		HRC cartridge fuse links for voltage above 650V.
69	IS-2419 IS-2516	Dimensions for panel mounting indicating and recording electrical instruments.
70		Circuit Breakers - Requirements and Test voltages not exceeding 1000V AC or 1200V DC.
71	IS-2607	Air break isolators for voltages not exceeding 1000 volts.
72	IS-2959	Contactors for voltages not exceeding 1000V AC or 1200V DC
73	IS-3072	Code of practice for installation and maintenance of switchgear.

Sr. No.	Code Number	Description
74	IS-3106	Code of practice for selection, installation, maintenance of fuses (voltage not exceeding 650V).
75	IS-3156, Part - I	Voltage Transformer - General Requirements.
76	Part – II	Voltage Transformer - Measuring Voltage Transformers.
77	Part – III	Voltage Transformer - Protective Voltage Transformers.
78	IS-3231	Electrical Relays for Power System Protection.
79	IS-3914	Code of practice for selection of AC Induction Motor Starters (Voltage not exceeding 1000V)
80	IS-4047	Heavy-duty air-break switches and composite units of air-break switches and fuses for voltages not exceeding 1000 Volts.
81	IS-4064	Air break switches, air break disconnections, air break switch disconnections and fuse combination units for voltages not exceeding 1000V AC or 1200V DC.
82	Part – I	Part I - General Requirements.
83	IS-4146	Application guide for Voltage Transformers.
84	IS-4201	Application guide for Current Transformers.
85	IS-4237	General Requirements for Switchgear and Control Gear for Voltages not exceeding 1000V AC or 1200V DC.
86	IS-4483	Preferred panel cut-out dimensions for electrical relays - flush mounting IDMTL relays.
87	IS-4794, Part- I	Push Button Switches - General Requirement and Tests.
88	IS-5082	Wrought aluminum & aluminum alloy bars, rode, tubes and sections for electrical purposes.
89	IS-5987	Code of practice for selection of switches (Voltage not exceeding 1000V).
90	IS-6236	Direct recording electrical measuring instruments.
91	IS-6875	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages up to and including 1000V AC and 1200V DC.
92	IS-8623	Factory built assemblies of switchgear and control gear for voltages up to and including 1000V AC and 1200V DC.
93	IEC 62040-3	(International Electro technical Commission) – Uninterruptible power systems (UPS) – Part 3: Method of specifying the performance and test

Sr. No.	Code Number	Description
		requirements.
94	IEEE 587 (ANSI C62.41)	Category A & B (International Electrical and Electronics Engineers) – Recommended practices on surge voltages in low voltage power circuits.
95	ANSI B 31.5	Code for Refrigeration Piping
96	ASHRAE 30	Methods of Testing Liquid Chilling Packages
97	ASHRAE 15	Safety Code for Mechanical Refrigeration

Bidder is required to submit compliance sheet in the tabular format for the selected products against above applicable code provision.

14 Recommended Makes:

List of Recommended Makes / Models of the major components/ equipment is given in **Annexure – D**. Bidders should use the makes and models having successful deployments in Data Centre applications in India. It is bidder's responsibility to comply with GeM Bid Document specifications and conditions, while selecting make and model of the product. However, bidder may offer equipment of any suitable make and model that complies with the GeM Bid Document specifications and conditions.

15 DC Acceptance Criteria:

Based on demonstration of following technical parameters, the DC implemented solution will be accepted.

15.1 Equipment's supplied and installed as per GeM Bid Document specifications defined in respective sections.

15.2 PUE

PUE should not be more than 1.4 during linpack testing.

15.3 Validating UPS redundancy operation by switching on and OFF some breakers.

15.4 Room Temperature – Measurement at various points inside data center to work out the hot pockets.

15.5 FAT report of equipment.

15.6 Demonstration of UPS operation under EB failure condition and EB restoration condition.

15.7 Demonstration of Battery backup under full load condition.

15.8 Demonstration of In Row Operation on actual heat load for air flow and temperature.

15.9 As build Drawing

15.10 Demonstration of creating false fire signal (Cross Zoning Input) and checking operation of magnetic coil on NOVEC cylinder manifold.

15.11 Demonstration of Water Leak Detector system

15.12 Safety during Project Execution

15.13 Submission of Warranty Certificate from manufacturer of UPS, Battery, In Row, Battery etc. as per RFP

15.14 Effective GUI in BMS screen, Effective implementation and utilization of BMS system. Monitoring of all field devices including Humidity, temperature sensors etc. on BMS screen, Control thro BMS in Automatic mode as well as Manual mode (Manual mode should be on BMS screen as well as Hard Wiring) of all actuators equipment's etc as per operating, failure and false safe logic.

15.15 Data Center aesthetics and interiors

16 Safety Regulations

The contractor shall at his own expense, arrange for the safety provisions as per the codes of Indian Standard Institution, Indian Electricity Act / Rule and such other Rules, Regulations and Laws as may be applicable in respect of all labour, directly or indirectly employed in the work for performance of the Contractor's part of this agreement. While the Indian Electricity Rules 1956, as amended up to date, are to be followed in entirety, any installation or portion of the installation that does not comply with these Rules, should be rectified immediately.

The contractor shall be responsible for and indemnify the buyer against all injury to persons – both his own workmen and others and for all damage to structural and / or decorative part of the buyer's property during erection and commissioning of the equipment. The contractor shall repair / reinstate all such damage at his own cost.

It shall be ensured that the control switches and distribution boards are duly marked, the distribution diagrams of substations are prominently displayed, and the substation premises, main switch rooms and D.B. enclosures are kept clean. Particular care should be taken to prevent the substation being used as store for inflammable materials, broken furniture, waste materials etc.

No inflammable materials shall be stored in places other than the rooms specially constructed for this purpose in accordance with the provisions of the Indian Explosives Act. If such storage is unavoidable, it should be allowed only for short period and in addition, special precautions such as cutting off supply such places at normal times, storing materials away from wiring and switch boards, giving electric supply for a temporary period with due permission of engineer- in charge shall be taken.

Protective and safety equipment such as rubber gloves, earthing rods, line men's belt, portable respiration apparatus, necessary number of caution boards such as "Man on Line", "Don't switch on" etc. should be provided in easily identifiable locations. Where electric welding or such other nature of work is undertaken, goggles shall be provided.

Rubber or insulating mats should be available in front of the main switchboards or any other control equipment of medium voltage or above.

Standard first Aid boxes containing materials as prescribed by Indian red cross should be provided in easily identifiable locations and should be easily available.

Periodical examination of the first aid facilities and protective and safety equipment provided should be undertaken and proper records shall be maintained for their adequacy and effectiveness.

Charts (one in English and one in regional language) displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently displayed at appropriate places.

A chart containing the names, addresses and telephone numbers of nearest authorized medical practitioners, hospitals, fire brigade and also officers in charge shall be displayed prominently along with the first Aid box.

Steps to train supervisory staff and authorized persons of the engineering staff in the first Aid practices, including various methods of artificial respiration with the help of local authorities such as fire brigade, St. John's Ambulance Brigade, Indian Red Cross or other recognized institutions equipped to impart such training shall be taken, as prompt rendering of artificial respiration can save life at the time of electric shock.

Electrical wiring and control switches should be periodically inspected and any defective wiring switches which will expose live parts should be replaced immediately to make installation safe.

No work on live L.T. bus bars or pedestal switch boards should handle by a person below the rank of a wire man and such a work should preferably be done in the presence of the Engineer in charge of the work.

- When working on or near live installation, suitable insulated tools should be used, and special care should be taken to see that these tools accidentally do not drop on live terminals causing shock or dead short.

- The electrical switchgear and distribution boards should be clearly marked to indicate the area being controlled by them.

- Before starting any work the existing installation, it should be ensured that the electric supply to that portion in which the work is undertaken is preferably cut off. Precautions like displaying "Men at Work" caution boards on the controlling switches, removing fuse carrier from these switches and these fuse carriers being kept with the person working on the installation, etc., should be taken against accidental energization. "Permit to Work" should be obtained from the Engineer-in-charge. No work on H.T. main should be undertaken unless it is made dead and discharged to earth with an earthing lead of appropriate size. The discharge operation shall be repeated several times and the installation connected to earth positively before any work is taken up.

- Before energizing any installation after the work is completed, it should be ensured that all the tools have been removed and accounted and no person is present inside any enclosure of the switchboard. Any earthing connection made for carrying out the work should be removed. "Permit to work" should be received back duly signed by the person to whom it was issued in token of having completed the work and the installation being ready for energisation and "Men at Work" caution Boards removed.

- In case of electrical accidents and shock, the electrical installation on which the accident occurred should be switched off immediately and the affected person should be immediately removed from live installation by pulling him with the help of coat, shirt, and wooden material or with any other dry cloth. He should be removed from the place of accident to a nearby safe place and artificial respiration continuously given as contained in BIS code and standard prescribed by St John Ambulance Brigade or Fire Brigade.

- While artificial respiration on the affected person is started immediately, help of Fire Brigade and Medical Practitioner should be called for an artificial respiration should be continued uninterrupted until such help arrived.

- These instructions should be explained in Hindi / local language to those staff who does not understand English.

The contractor shall ensure that all portable power tools used by the workman are rated 230 volts, double insulated and have to taken through 100 mA Earth Leakage Circuit Breaker (ELCB). Also all temporary lighting shall be supplied through 30 mA ELCB. Inserting wire into the sockets without the plug tops is not allowed. The length of the extension cord for portable tools should not be more than 5 feet. Temporary cables and flexible wires of short length should be bunched up and supported at inaccessible height. Temporary lamps should be mounted at inaccessible height. If lamps are incandescent, they should be protected by wire-mesh.

All power supply / Distribution Boards shall have canopy for protection against weather if located outdoors.

While carrying out work in Vessels / AC ducts or any other confined place, hand lamps with metallic guard suitable for 24 Volts AC supply shall be used All non-current carrying metallic parts of electrical system and equipment shall be earthed with two separate earthing wires of adequate capacity.

a. GENERAL RESPONSIBILITY

The contractor shall obtain a "Work Permit" from the Site Engineer / Client before starting any work at site. The work permits are issued to prevent any one working in unauthorized areas and they are valid for specific period.

The contractor shall produce test certificates from Government approved certifying authorities for all the lifting gear & hoists (slings, chains, hooks, chain pulley blocks, winches, cranes etc.) before starting the work. The contractor's supervisor for subsequent spot checks shall retain the certificates.

The gas cylinders should be used in safe manner. They should not be dropped from heights. Acetylene cylinder should be kept upright position. Oxygen cylinders should not be kept near inflammable materials like oil etc.

The contractor is to remove all waste materials from and around the work site and leave the work spot spick and span.

Works like Gas cutting, welding etc.

Before carrying out any work like gas cutting, welding etc. the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

The contractor shall produce certificates for his welding sets checked by the site in charge before starting the work. The certificates shall have to be renewed every two months. A copy of the current certificate shall be displayed on the welding sets.

Only cables in good condition and insulated holders are to be used. The length of the supply cable shall not exceed 25 feet and the welding set body shall be properly earthed. Under no circumstance building structure pipeline should be used as a return path of the current.

A charged fire extinguisher of CO2 type is to be carried with each welding set.

The welder is to wear good quality insulated welding gloves, shoes & goggles while at work.

Tarpaulins are not be used in the vicinity of welding / gas cutting jobs.

b. EXCAVATION

In the event of an excavation being made, it is the responsibility of the contractor to see that any opening, sump or pit caused by them is securely fenced as required by the Factory Act.

c. WORKING AT HEIGHT

For carrying out work at heights exceeding 6 feet or over and near the opening in floors, roofs, etc the following precaution to be taken.

The written permission of the Departmental Manager is to be taken before carrying out any work. Adequate safety precautions like use of safety belts, crawling ladders etc are to be taken.

All personnel engaged on overhead work shall be men experienced in such work.

Whenever possible timber staging or platform shall be erected with planks of minimum thickness 2 inches and minimum width 12 inches when the nature of work demands staging of a greater width than plank provided then additional planks shall be added and lashed securely.

Staging shall be provided with simple safety rails or ropes throughout its length, at waist height and on each open side.

Staging supports shall be of standard steel scaffolding safely secured and supported on firm level footings or slung from overhead beams. The supports shall be situated at a maximum distance of 8 feet apart and staging shall be secured to each support.

In case the site or nature of work is unsuitable for erection of proper staging all workers shall wear safety belts around their waists and secure their lifelines to strong scaffolding or structural members.

Wherever it is not possible to put up staging and / or use safety belts, safety nets or sheets shall be slung beneath the place of work.

When working in open process vessels or tanks, safety belts or safety nets shall always be used whether or not staging and scaffolding is provided.

Safe access to all points of work should be provided in the form of suitable ladders, stairways etc.

Contractor's employee of at least status of a foreman shall examine all arrangements before starting such work is commenced and shall satisfy himself that all reasonable safety precautions have been taken.

d. FIRE INSTRUCTIONS

Before carrying out any gas cutting, welding etc, the contractor shall contact the site-in -charge to ascertain about the safety of the area for welding work.

Smoking is strictly prohibited in premises. Severe action will be taken if any of the contractor's workmen is found smoking at the work site area.

In case fire is discovered, dispatch additional force & site Engineer. Wherever possible switch off any electrical and gas apparatus near the fire.

Check the nature of fire, pick up appropriate fire extinguisher and try to put out fire. For Electrical fire use carbon dioxide fire extinguisher.

e. PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment should be worn wherever necessary.

f. REVIEW MEETINGS

Periodic safety review meeting shall be conducted to review safety and for better coordination with other agencies.

Periodically safety review will be held with Site Engineer and issues will be discussed and action points shall be monitored and recorded in a separate safety Register / File.

g. WORK AFTER NORMAL WORKING HOURS

Extra care need to be taken for jobs being carried out after normal working hours with due revalidated work permit.

h. ACCIDENTS

In case of injury or serious illness, the department should be informed immediately. All injuries are to be reported by filling in the "injury report" form, which will be available with the respective department / site engineer.

These safety conditions should not be regarded as exhaustive. These have been issued for the guidance of the contractor and will not in any way absolve the contractor from any obligations or liabilities that might incur or transfer such obligations on liabilities to the company.

(End of Section- IV)

SECTION V – PRICE SCHEDULE

Summary Format- Supply, Installation, Testing and Commissioning along with Loading, Unloading, Transport, Transit Insurance etc.

Sr. No.	Particulars	Unit	Quantity	Rate	GST Rs.	Total Price Rs.
	Bidders to calculate the quantity as per Drawing Layout, SLD and Site visit					
1	Civil and allied works	Lot	1			
2	UPS 2 X 150 KVA along with SMF battery bank for 10 minutes back up time, with Battery Stand, Isolator, DC cabling etc.	Set	1			
3	UPS 1 X 75 KVA along with SMF battery bank for 10 minutes back up time, with Battery Stand, Isolator, DC cabling etc.	Set	1			
4	LV Electrical Components, All LT Panels, DBs, IEC sockets, Isolator Panels, In Row Panels etc.	Lot	1			
5	All LT Cabling –Power and Control, Earthing, Lighting Arrestors, Cable Trays, SS Cable Tray, perforated mesh cable trays Supports, Cable terminations, Glands and other accessories etc.	Lot	1			
6	Internal Illumination System along with DBs	Lot	1			
7	In Row Unit along with Air cooled Condenser, Cu piping and other accessories including containment, doors etc. Cu piping needs to be laid thro perforated cable trays.	Lot	1			
8	AC unit 3 T and 3 Nos in UPS and battery room along with Air cooled Condenser, Cu piping and other accessories etc. Cu piping needs to be laid thro perforated cable trays.	Lot	1			
9	AC unit in UPS and Battery room	Lot	1			
10	AC unit in BMS area	Lot	1			
11	Fire Alarm system including Detectors, panels, cabling and associated accessories etc.	Lot	1			
12	Fire Suppression system including Gas release panel, cylinder, Manifold, piping and associated accessories etc.	Lot	1			

13	NOVEC Gas with NOVEC cylinder for Data center area	Lot	1			
14	NOVEC Gas with NOVEC cylinder for UPS area.	Lot	1			
15	CCTV system including camera, switch, NVR, Cables, monitors etc.	Lot	1			
16	IBMS software including system (Computer, Monitor) integration of third-party devices, I/O modules, all control and communication cabling etc.	Lot	1			
17	Other IBMS including Water leak detectors, Rodent Repellent, Water quality sensor system	Lot	1			
18	Any other item, material required to complete the solution	Lot	1			
19	Any other charges required to complete the solutions on turn-key basis.	Job	1			
20	Installation, commissioning & allied charges for entire solutions.	Job	1			
21	Operation and Maintenance –Year-1	Set	1			
22	Operation and Maintenance –Year-2	Set	1			
	Grand Total Rs.					

Note: The Post warranty AMC charges (3rd year, 4th year & 5th year) should not exceed more than 7% of the cost of all the capital equipments, which includes but not limited to All LT panels, In Row units, UPS. Batteries are not considered under AMC.

Detailed Commercial Bid is to be submitted in the format.

Notes:

1. Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same.The prices quoted should include the charges towards testing of equipments, installations and approvals from local electricity board/PWD, electrical/ civil engineering authority, pollution control board - as applicable. The official charges required for the required testing, certification, NOC etc. are to be paid by the bidder. The certifications, NOC etc. shall be in the name of C-DAC .
2. The invoice can be raised in compliance with GST requirements, giving full bill of material.

ANNEXURE A – COVERING LETTER

Date:

To:
Director General,
Centre for Development of Advanced Computing(C-DAC)
Innovation Park, Panchavati, Pashan Road,
Pune – 411008.

Subject: Submission of the Technical bid for Supply of Data Centre Solutions

Dear Sir,

We, the undersigned, offer to supply Data Centre Solutions and allied services in response to the GeM bid & CDACP/NSM-DATACENTRE-PATNA/23-24/396. We are hereby submitting our proposal for same, which includes this technical bid and the Financial Bid through the GEM portal.

We hereby declare that all the information and statements made in this technical bid are true and we accept that any misinterpretation contained in it, may lead to our disqualification.

We undertake, if our proposal is accepted, to submit a Security Deposit of 5 % of the contract / order value, as per terms stipulated in the GeM Bid Document.

We confirm that the deliveries, installation will be done within 5 months (20 weeks), if the order is placed.

We hereby certify that my/ our firm has not been disqualified and / or blacklisted by any Office/ Department/ Undertaking of the State Government / Central Govt. of India, PSU/ Autonomous Body of Government of India, as on the date/time of submission of this bid.

We undertake, if our proposal is accepted, to initiate the Implementation activities towards supply of material and services, as stipulated in the referred RFP.

We hereby accept the applicable protocols while delivery, installation, implementation, commissioning of the entire `Turn-key' job with regards to `COVID-19' conditions at the Institution/site. (The same will be informed in the supply/work order(s) placed, if any).

We agree to abide by all the terms and conditions of the RFP document, including corrigenda. We would hold the terms of our bid valid for 180 days as stipulated in the RFP document.

We understand you are not bound to accept any Proposal you receive.

The undersigned is authorized to sign this bid document. The authority letter to this effect is enclosed.

Yours sincerely,
Authorized Signatory:
Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE B – AUTHORITY LETTER

Date:

To:

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

Subject: Authority Letter

Reference: GeM bid & CDACP/NSM-DATACENTRE-PATNA/23-24/396

Dear Sir,

We, M/s _____ (Name of the bidder) having registered office at _____ (address of the bidder) herewith submit our bid against the said RFP document.

Mr./Ms. _____ (Name and designation of the signatory), whose signature is appended below, is authorized to sign and submit the bid documents on our behalf against said RFP

Specimen Signature:

The undersigned is authorized to issue such authorization on behalf of us.

For M/s _____ (Name of the bidder)

Signature and company seal

Name

Designation

Email

Mobile No.

ANNEXURE C – UNDERTAKING BY PRINCIPAL MANUFACTURER

(To be submitted in Original on Letterhead- for all major equipments/devises/products – separately.)

Date:

Director General,
Centre for Development of Advanced Computing(C-DAC)
Innovation Park, Panchavati, Pashan,
Pune – 411008.

Subject: **Undertaking by Principal Manufacturer against GeM Bid & CDACP/NSM-DATACENTRE-PATNA/23-24/396 for Supply, Installation & Commissioning of Data Centre Solutions.**

Dear Sir,

We, M/s _____ (Name of the manufacturer) having registered office at _____ (address of the manufacturer) by virtue of being manufacturer for _____ (Name of the product/s), hereby authorise M/s _____ (Name of the bidder) having their office at _____ (Address of bidder) to submit quote, supply, install and provide after sales support for our range of products quoted by them to meet the above mentioned GeM Bid Document requirements.

M/s _____ (Name of the manufacturer) within the scope of requirement as per the GeM Bid Document mentioned above undertake to provide technical & other support towards fulfilling the requirements of installation, commissioning, acceptance criteria and product warranty services of the Data Centre Solutions to be supplied and installed at site(s) by our authorised representative M/s (Name of bidder) against said GeM Bid Document.

The undersigned is authorised to issue such authorisation on behalf of M/s _____ (Name of the manufacturer).

For M/s _____ (Name of the manufacturer)

Signature & company seal

Name

Designation

Email

Mobile No.

ANNEXURE D - LIST OF RECOMMENDED MAKES

Sr. No	Description List of Makes - Electrical	Recommended Makes
1	UPS System	Schneider/Vertiv/Eaton/Numeric/ FUJI /TMEIC/Delta/Socomec/ Riello Power India Pvt. Ltd
2	SMF Batteries for UPS	Rocket/Exide/Quanta
3	LT CABLES	RPG /KEI /FINOLEX/POLYCAB/Ravin/Lapp
4	Multifunction Meter (Digital Type)/Load Manager	Schneider/Socomec/Secure Meter/HPL/Siemens/L&T
5	MS/GI CONDUITS	BEC/BHARAT/AKG/UNIVERCELL
6	PVC CONDUITS	AVON PLAST//Precision/Dimond
7	MODULAR SWITCH SOCKET WITH SWITCH BOXES	ANCHOR/Legrand/Schneider
8	BRASS DOUBLE COPRESSION GLANDS	DOWELLS/COMMET/Siemens/Phoenix
9	MCCB/MCB/ACB	Schneider/L&T/ABB/Siemens/Eaton/Legrand
10	ELCB/MCB	Siemens/ Schneider / Legrand/Eaton
11	MCB DBS	Siemens/Schneider/Legrand/L&T /Eaton/ABB
12	METAL CLAD SOCKET OUTLETS	Legrand/SALZER/HAVELLS/L&T HAGER/Schneider
13	CABLE TRAYS	PROFAB/Indiana/OBO Bettermann
14	LUMINAIRIES	PHILLIPS/WIPRO/BAJAJ/HAVELLS/Syska
15	PROTECTIVE RELAYS	Siemens/ABB/L&T/Schneider/Eaton
16	CT's	VOLTAMP/AE/KAPPA
17	SURGE PROTECTION DEVICES	Schneider/Siemens/Legrand/Eaton
18	LT Switchboards	License of IEC 61439 Panel Builder
19	FRLS PVC insulated stranded copper conductor wires and cables	Finolex|Lapp Kabel|Skyline|L&T|National |Echo | Havells|
20	Terminal blocks & cage clamps	Elmexx|Phoenix|Wago
Sr. No.	**Details of Material- Civil and Interior**	
1	Cement	ACC, L&T, Ambuja

Sr. No	Description List of Makes - Electrical	Recommended Makes
2	WALL PUTTY	GOLDSIZE PUTTY BY SHALIMAR PAINTS LTD., J K WALL PUTTY, Birla White
3	STRUCTURAL STEEL	TISCO, SAIL, RINL, JINDAL, ESSAR, Tata Steel
4	ANCHOR FASTNER	HILTI, FISHER
5	ALUMINIUM SECTIONS	INDAL, HINDALCO, JINDAL,
6	DISTEMPER & PAINTS	ICI-Dulux, ASIAN PAINTS, BERGER PAINTS, NEROLAC, British Paint
7	GYPSUM BOARD and Fire Rated partition	INDIA GYPSUM, LAFARGE BORAL, RAMCO LTD
8	Fire Sealants	3M,Hilti,Fischer
9	GLASS	SAINT GOBAIN, Schott, Pilkington
10	FALSE CEILING	INDIA GYPSUM, ARMSTRONG,AMF
11	Raised/False Flooring	Unitile/Uniflair/ USG/Access Floor Systems/AET Flexiable
12	Fire Door	Shakti Mat, Radiant, ProMat, Godrej,
13	Insulation	Armaflex/K-FLex
Sr. No.	**System / Description-IBMS**	
A	Intelligent Fire detection System	
1	Analogue Addressable Fire detection Panel	Tyco , Honeywell, Siemens , Schneider, Johnson Control
2	Analogue Addressable Thermal /smoke Detector	Tyco , Honeywell, Siemens , Schneider
3	Analogue Addressable Manual Call Point	Tyco , Honeywell, Siemens , Schneider
4	Analogue Addressable Abort cum Gas Release Station	Tyco , Honeywell Siemens , Schneider
5	Analogue Addressable Control / Relay / Isolator Modules	Tyco , Honeywell Siemens , Schneider
6	Building Management Interface	Tyco , Honeywell, Siemens , Schneider
7	Fire Extingusher's	Cease Fire / Minimax

Sr. No	Description List of Makes - Electrical	Recommended Makes
8	Aspiration Smoke Detection System	Xtralis, ICAN, Tyco,Siemens
9	Response Indicators	Daksh, Polixel, Agni
10	Gas Release Modules	Tyco , Honeywell, Siemens , Ravel
11	Fire Detection Cables	Polycab, Excel, LAPP kabel
B	**IP CCTV Surveillance System**	
1	IP Dome Cameras with Varifocal lense	BOSCH, Honeywell, Siemens ,Samsung
2	IP BOX Camera	BOSCH, Honeywell, Siemens
3	IP PTZ Camera	BOSCH, Honeywell, Siemens
4	Video Management, Recording Software	Pelco, BOSCH, Axis, Indigo Vision, Polixel, Milestone
5	32" Monitors	Samsung, LG, Sony
6	Network Switch	Comnet, RuggedCom, Moxa
7	CAT 6 Cable	AMP, Molex, ,Schneider
8	OFC Cables	Finolex, Sterlite, HFCL
9	Power Cables	Polycab, Excel, LAPP kabel
10	MS Conduit	BEC, AKG, Dimond
11	PVC Conduits	BEC, AKG, Precision
12	Storage Device	DELL, HP, IBM
13	Servers / Workstation	DELL, HP, IBM
C	**Access Control System**	
1	Intelligent Access Controller	Siemens, Honeywell, Daccess
2	Time and Access Management Software	Nexwatch, Software House, Siemens, Honeywell, Daccess
3	Biometric Readers	Nexwatch, HID, DDS, Siemens, Honeywell, Daccess
4	Cards	Siemens, Honeywell, Daccess
5	Proximity Readers	Nexwatch, DDS, HID, Siemens, Honeywell, Daccess

Sr. No	Description List of Makes - Electrical	Recommended Makes
6	Electromagnetic Locks	Dafikas,BELL, Trimec, Insyn
7	Network Switch	Comnet, RuggedCom, Moxa
8	Emergency Glass Break Station	KAC
9	CAT 6 Cable	AMP, Molex, Schneider
10	OFC Cables	Finolex, Sterlite, HFCL
11	Servers / Workstation	DELL, HP, IBM
D	**UL Listed Novec 1230 Clean Agent Fire Suppression System**	
1	UL Listed & PESO Approved Seamless Cylinders	Ansul, UTC, Siemens, Tyco
2	Novec 1230	Ansul, UTC, Siemens, Tyco,Siemens
3	Nozzles	Ansul, UTC, Siemens
4	Electronic/ Pneumatic Acutators	Ansul, UTC, Siemens
5	Discharge Valves	Ansul, UTC, Siemens
6	M.S Seamless Pipes	Jindal, Tata
7	Discharge Hose	Ansul, UTC, Siemens
8	Manifold Check Valve	Ansul, UTC, Siemens
9	Warning Sign Boards	Ansul, UTC, Siemens
10	Manual Abort & Release Station.	Daksh, Agni
E	**Building Management System**	
1	Main Control System/DDC Controllers	Honeywell, Schneider, Siemens, Rockwell, Mitsubishielectric
2	Temperature, Air humidity Sensors (Duct, Room)	Azbil (Yamatake), ALC, Sauter,Siemens,Endress-Hauser
3	Building Management Software	Honeywell, Siemens, Schneider , Rockwell, Mitsubishielectric
4	Differential pressure switch Air flow / Water Flow switch/water Level switch	Azbil (Yamatake), ALC, Sauter, Honeywell,Emerson Process
5	Printer	HP/Epson

Sr. No	Description List of Makes - Electrical	Recommended Makes
6	Switching Relays	PLA/OMRON
7	Flame proof level switch	Veksler/Minilec
8	Electromagnetic Lock	Trimec/Dafickas
9	Current Relays	Sitn/Minilec/Sentry
10	Electric Actuators for 2-way ON/OFF valves	Danfoss/ Emtrack/ Johnson/ Honeywell/ Siemens/ Trane/ Cyclon Controls.
11	CAT 6 Cable	AMP, Molex,Schneider
12	OFC Cables	Finolex, Sterlite, HFCL
13	Servers / Workstation	DELL, HP, IBM
F	**Water Leak Detection System**	
1	Sensing Cables	Tracetek, Liebert, Sontay
2	WLDS Controller	Tracetek, Liebert, Sontay
3	Jumper Cables	Tracetek, Liebert, Sontay
G	**Rodent System**	-
1	Controller	MASER (Torrant Range), C Systems, Verma Craft
2	Sattelites	MASER (Torrant Range), C Systems, Verma Craft
3	GUI Software	MASER (Torrant Range), C Systems, Verma Craft
	Mechanical Components	
1	In ROws	Schneider | Blue Box| Vertiev | Rittal/ Climaveneta
2	Variable frequency drives	Danfoss |ABB/Eaton
3	Racks (for BMS)	Schneider, Valrack,,EFS,Rittal,Netrack,Dhananjay Group
4	G.I.	Jindal (Hissar)|TATA|GST
4.1	M.S. upto 300 mm	Jindal (Hissar)| TATA|GST
4.2	M.S. Above 300 mm	Maharashtra Seamless| TATA|GST
11	**Accessories**	
11.1	Pressure Gauges	H.Guru|Fiebig|WAREE
11.2	Thermometers	Emerald| Fiebig|WAREE

Sr. No	Description List of Makes - Electrical	Recommended Makes
11.3	Flow Switch	Anergy | Honeywell | Siemens | Johnson | Schneider
11.4	Dash Fastners	Hilti | Fischer
11.5	Rubber Groumat/ Clamps/ Hangers	Emerald/ Resistoflex/ Kanwal
12	**Air Filters**	
12.1	Filters	Airtech | Purolator | Puromatic | Thermodyne | Spectrum | Dynafilters
13	**Insulation**	
13.1	Glass Wool	Owens Corning | U.P. Twiga | Kimmco
13.2	Mineral Wool	Lloyd Insulation
13.3	Closed Cell Elastomeric Insulation	Armaflex | Aeroflex | Vidoflex | Kflex
13.4	Aluminium Sheets	TATA | Nippon | Hindalco | Indalco

ANNEXURE E – PERFORMANCE BANK GUARANTEE

(on non-judicial paper of appropriate value)

To,

Director General,
Centre for Development of Advanced Computing(C-DAC)
S.P. Pune University Campus,
Pune – 411007.

BANK GUARANTEE NO:

DATE:

Dear Sir(S)

This has reference to the Purchase Order No. _____ Dated _____ been placed by C-DAC on M/s_____ (Name & Address of vendor) for supply, installation, commissioning warranty of _____ (description of items) at IIT Patna.

The conditions of this order provide that the vendor shall,

1. Arrange to deliver the items listed in the said order to the consignee, as per details given in said order, and
2. Arrange to install and commission the items listed in said order at client's site, to the entire satisfaction of C-DAC and
3. Arrange for the comprehensive warranty service support towards the items specified in purchase order.

M/s (Name of Vendor) has accepted the said purchase order with the terms and conditions stipulated therein and have agreed to issue the performance bank guarantee on their part, towards promises and assurance of their contractual obligations vide the Supply Order No. _____ M/s. _____ (name of vendor) holds an account with us and has approached us and at their request and in consideration of the promises, we hereby furnish such guarantees as mentioned hereinafter.

C-DAC shall be at liberty without reference to the Bank and without affecting the full liability of the Bank hereunder to take any other undertaking of security in respect of the suppliers obligations and / or liabilities under or in connection with the said contract or to vary the terms vis-a – vis the supplier or the said contract or to grant time and or indulgence to the supplier or to reduce or to increase or otherwise vary the prices or the total contract value or to forebear from enforcement of all or any of the obligations of the supplier under the said contract and/or the remedies of C-DAC under any security (ies) now, or hereafter held by C-DAC and no such dealing(s) with the supplier or release or forbearance whatsoever shall have the effect of releasing the bank from its full liability of C-DAC hereunder or of prejudicing right of C-DAC against the bank.

This undertaking guarantee shall be a continuing undertaking guarantee and shall remain valid and irrevocable for all claims of C-DAC and liabilities of the supplier arising up to and until _____ (date)

This undertaking guarantee shall be in addition to any other undertaking or guarantee or security whatsoever the that C-DAC may now or at any time have in relation to its claims or the supplier's

obligations/liabilities under and / or in connection with the said contract and C-DAC shall have the full authority to take recourse to or enforce this undertaking guarantee in preference to the other undertaking or security (ies) at its sole discretion and no failure on the part of C-DAC in enforcing or requiring enforcement of any other undertaking or security shall have the effect of releasing the bank from its full liability hereunder.

We _____ (Name of Bank) hereby agree and irrevocably undertake and promise that if in your (C-DAC's) opinion any default is made by M/s _____ (Name of Vendor) in performing any of the terms and /or conditions of the agreement or if in your opinion they commit any breach of the contract or there is any demand by you against M/s _____ (Name of Vendor), then on notice to us by you, we shall on demand and without demur and without reference to M/s _____ (Name of Vendor), pay you, in any manner in which you may direct, the amount of Rs. _____/- (Rupees _____ Only) or such portion thereof as may be demanded by you not exceeding the said sum and as you may from time to time require. Our liability to pay is not dependent or conditional on your proceeding against M/s _____ (Name of Vendor) and we shall be liable & obligated to pay the aforesaid amount as and when demanded by you merely on an intimation being given by you and even before any legal proceedings, if any, are taken against M/s _____ (Name of Vendor)

The Bank hereby waives all rights at any time inconsistent with the terms of this undertaking guarantee and the obligations of the bank in terms hereof shall not be anywise affected or suspended by reason of any dispute or disputes having been raised by the supplier (whether or not pending before any arbitrator, Tribunal or Court) or any denial of liability by the supplier or any order or any order or communication whatsoever by the supplier stopping or preventing or purporting to stop or prevent payment by the Bank to C-DAC hereunder.

The amount stated in any notice of demand addressed by C-DAC to the Bank as claimed by C-DAC from the supplier or as suffered or incurred by C-DAC on the account of any losses or damages or costs, charges and/or expenses shall as between the Bank and C-DAC be conclusive of the amount so claimed or liable to be paid to C-DAC or suffered or incurred by C-DAC, as the case may be and payable by the Bank to C-DAC in terms hereof.

You (C-DAC's) shall full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contact with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s _____ (name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.

You will have full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the contract with the said M/s _____ (Name of Vendor) and to enforce or to forbear from endorsing any power or rights or by reason of time being given to the said M/s _____ (Name of Vendor) which under law relating to the sureties would but for the provisions have the effect of releasing us.

Your right to recover the said sum of Rs. _____/- (Rupees _____ only) from us in manner aforesaid will not be affected/ or suspended by reason of the fact that any dispute or disputes have been raised the said M/s

_____ (Name of Vendor) and/ or that any dispute or disputes are pending before any officer, tribunal or court or Arbitrator.

The guarantee herein contained shall not be determined or affected by the liquidation or winding up, dissolution or change of constitution or insolvency of the said M/s _____ (Name of Vendor) but shall in all respects and for all purposes be binding and operative until payment of all dues to C-DAC in respect of such liability or liabilities.

Our liability under this guarantee is restricted to Rs._____/- (Rupees _____Only). Our guarantee shall remain in force until unless a suit action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there under.

We have power to issue this guarantee in your favour under Memorandum and Articles of Association of our Bank and the undersigned has full power to do under the power of Attorney dated.

Notwithstanding anything contained herein:

A. Our liability under this guarantee shall not exceed Rs_____ (in words)
B. This bank guarantee shall be valid up to (26 months from date of installation) & unless a suit for action to enforce a claim under guarantee is filed against us within one month from the date of expiry of guarantee, all your rights under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities there after i.e. after one month from the date of expiry of this Bank guarantee
C. We are liable to pay the guaranteed amount or any parts thereof under this bank guarantee only and only if you serve upon us a written claim or demand or before _____
D. The Bank guarantee will expire on _____

Granted by the Bank

Yours faithfully,

For (Name of Bank)

SEAL OF THE BANK

Authorised

Signatory

ANNEXURE F – UNDERTAKING

Date:

To:

The Director General,
Centre for Development of Advanced Computing (C-DAC)
Innovation Park, Panchavati, Pashan Road,
Pune - 411008 Maharashtra, INDIA

Subject: Undertaking as per GFR – 2017, Rule 170(iii)

Dear Sir,

We, the undersigned, offer to carry out the 'Turn-key' project including **Products/items, components etc.** as per GeM Bid Document at C-DAC, Pune, in response to the GeM Bid & **CDACP/NSM-DATACENTRE/23-24/396**. We are hereby submitting our proposal for same, which includes technical bid and the Financial Bid through the GEM portal. As a part of eligibility requirement stipulated in said GeM Bid Document, we hereby submit a declaration in lieu of Earnest Money Deposit (EMD), as given below:

1. Our bid shall remain valid for 180 days from the date of submission and that we will not withdraw or modify our bid during the validity period,
2. In case, we are declared as successful bidder and an order is placed on us, we will submit the acceptance in writing within 7-10 days of placement of order on us.
3. In case, we are declared as successful bidder and an order is placed on us, we undertake, to submit a Security Deposit of 5 % of the order value, as per terms stipulated in the GeM Bid Document.
4. In case of failure on our part to comply with any of the above said requirements, we are aware that we shall be declared as un-eligible for said GeM Bid Document and /or debarred from any future bidding process of C-DAC or any Government entity for a period of minimum one year.
5. The undersigned is authorized to sign this undertaking.

Yours sincerely,

Authorized Signatory:

Name and Title of Signatory:
e-mail:
Mobile No:

ANNEXURE –G: DOCUMENTS CHECK –LIST

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	e-Packet-1 (Section-I)	
1	Annexure-G duly filled and neatly arranged in the following sequence only. The bidder must submit all the documents as per Document Checklist – Annexure G, with appropriate page nos for the same. The flow of the submitted documents must be in the same order/sequence.	
2	Covering Letter as per Annexure - A.	
3	Authority Letter as per Annexure – B	
4	Exemption documents or Annexure F towards EMD	
5	A copy of Certificate of Incorporation, Partnership Deed / Memorandum and Articles of Association / any other equivalent document showing date and place of incorporation, as applicable.	
6	A copy of GST registration certificate.	
7	Copies of at least one purchase orders or contracts and installation reports in the name of bidder from the end client / end user, during last Five years for Data Centre work.	
8	A photo copy of the commercial bid without prices (prices blocked) and copy of commercial terms & conditions (in detail) as included in the commercial bid. C-DAC reserves the right to reject the bid in case of any discrepancy observed in the un-priced commercial bid and the actual commercial bid.	
9	The undertaking(s) from the Principal Manufacturer(s) (OEMs) of products/ items offered as per Annexure – C.	
10	Undertaking to the effect that a Security Deposit of 5% of the order value will be submitted in case C- DAC decides to place the Purchase Order.	
11	Undertaking to the effect that the bidder is not black-listed or barred from	

Sr. No.	Documents to be Submitted (IN THE FOLLOWING SEQUENCE ONLY).	Submitted (Yes / No) with page nos.
	participation in bidding process by any Central/ State Government, Government Department, Government Undertaking, Public Sector Unit (PSU) or autonomous institution, as on date of submission of bids.	
12	All the necessary documents in support of eligibility criteria stipulated in Eligibility Criteria.	
	(Section-III)	
13	The executive summary of the bid submitted (As per Section-V)	
14	Duly filled Technical Bid (covering the details of solution, detailed bill of material, technical specifications, makes and models of items, diagrams, layouts, all drawings etc.)	
15	The details of electrical power consumption, foot-print, ambient temp, temperature range targeted, discrimination curves, short circuit calculations, cable schedule along with voltage drop calculations, battery sizing and back up calculations etc.	
16	Design basis and analysis of cooling solution at full and partial load conditions including complete details, assumptions made and the specific references/standards used for the same	
17	Legal / statutory permissions required, if any.	
18	e –packet 2 (FINANCIAL BID)	
	Price Bid as per format given in Section – V (as per GeM policy)	

ANNEXURE H – SERVICE LEVEL AGREEMENT (SLA)

The successful bidder will be required to sign a SLA, at the time of issuing the works order for supply, installation and commissioning of Data Centres. The basic service requirements /conditions that would be covered in the SLA are as given below.

1. Scope of Work for Operation and Maintenance

Scope of this SLA covers the satisfactory Operations of DC, Maintenance, warranty and support, as stipulated in the GeM Bid Document, Works Order, for a period of two years from the date of successful installation and commissioning of the Data Centre. One minimum four years experienced technician with experience in the field of O & M for Electrical and cooling equipment's per shift (Shift means 8 working hours) and one Diploma Engineer with minimum six years of technical + administration experience needs to be deployed. Data center operation will be 24 hr and 365 Days. 45 U CPU ,45 U CPU+GPU Racks -OCP complied, DC power modules for this components bidder needs to do the operation activity. During any kind of maintenance (Routing or Breakdown) bidders O & M team needs to communicate with the respective vendors service representative by phone / e mail keeping CDAC and end client in loop. CDAC will communicate in due time the list of service persons and escalation matrix.

2. Definitions

"**Uptime**" shall mean the time period for which the specified services / components with specified technical and service standards are available to the state and user departments. Uptime, in percentage, of any component (non-IT) can be calculated as:

Uptime = {1- [(Downtime) / (Total Time – Scheduled Maintenance Time)]} * 100

"**Downtime**" shall mean the time period for which the specified services / components with specified technical and service standards are not available to the state and user departments and excludes the scheduled outages planned in advance, the link failures and reasons beyond Vendor Control.

"**Incident**" refers to any event / abnormalities in the functioning of the Data Centre Equipment / specified services that may lead to disruption in normal operations of the Data Centre services.

"**Resolution Time**" shall mean the time taken (after the incident has been reported at the helpdesk), in resolving (diagnosing, troubleshooting and fixing)

The following shall be the responsibilities of the successful bidder.

3. Uptime Requirements:

The bidder shall ensure the uptime requirements for various systems, equipment's, components as per details given in the following Table.

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
1	HVAC and Cooling (Including In Row, PAC etc.)	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major

Sr No	List of Utilities	Criticality	Redundancy	Uptime	Resolution time
					complaints.
2	UPS	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
3	Electrical Infrastructure	High	N+1	98.5%	6-8 hours for minor complaints and 24-48 hours for major complaints.
4	Fire detection and alarm systems, VESDA system, Fire suppression system,	High			Within 24 Hours
5	BMS and real-time measurements, CCTV system, Rodent control, Water leak detection system, Access control system	Medium			Within 48 Hours

4. Reporting Methodology

Understand & analyzing the products covered in the Supply, installation and commissioning scope and performance on periodic basis.

Submission of daily, weekly and monthly service performance reports in the agreed format specified as per the requirement of the infrastructure facilities.

Measurement and Monitoring with recording of readings and checking parameters of different facility equipment's.

Analyzing the readings and escalating suitably for abnormalities observed, if any. Supervise installation and maintenance work, whenever new equipment or systems are to be / being installed.

Adequate stock of onsite and offsite spare parts and spare component must be maintained by the successful bidder.

Successful bidder to ensure the commitment towards uptime requirement of the DC.

To provide this service it is important for the M/S..... selected bidder to have back to back arrangement with the OEMs. The selected bidder would be required to provide a copy of the service level agreement signed with the respective OEMs.

Component that is reported to be down on a given date should be either fully repaired within the stipulated time frame. If breakdown is major, bidder to arrange for standby component/equipment on temporary basis (of equivalent configuration) within the time frame. In case the selected bidder fails to meet the above standards of maintenance, there will be a penalty as per clause 9 of section III.

5. DAILY CHECKS:

Access Control System:

- 24x 7 checking of Access System for alert and alarms.
- Monitoring of Status.
- Abnormality of System / errors
- Access Card Activity
- Report of Access to Data Center
- Report of Forceful Access (Invalid Access)
- Generation of Logs / reports and submission to Host Institute for review and necessary action.
- Testing & checking of all Doors, Magnetic locks and Sensors.

CCTV:

- Daily Checking of DVR System & Cameras
- Suspicious Action Report
- Abnormality of System
- Generation of Logs / reports and submission to Host Institute for review and necessary action/s Maintenance of reports

Fire Alarm System, Novec 1230 Gas, VESDA, Water Leak Detection (WLD), Rodent Repelled:

- Daily Checking of FAS Panel
- Immediate Action to Alarm Generated
- Monitoring of MCP
- Generation of Logs / reports and submission to Client for review and necessary action/s Maintenance of reports, Report Generation through IBMS.

In Row unit:

- Monitoring of In ROw's Temperature and Humidity every half an hour physically.
- Monitoring of Alarms & Immediate Action to it Comparison of Software readings with Actual Reading.

6. Fire Drill Test

Maintenance Activities will be carried for the System/Devices in Coordination with Host Institute Engineer & Technician

7. Daily Reports

1. Hourly basis monitoring of UPS & In Row & concern System
2. Reports of Energy meter reading of all meters.
3. Readings of main LT panel.
4. Fuel in DG fuel tank.
5. Immediate response to electrical complaints by any Working staff.
6. Following of effective power consumption chart provided by Customer.
7. Maintaining Critical Electrical parts.
8. Generation of Logs / reports and submission to Host Institute for review and necessary action's Maintenance of reports

8. Weekly Reports

1. All Electrical Systems Health Check Report
2. Vendor call tracking until closure
3. UPS & DG: On load Report.
4. Fire Alarm System: Reports of False Alarm.
5. Access System: Data Backup.
6. CCTV: Backup of DVR Status.
7. WLD: Test of Water Leak Detection Sensor Cable.
8. All System Health Report.
9. In Row, Adiabatic Dry Cooler and comfort AC

9. Monthly Reports

1. Follow up of schedule regarding preventive maintenance.
2. Presentation of consumption of meter units by Pie diagram.
3. Vendor Performance Reports.
4. Report of pending calls/problems.
5. MIS Report Presentation for Each Month

10. Call Logging Process with OEM/Vendors

The onsite team will get alerts on any issue in the data center. The onsite team will identify the area of problem and define problem severity into minor or major call. Call severity will be decided on basis of unit under suspect and impact on functions inside data center like - electrical power in DB, racks, cooling efficiency. Based upon this on site team will either manage to close the problem in case of minor alerts/alarms or In case of major alarms the team will raise an alarm over phone and email to OEM/Vendor with information to C-DAC /Host Institute designated team and O&M in-charge. O&M team will follow the Escalation matrix. The site team / OEM will identify problem area and will work towards resolution of problem.

11. Scheduled Maintenance

Bidder to submit the scheduled maintenance time along with frequency for the components.

12. Bidder has to submit and present the detailed plan of execution for Operation and maintenance activities including manpower deployment along with qualification details of manpower deployed at site.

Annexure - Certificate from bidder/ OEM
(ON BIDDER'S LETTERHEAD)

To:

The Executive Director,
Centre for Development of Advance Computing, Pune – 411008

Sub: Bid Document for …….

We hereby certify that the goods / software being offered by us vide our proposal, comply with the provisions of Make In India Order No P-45021/2/2017-PP (BE-II), dated 16th Sept 2020 & further OM issued by Public Procurement Division, Department of Investment and Internal Trade, Ministry of Commerce, GoI, read with order number W-43/4/2019-IPHW- MeitY, dated 7th September, 2020 issued by IPWH division of MeitY, GoI for respective items.

We also certify that, we are not from a country sharing land border with India as defined in order No. (Public Procurement No. 4) No. F.No.7/10/2021-PPD (1) dated 23 Feb 2023 issued by public procurement Division, Dept. of Expenditure, Ministry of Finance, GoI and the goods offered by us comply with the provisions of said order (details provided below).

We hereby certify the details pertaining to goods / software offered by us, against the GeM Bid Document requirement is given below:

Sr. No.	Description / Item	Make/ Model No				(%) Make in India contents (as defined by Order No. F. No. W-43/4/2019-IPHW-MeitY dated 7th September, 2020 issuedby IPWH division of MeitY,GoI)
			Country of Origin	Country of Manufacture	Place of Value Addition towards Local Content (if applicable).	
1						Consolidated MII / Local Content for the complete solution declared by OEM/System
2						
2						
4						

5						**Integrator (SI)/ Bidder**
6						

Bidder may add rows for the items required to cover the entire scope as per the Schedule of Requirements.

Note 1: The Country of origin / manufacturing, should be declared for individual items.

Note 2: CDAC reserves the right to Accept / Reject / Cancel the bid / bidder, at its sole discretion, based on the responses received against the MII and Land border sharing declarations submitted by the bidders / vendors.

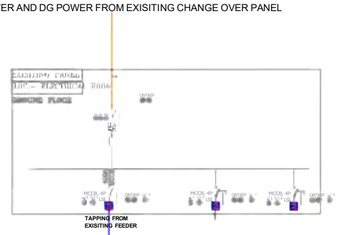
Note 3: The System Integrator / Bidder, needs to provide the MII / Local content declaration as a consolidated figure for the complete solution.

For (Name of bidder)

Authorized Signatory Name & Designation:
Mobile No:

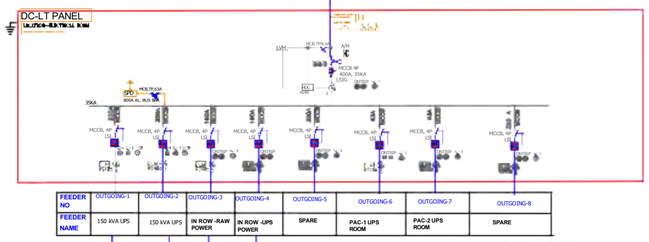
(End of Document)

EB POWER AND DG POWER FROM EXISITING CHANGE OVER PANEL



TAPPING FROM EXISITING FEEDER

3.5 C, 2 X 240 SQ MM ,AL A2XFY CABLE



FEEDER NO	OUTGOING-1	OUTGOING-2	OUTGOING-3	OUTGOING-4	OUTGOING-5	OUTGOING-6	OUTGOING-7	OUTGOING-8
FEEDER NAME	150 kVA UPS	150 kVA UPS	IN ROW -RAW POWER	IN ROW -UPS POWER	SPARE	PAC-1 UPS ROOM	PAC-2 UPS ROOM	SPARE

CU UNARMOURED

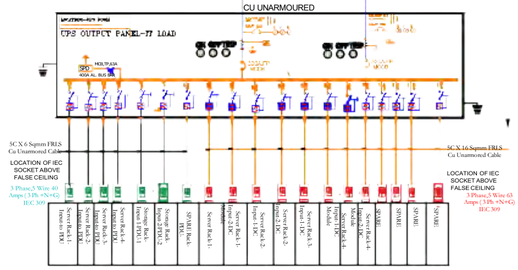
CU UNARMOURED

CU UNARMOURED

UPS-150 KVA

UPS-150 KVA

CU UNARMOURED



5C X 6 Sqmm FRLS Cu Unarmored Cable

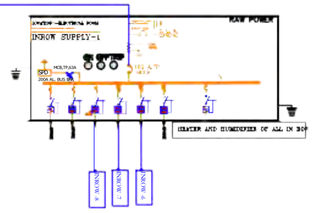
LOCATION OF IEC SOCKET ABOVE FALSE CEILING

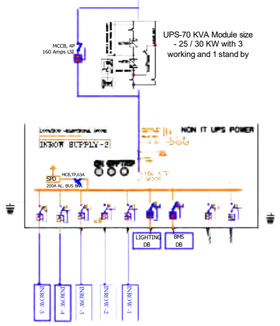
3 Phase,5 Wire 40 Amps (3 Ph. +N+G) IEC 309

5C X 16 Sqmm FRLS Cu Unarmored Cable

LOCATION OF IEC SOCKET ABOVE FALSE CEILING

3 Phase,5 Wire 63 Amps (3 Ph. +N+G) IEC 309





NOTES:

The panels will be built to relevant IEC specification

Unless otherwise stated and or where applicable :

Construction :

1. The panels will be dust and vermin proof with gaskets of the doors Installed on the panel and not on door. The compartmentalized construction is required with extendable bus bars. The entire assembly must go through 7 tank process and will be oven baked .
2. Outdoor installation will be with IP55 enclosure
3. Base frame of at-least 4" made out of steel sections is to be provided.
4. Panel will have :
   Top Entry /Bottom Entry
   Floor Mounted Installation/Wall Mounted Installation
5. Bus bar system supports will be CPRI or equal test laboratory approved.
6. All panel compartments shall have identification etched on Aluminum strip.
7. All MCB DB will have each MCB identification
8. Stands should be provided for the installation of switch board matching to height of the false floor.
9. All VFDs shall have an active-front-end design
10. All UPSs shall have an active-front-end design
11.

1. MCCBs will be atleast 35 kA or as specified In SLD.
2. MCBs will be atleast 10 kA short circuit withstand of the curve to suit
3. ALL protections will be coordinated
4. The range of the instruments be such that the readings will shown the mid-range of the instrument.
5. The load manager will be installed with communication port and win95 or similar graphic OS based software.
6. All ACBs will be draw out type with static relays provided for over-current, earth fault.
   For DG set protection restricted earth fault protection is required.
7. MCCB to have following :
   Shunt trip , fault indications, Electronics trip mechanism.
8. All Panel Should Have Tvss Protection

Earthing components :

1. All doors will have flying earth.
2. Copper earth bus is to be installed.
3. Where applicable UPS system, VS system and Raw power earth shall be separate. All the earth bus installed on suitable insulators

Drawings and Tests :

1. Shop drawings are required to be submitted for the review and approval
2. Test certificates for all components and the panel's routine tests are required to be provided in triplicate
3. Panel is required to be tested at site and works

LEGENDS

	ONAN 11KV/433V STEPDOWN TRANSFORMER
	AIR COOLED K-20 400/400V ISOLATION TRANSFORMER
	ELECTRICALLY OPERATED DRAWOUT (EDO) TYPE ACB WITH O/L & S/C RELEASE (LSI).
	ELECTRICALLY OPERATED DRAWOUT (EDO) TYPE ACB WITH O/L, S/C & E/F RELEASE (LSIG).
	MANUALLY OPERATED DRAWOUT (MDO) TYPE ACB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED DRAWOUT (MDO) TP+N(100%) TYPE ACB WITH O/L, S/C & E/F RELEASE (LSIG).
	MANUALLY OPERATED DRAWOUT (MDO) TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED MICROPROCESSOR BASED FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSIG).
	MANUALLY OPERATED FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MOE (MOTOR OPERATED) FIXED TYPE MCCB WITH O/L & S/C RELEASE (LSI).
	MANUALLY OPERATED FIXED TYPE MCCB WITH O/L, S/C & E/F RELEASE (LSIG).
	MOTOR PROTECTION CIRCUIT BREAKER (MPCB)
	MINIATURE CIRCUIT BREAKER (MCB)
	RESIDUAL CURRENT CIRCUIT BREAKER (RCCB)
	LOAD BREAK SWITCH
	CHANGEOVER SWITCH
	CURRENT TRANSFORMER (CT) RESIN CAST
	POTENTIAL TRANSFORMER (PT)
DLM	DIGITAL LOAD MONETOR - EM6436 INTEGRATED BASIC POWER & ENERGY PARAMETERS
MDC	MAXIMUM DEMAND CONTROLLER - EM6400
kWH	BASIC ENERGY METER - A,kW,kWH
LVM	LINE VOLTAGE MONETOR & CONTROL FOR OVER, UNDER VOLTAGE, SINGLE PHASE & PHASE REVERSAL PROTECTION
	ON-OFF-TRIP INDICATING LAMPS
	R,Y,B (RED,YELLOW,BLUE) INDICATING LAMPS
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	AUTO MANUAL SELECTOR SWITCH
H	ALARM - HOOTER / BUZZER
TFR	TRANSFORMER
MSB	MAIN SWITCH BOARD
MCC	MOTOR CONTROL CENTRE
	12 ANNUNCIATION PANEL WITH HOOTER
	TNC SWITCH WITH SPRING RETURN TO NEUTRAL AUTO / MANUAL SELECTOR SWITCH
	ONAN 11KV/433V STEPDOWN TRANSFORMER WITH OLTC
	AIR COOLED K-20 400/400V ISOLATION TRANSFORMER
	UNINTERRUPTED POWER SUPPLY (UPS)
	MOTORISED LOAD BREAK CHANGEOVER SWITCH (ATS)
	ATS

ABBREVIATIONS

LSIG	L : OVER CURRENT WITH TIMER DELAY S : SHORT CIRCUIT CURRENT WITH TIMER DELAY I : CONTINUOS SHORT CIRCUIT G : GROUND FAULT CURRENT WITH TIME DELAY

NATIONAL SUPERCOMPUTING MISSION

CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

Electrical SLD

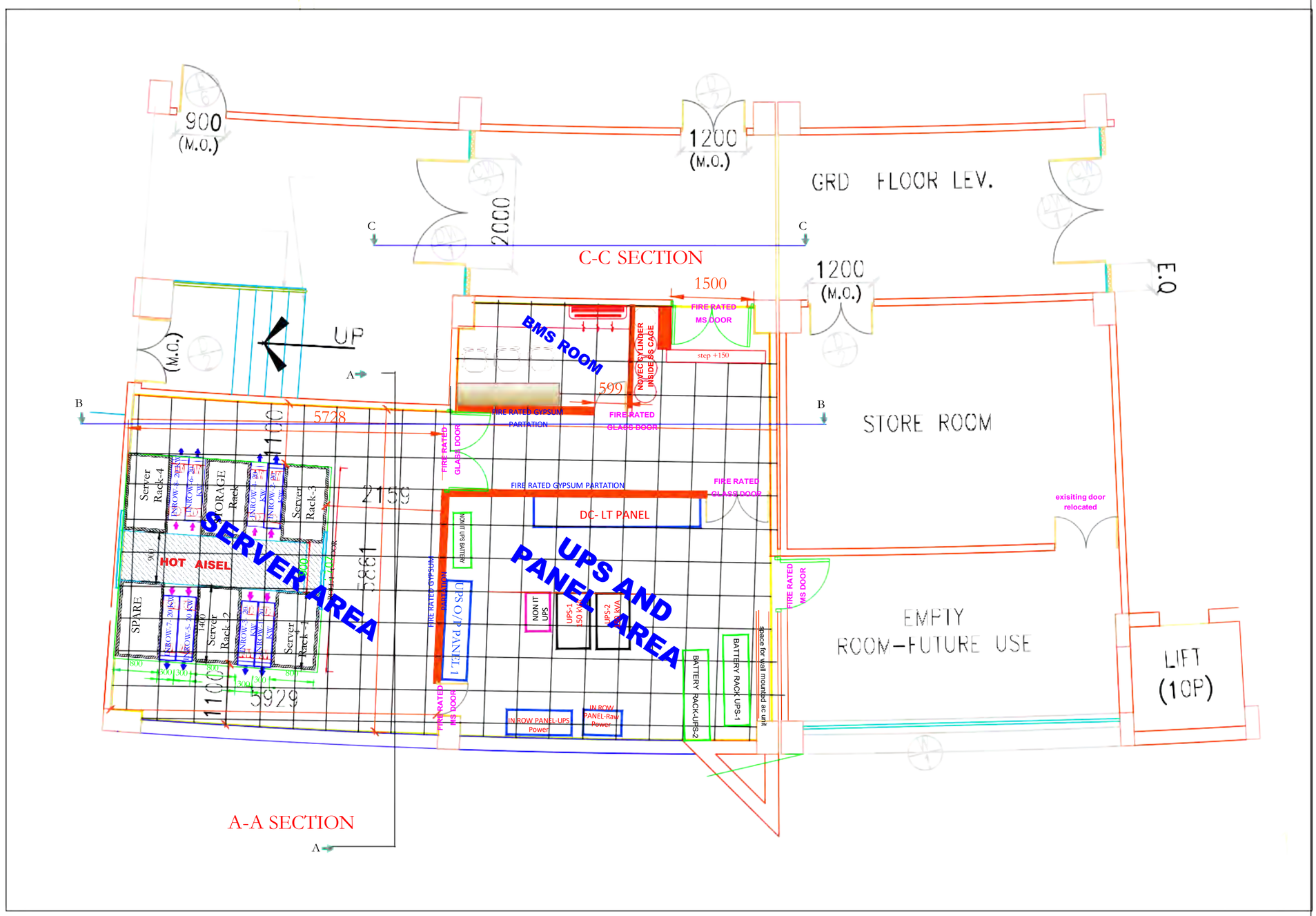
Indian Institute of Technology, Patna

Date

DRAWN

CKD

APPROVED



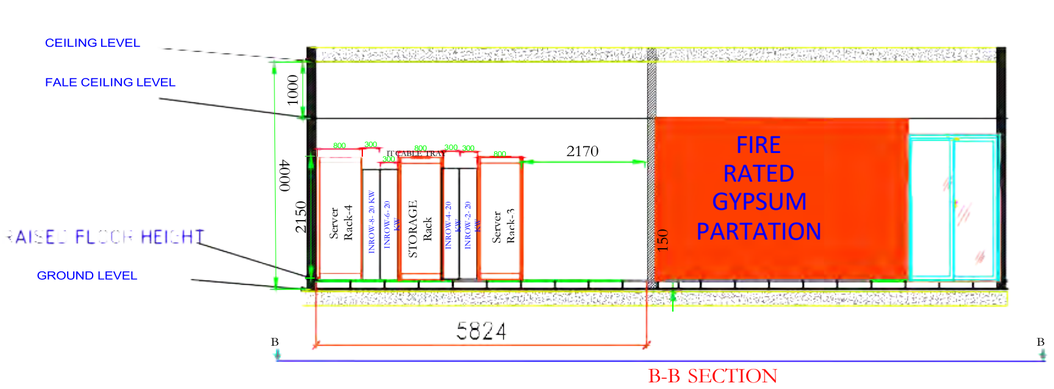
NATIONAL SUPERCOMPUTING MISSION

CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

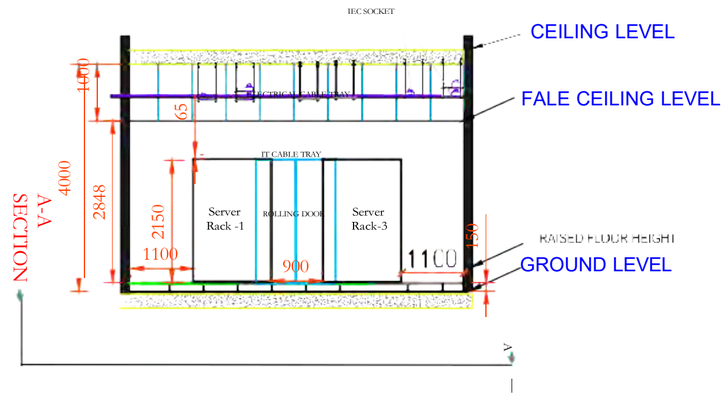
DC LAYOUT

Indian Institute of Technology, Patna

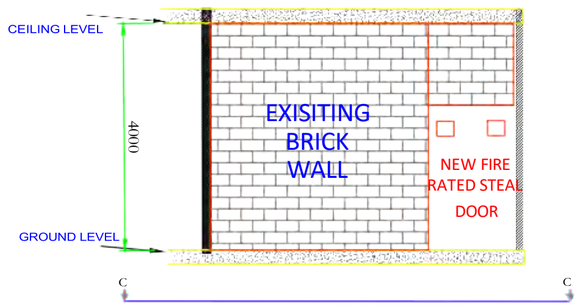
	Date
	DRAWN
	CKD
	APPROVED



B-B SECTION



A-A SECTION



C-C SECTION

NATIONAL SUPERCOMPUTING MISSION

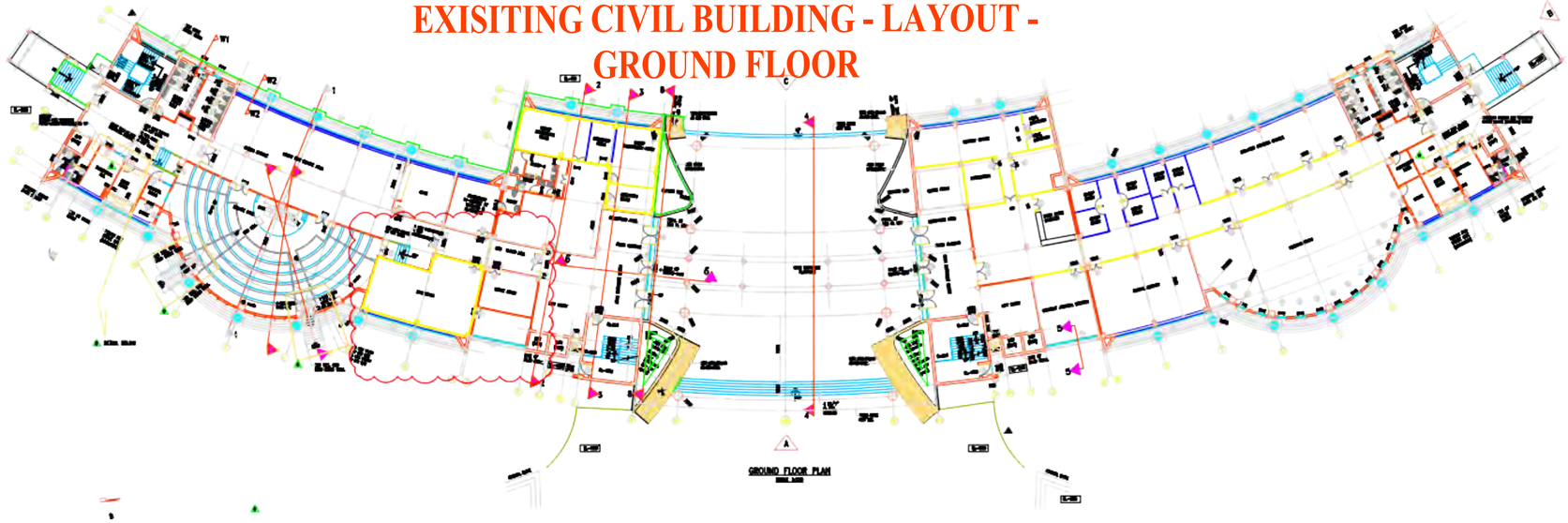
CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

All Sections

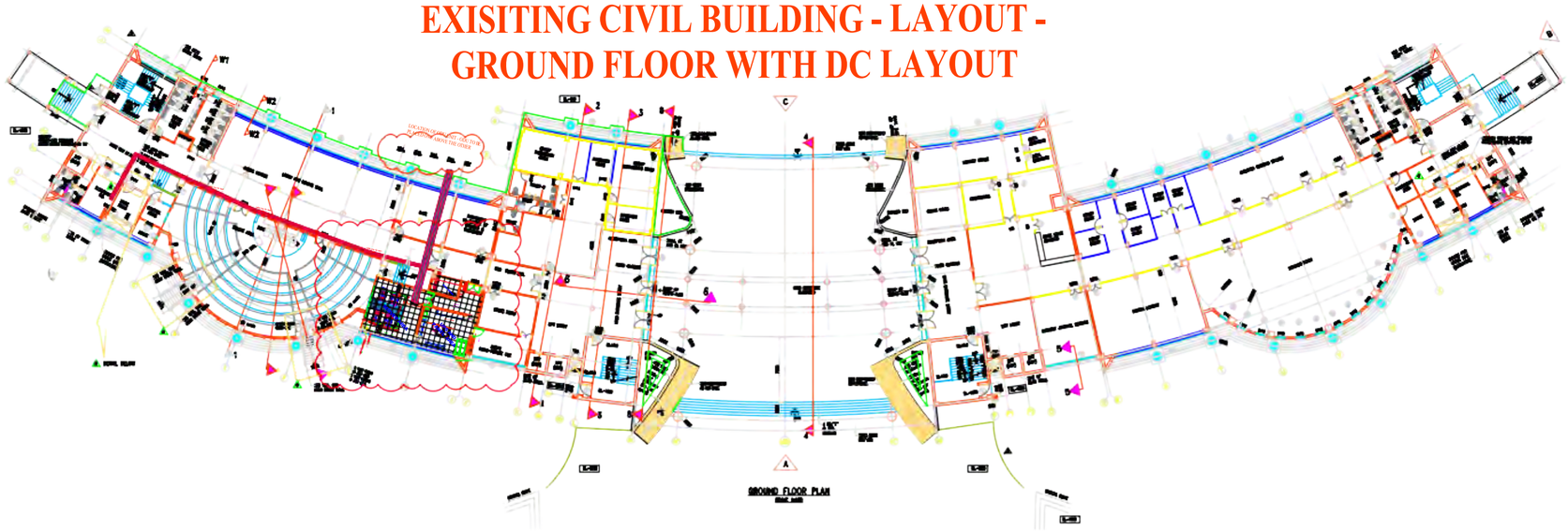
Indian Institute of Technology, Patna

Date	
DRAWN	
CKD	
APPROVED	

EXISITING CIVIL BUILDING - LAYOUT - GROUND FLOOR



EXISITING CIVIL BUILDING - LAYOUT - GROUND FLOOR WITH DC LAYOUT



NSM NATIONAL SUPERCOMPUTING MISSION

सी-डैक C-DAC

CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

Building Layout - Ground Floor - Existing and New Requirment

Indian Institute of Technology, Patna

Date

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