

Enclosure_21-Scope of Work

**Sub: Development of Gavan Land, Plot No 12A, Sector No-8, Node - Ulwe, Raigad, Navi Mumbai.
Tender No 1900000184**



MAZAGON DOCK SHIPBUILDERS LIMITED

(Formerly known as Mazagon Dock Ltd.)

CIN : U35100MH1934GOI002079

(A Government of India Undertaking)

Shipbuilders to the Nation

Dockyard Road, Mazagon,

Mumbai 400 010.

INDIA

**Scope of Work
List of Tender Drawings**

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1. SCOPE OF WORK**A. CIVIL WORK:****Introduction**

The Project consist of construction of Apprentice training centre (ATC & Infrastructure) Building which is an Intelligent Green Building located at the Gavan land Ulwe.

ATC- The proposed RCC Building structure is a Ground + 7 Floors RCC framed structure of size approx 150.30 x 20.3m approx height of 38.75 m; with RCC, and Structural Glazing System.

The works consist of Earthwork, Concrete work, Shuttering, Reinforcement , Structural glazing, Block masonry, Plastering & Painting, Flooring, Carpentry work, False ceiling, Plumbing & Sanitary, waterproofing works, Horticulture & Site development works. All the works shall be done as per specification, drawings and Latest version of applicable Indian standard codes; manufacturer specifications and to the satisfaction of Engineer in charge.

DEMOLITION WORK:

Demolition/ Removal of Existing Ground floor structures in Proposed ATS area. (Note- Demolition work should be carried out using latest & less vibration tools and equipments.)

CIVIL WORK:

The work includes Earthwork, Concrete work ,Shuttering, Reinforcement , Structural steel work, Block masonry, Plastering & Painting, Flooring, Carpentry work, False ceiling, Plumbing & Sanitary, waterproofing, Finishing works. All the above construction and demolition works shall be done as per MDL construction safety rules and regulations; safety measures at construction sites.

1. EARTH WORK

The scope of work covered under this specifications pertains to excavation of foundations, trenches, pits and over areas, in all sorts of soils, soft and hard rock, correct to dimensions given in the drawing including shoring, protections of existing underground utilities if any, such as water lines, electric cables etc., dewatering and shoring if necessary, stacking the useful materials as directed within the lead specified, refilling around the foundation and into the plinth with selected useful excavated earth and disposing off the surplus earth/materials within specified lead and finishing the surface to proper levels, slopes and camber etc. all complete.

2. ANTITERMITE TREATMENT:

The scope of preconstruction anti-termite treatment covers the soil treatment with approved chemicals in water emulsion in foundation trenches for columns, plinth beams, brick walls, service trenches, lift pits, steps, ramps etc. in top surfaces of plinth filling, at junction of walls and floor, in expansion joints etc. in stages as detailed in this specifications and drawings. Unless otherwise stipulated, the anti-termite treatment will

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be carried out as per I.S.6313 (part II) 1981 and/or as per direction of the Engineer-in-Charge.

3. HARD CORE / SOLING UNDER FLOORS / FOUNDATIONS :

The work covered under this specification includes all type of soling work by rubble stones laid under floors/foundations, hand packed, complete as per under mentioned specification and applicable drawings.

4. PLAIN / REINFORCED CONCRETE AND ALLIED WORKS:

Scope of the specification deals with the structural and general use of plain and reinforced cement concrete. The specifications cover the qualitative and quantitative requirements in respect of selection of ingredients, proportioning, manufacture of concrete, transport, placing, consolidation, curing, finishing, acceptance criteria etc., and these specifications also cover the requirement of form work and reinforcement. Unless otherwise specified, the manufacture and placing of concrete shall be done by weigh batching. However, in the specific cases where mechanized batching system (Ready mix concrete), mechanical transport and pumping is specified the same shall be followed as per the terms of the contract.

5. STEEL FOR CONCRETE REINFORCEMENT:

The contractor shall make his own arrangement for procurement of Reinforcement steel bars and wires for use in Reinforced Cement Concrete works. Unless otherwise specified in drawings / Schedule of quantities, the steel bars shall be of “High strength deformed steel bars and wires” conforming to the IS 1786 (latest revision), in the following strength

Grades:

- a) Fe 415D
- b) Fe 500D
- c) Fe 550D

Where “Fe” stands for specified minimum 0.2% proof / yield stress in N/mm² and “D” stands for same specified minimum 0.2% proof / yield stress but with enhanced specified minimum percentage elongation.

6. DAMP PROOF COURSE:

The work covered under these specifications consists supplying and laying plain cement concrete as damp proof course with or without waterproofing admixture in accordance with this specification and applicable drawings.

7. STRUCTURAL STEEL:

The work covered by this specification consists of furnishing and erecting of structural steel complete in strict accordance with this specifications and the applicable drawings.

8. BRICK WORK:

The work covered under this specification pertains to procurement of well burnt clay bricks of class 35 unless otherwise specified and workmanship in building walls of various thickness, in strict compliance with the specifications and applicable drawings.

9. STONE MASONRY:

The work covered under this specifications consists of supplying and erecting stone masonry walls with available best quality of stone in strict compliance with this specifications and applicable drawings.

10. AUTOCLAVED AERATED BLOCK MASONRY:

The work covered under this specifications pertains to procurement of best quality locally available or locally manufactured Autoclaved aerated block and workmanship in building walls of various thickness in strict compliance with the specifications and applicable drawings.

11. CEMENT CONCRETE FLOORING (IPS) :

The work covered under this specification consists of providing and laying at all levels and floors, flooring of different types, strictly in accordance with these specifications and relevant drawings.

12. FLOORING & CLADDING :

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The work covered under this specification consists of providing and laying at all levels and floors, flooring of different types, strictly in accordance with these specifications and relevant drawings.

13. TILES IN STAIR TREADS AND LANDINGS:

The work envisaged under these specifications consists of supplying and laying stepping tiles in the treads of staircase steps and over landings.

14. PRESSED STEEL DOOR FRAME:

This specification lays down the requirements regarding material, dimensions and construction of steel door frames for internal and external use.

15. FITTINGS AND FIXTURES:

The work covered under these specifications consists of supplying different types of fittings and fixtures required for doors, windows, ventilators etc. The supply shall be in accordance with the specification, drawings / approved samples. Samples of various fittings and fixtures proposed to be incorporated in the work shall be submitted by the contractor for approval of the Engineer-in-charge before order for bulk supply is placed.

16. GLASS AND GLAZING:

The work covered by this specification includes furnishing and fixing the glass panes to teak wood or steel doors and windows, strictly in accordance with these specifications and drawings.

17. STEEL DOORS, WINDOWS AND VENTILATORS:

The work covered under these specifications consist of supplying steel windows and doors and ventilators, fixing, glazing etc. complete in strict accordance with the specifications and relevant detailed/shop drawings.

18. ROLLING SHUTTERS:

Item refers to supplying and fixing rolling shutters of size and type as specified in the description of item.

19. M. S. GRILLS / RAILINGS :

The contractor shall submit 6 copies of shop drawings covering all types of work under these specifications before manufacture. The drawing shall show all dimensions, details of construction, installation relating to the adjoining work.

20. ALUMINIUM DOORS, WALL SPANS, GLAZING ETC.

The scope of work in the present tender item includes fabrication, supply and installation of anodised matt finished aluminium doors, glazing etc. strictly in accordance with these specifications and relevant detailed approved shop drawings.

21. ALUMINIUM WINDOWS, VENTILATORS, COMPOSITE UNIT ETC. :

The scope of work in the tender item includes fabrication, supply and installation of anodized finished aluminum windows, ventilators, composite units, glazing etc. Strictly in accordance with these specifications and relevant detailed approved shop drawings.

22. ALUMINIUM CURTAIN WALL SYSTEM**23. STRUCTURAL GLAZING**

Preliminary Requirements

- i) The contractor shall design, test, fabricate, deliver, install and guarantee all construction necessary to provide a complete curtain wall system, all in conformity with the drawings and approval of the Engineer-in-Charge.
- ii) Specification and all relevant construction regulations including providing any measures that may be required to that end, notwithstanding any omissions or inadequacies of the drawings,
- iii) The curtain wall system shall also include the following activities :
 - (a) Metal frames, glass glazing, spandrels, ventilators, finish hardware, copings, metal closure, windows etc.
 - (b) All anchors attachments, reinforcement and steel reinforcing for the systems required for the complete installations.
 - (c) All thermal insulation associated with the system.
 - (d) All fire protection associated with the system.

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- (e) All copings and closure and metal cladding to complete the system.
- (f) All sealing and flushing including sealing at junctions with other trades to achieve complete water tightness in the system.
- (g) Isolation of dissimilar metals and moving parts,
- (h) Anticorrosive treatment on all metals used in the system,
- (i) All aluminum members shall be finished with 35 micron thick PVDF coated,
- (iv) The contractor shall also be responsible for providing the following :
 - (a) Engineering proposal, shop drawings, engineering data and structural calculations in connection with the design of the curtain wall system.
 - (b) Mock-ups, samples and test units.
 - (c) Performance testing of the curtain wall framing and glazing assembly.
 - (d) Co-ordination with the work of other trade.
 - (e) Insulation with glass wool 48 kg/cum at spandrels area.
 - (f) Protection.
 - (g) All final exterior and interior cleaning and finishing of the curtain wall system.
 - (h) As built record drawings and photographs.
 - (i) Guarantees and warranties.
 - (j) All hoisting, scaffolding, staging and temporary services.
 - (k) Conceptualising and design of a suitable maintenance system for curtain glazing,
 - (v) The water tightness and structural stability of the whole curtain wall system shall be the prime responsibility of the contractor. Any defect or leakage found within the guarantee period shall be sealed and made good all at the risk and cost of the contractor.
- (vi) The curtain wall system shall be designed to provide for expansion and contraction of components which will be caused by an ambient temperature range without causing buckling, stress on glass, failure of joint sealants, undue stress on structural elements or other detrimental effects, specific details should be designed to accommodate thermal and building movements.

24. READY MIX CEMENT PLASTERING FOR WALLS & CEILINGS AND SAND FACE / ROUGH CAST PLASTERS:

The work covered under these specifications consists of supplying all materials and rendering all types of plaster/pointing finishes strictly in accordance with these specifications, applicable drawings.

25. WALL CARE PUTTY

Wall care putty consists of white cement, high quality polymers and specialty chemicals and mineral fillers and is formulated to make it suitable to apply even on damp surfaces.

Being cement based putty, it has better compatibility with the base plaster and forms a durable base for paints. It can be applied on both, Interior and exterior plastered surfaces. It is a water resistant base coating to the plastered surfaces to provide fine leveling and a protective base for the surfaces to be painted.

26. PAINTING :

The work covered under these specifications consist of furnishing the various types of paints and also the workmanship for these items, in strict compliance with these specifications, which are given in detail here-in-after with the item of schedule of quantities.

27. FALSE CEILING WITH FLEXO BOARDS / A.C. SHEETS:

The work envisaged under these specifications refer to supplying and fixing in position false ceiling at any floor, any location and at any height.

28. DISMANTLING AND DEMOLITION :

The work envisaged under this sub-head is for dismantling and demolition of brick masonry in cement/lime mortar, reinforced cement concrete works, removing wooden chowkhats of doors, wooden or steel windows etc.

29. WATERPROOFING:

The work contemplated under these specifications consist of supplying & Laying Toilet waterproofing, Box type waterproofing, Terrace waterproofing, Crystalline waterproofing etc. strictly as per these specifications and relevant drawings.

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30. ROAD AND PAVEMENTS:

The work contemplated under these specifications refers to Earth work in Excavation, Forming Embankments, Soling, PCC, Concrete, etc. for road and pavement works.

Concrete road shall be constructed as per IRC:15-2011 & IRC:44-2008, MORTH Specification & as per details shown in the drawing to the satisfaction of E.I.C

31. HORTICULTURE:

The work contemplated under these specifications refers to Earth work in Excavation, Garden soil, Lawn, Shrub, Trees, Ground cover, etc. for Horticulture works.

32. AUTOCLAVED CELLULAR (AREATED) CONCRETE BLOCK MASONRY

The work covered under this specifications pertains to procurement of best quality locally available or locally manufactured precast AAC concrete solid block and workmanship in building walls of various thickness in strict compliance with the specifications and applicable drawings.

Contractor to note that, if the items mentioned in the specifications, drawings are not included in the BOQ, then the Contractor is required to provide the same without any additional cost and the same need to be included in the overall offered price for the project.

B. PLUMBING WORK:

1.0 SANITARY FIXTURES & C.P. FITTINGS:

- 1.1 Work under this section shall consist of transportation, furnishing, installation, testing and commissioning and all labour as necessary as required to completely install all sanitary fixtures, brass and chromium plated fittings and accessories as required by the drawings and specified hereinafter or given in the Bill of Quantities.

2.0 WATER SUPPLY

- 2.1 Work under this section consists of furnishing all labour, materials equipment and appliances necessary and required to completely install the water supply system as required by the drawings, specified hereinafter and given in the bill of quantities.
- 2.2 Without restricting to the generality of the foregoing, the water supply system shall include the following:-
- i. Pipe protection & painting.
 - ii. Connections to all plumbing fixtures, tanks, pump etc.
 - iii. Providing hot water pipe lines and supply point with isolation valves, wherever required.
 - iv. Control valves, masonry chambers and other appurtenances.
 - v. Connections to all plumbing fixtures, tanks and appliances.
 - vi. Excavation and refilling of pipe trenches, wherever necessary.
 - vii. Internal CPVC water supply piping inside the toilets shaft/plant room/terrace.
 - viii. Testing all line and fixtures as specified.

3.0 INTERNAL DRAINAGE (SOIL, WASTE, VENT AND RAIN WATER PIPES):

- 3.1 Work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes as required by the drawings, specified hereinafter and given in the Bill of Quantities.

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- 3.2 Without restricting to the generality of the foregoing, the soil, waste, vent and rainwater pipes system shall include the followings:-
- i. UPVC vertical and horizontal soil waste and vent pipes, rainwater pipes and fittings, joints clamps and connections to fixtures.
 - ii. Floor traps, floor drain clean out plugs, inlet fittings and rainwater roof drain, area/local drains, trench drain...
 - iii. Waste pipes connections from all fixtures e.g. Wash basins, sinks, kitchen equipment.
 - iv. Testing of all pipes.
 - v. Connection of main.

4.0 EXTERNAL DRAINAGE SYSTEM (SEWERAGE AND STORM WATER):

- 4.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install the drainage system as required by the drawings and specified hereinafter or given in the Bill of Quantities.
- 4.2 Without restricting to the generality of the foregoing, the drainage system shall include: Sewer lines including excavations, pipe lines, man holes, drop connections, underground storm water drains, including pipes, man holes, catch basins and open drains, thrust blocks

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The work to be carried out under this Contract comprises of the Supply, Installation, Testing & Commissioning of the electrical Panels, Switchgears, Distribution Boards, Cables, Lighting fixtures, Earthing, UPS, CCTV, Telephone system, Rodent Repellent, Data Networking, cable tray/Raceways/ conduiting, lighting arrestor, insect killer, HT work, DG, transformer/On grid solar roof top system.etc for the Works as mentioned in the Bill of Quantity. The Contractor shall carry out and complete the said work under this Contract in every respect in conformity with the current rules and regulations of the local electrical authority, the Indian Standard Institution and with the directions of and to the satisfaction of the Client/Consultants. The Contractor shall furnish all the labour and install all materials, appliances, equipment (except those items which will be supplied by the Owner to the Contractor at site) necessary for the completion, and testing of the whole electrical installation as specified herein and shown on the drawings. This also includes any material, appliances, equipment not specifically mentioned herein or noted on the drawings as being furnished or installed but which are necessary and customary to make complete installation with all outlets for Power, Light, and other electrical systems shown on the schedule or described herein, properly connected and in working condition. The work shall include all incidental jobs connected with electrical installation such as excavation of trenches and back filling, cutting / drilling and grouting for fixing of fixtures, equipment etc. Further all the liaison work with the Supply Authorities for obtaining electrical load sanction, obtaining the released order from supply and other bodies like Electrical Inspector, Pollution, Board, etc including submitting all relevant Tests, Reports, Installation compliance, drawings etc. shall be done by the Contractor without any Extra Cost. No Separate Amount towards the same will be paid by the Owner.

Brief Scope of Works**Contractor's Scope of Work:****Broadly the scope of Contractor for Electrical System is as under:**

Supply and erection of New proposed system which will be more electrical energy efficient system meeting the latest I.S/IEC rules, meeting latest electrical safety standards with advanced technology in electrical distribution system from MSDCL/Power Supply Agency meters to various Distribution boards etc. The brief scope of Contractor is as under,

A) Supply, Installation, Testing and commissioning of following items as per Specifications, drawings and latest I.S/IEC Standards,

1. Supply installations and commissioning of earth pits as per design and latest I.S 3043.

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2. 415 V PCC/MCC panels with state of modern switchgears, control, state art numerical relays & safety interlocks.
 - I. Main LT Panel (PCC)
 - II. AMF Cum DG Synchronization panel
 - III. Automatic Power Factor correction Panel (APFC)
 - IV. New D.G sets
 - V. Emergency Panels
 - VI. Street light Panel and Feeder Pillars
 3. Low voltage 1.1kV grade XLPE Aluminums and Copper cables as required. Contractor shall perform an insulation test on cables to ensure cables are good condition and insulation is intact.
 4. Ladder and Perforated type Cable trays wherever required and DWC / RCC Hume Pipe with necessary excavation and backfilling.
 5. Safety items like Fire bucket with Stand, CO2 Fire extinguisher, Hand gloves, Synthetic elastomer electrically Insulating Mats, First Aid Box and Instruction charts etc.
 6. All equipments shall be from the approved make list only.
- B) Dismantling, Shifting and handing over to Client of following items and remaking the site good as original. Rate of dismantling shall be inclusive of transportation to storage place as directed by Engineer In charge. Existing Electrical equipments, instruments, etc if any.**
- C) Rebating of dismantled materials as mentioned in Tender. Amount Rebate of Dismantled items shall be deducted from total value of contract.**
- D) Execution Planning and Coordination:**
- 1) Contractor shall prepare Planning Schedule and bar Chart for execution and present the same to client for approval.
 - 2) Contractor shall intimate and Coordination well in advance with other agency.
 - 3) All the Materials, Manpower, Tools and tackles shall be arranged before execution.
 - 4) Charging of Panels DG, Installation of cables and terminations shall be well planned in sequence without disturbing the other Work .
- E) Material Approval**
- 5) Contractor shall submit technical details of all materials and equipments to Client/Consultant for approval in proper formats before placing any order.

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- 6) Contractor shall make sure that materials and equipments are complying to tender specifications and relevant latest I.S/IEC standards.
- 7) All Materials must be selected from tender approved make list only. Any make other than specified in tender will not be accepted. If make list silent about any material then make of such materials shall be decided by Client/Consultant from reputed makes.
- 8) A sample of equivalent LED fixtures shall be submitted along with technical data sheets for approval. Specification of LED lighting shall meet the requirement per latest I.S and Specifications.
- 9) G.A drawings of all H.T and L.T panels, Transformer and D.G sets shall be submitted for approval.
- 10) Once materials, G.A and samples are approved. Immediate order shall be placed confirming delivery time.

F) Factory acceptance Test(FAT) and Inspection at Manufacturer's facility

- 1) Contractor shall conduct Third Party inspection (TPI) of all Electrical Equipments and Instruments at Manufacturer's facility. TPI shall be performed strictly as per Specification and relevant latest I.S standards.
- 2) Contractor shall submit Quality Assurance Plan (QAP) from Manufacturer stating the no of tests to be conducted as per tender.
- 3) Inspection reports shall be submitted to Client/Consultant for approval before dispatch of the materials.
- 4) Client/Consultant may ask to witness the inspection of any or all equipments. The Contractor has to bear all the Expenditure for One Representative of Client, One Representative of Consultants for all the visits required for Inspection purpose. This expenditure shall include Air Fare / First Class lodging, boarding and local conveyance.

G) Testing and Commissioning at site.

- 1) Contractor shall perform insulation, HV other tests on site in presence of Client/Consultant as specified in tender after unloading of All the Electrical equipments like Transformer, H.T/L.T Panels, DG sets and cables.
- 2) After successful on site testing of equipments, Contractor shall begin installation work under qualified and experienced Engineers and team providing high quality of workmanship. Installation work should be as per guidelines provided in tender, latest I.S standards.
- 3) Excavation and backfilling, dismantling, making holes /cutouts etc. to complete the job, shall be in scope of contractor without any extra cost.

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- 4) Safety norms shall be strictly followed during installation works. Safety tools like Safety shoes, belt, helmet, rope, gloves, glasses and safety suites etc shall available at site all time.
- 5) Post installation work, Contractor shall arrange pre commissioning test of all equipments in presence of Client/Consultant. And all tests shall be recorded. Schedule of all pre or post commissioning tests shall be conveyed to Client/Consultant at least one week in advance.
- 6) After successful pre commissioning tests, Equipments shall be ready for charging.
- 7) Liasoning works, Load sanction, and necessary Approvals for the Electrical System Revamping and upgradation from Electrical incharge / Local Authority shall be in Contractor's Scope without any cost implications. Permission for installation of D.G sets, Earthing and Substation layout will be in scope of Contractor.
- 8) Post Installation Contractor shall perform final commissioning in presence of Client/Consultant. Readings shall be recorded and formal tests reports should be submitted.

H) G.A, Shop drawings and As built Drawings

- 1) Contractor shall submit G.A drawings of all H.T and L.T panels, Transformer and D.G sets for approval.
- 2) It shall be in Contractor's scope to prepare various shop drawings like Equipment layout, Lighting and power layouts, cable tray layout and Hume Pipe layout, trench layout with sections wherever required as instructed by Client/Consultant.
- 3) Contractor shall finally submit As-built drawings, Single line diagram, cable tray layouts, equipments layouts Lighting and power layouts etc. As built drawing of existing cable route and trench of entire Complex shall be in scope of Contractor. Necessary survey and evaluation shall be conducted in coordination CIDCO team.

I) Work Completion and Handing

- 1) On successful completion of Contract work, contractor shall submit 4sets of all test reports, Certificates, approved data sheets, Drawings, SLDs, TPI reports, Pre and Post Commissioning reports, Asbuilt drawings etc. in both Hard and soft copies. CAD file of drawings shall also be submitted.
- 2) Contractor shall submit warranty/guarantee certificates, operation and maintenance manuals,
- 3) Product / accessories supplier or vendor list.
- 4) Contractor shall submit an Escalation matrix chart.
- 5) On successful submission of documents as mentioned above and as required time to time, Contractor shall be eligible for issuing work completion certificate.

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The Contractor shall obtain and pay for any fees and permits required for the installation of the work. The Owner shall arrange only for payment of service connection charges and any other security deposit for getting electric charges and any other security deposit for getting electric supply. On completion of the work, the Contractor shall obtain and deliver to the Client / Consultants Certificates of final inspection and approval by the Local Electric Supply Authority. The Client / Consultants shall have full powers to require the materials or work to be tested by an independent Agency at the Electrical Contractor's expense in order to prove their soundness and adequacy.

1.2 Drawings and specifications:

The Specifications and Schedule of rates shall be considered as part of this contract and any work or material shown on schedule and not called for in the specifications or vice versa, shall be executed as if specifically called for in both. The drawings indicate the extent and general arrangements of the fixtures, controlling switches, wiring system etc. and are essentially diagrammatic. The drawings indicate the points of termination of conduit runs and broadly suggest the routes to be followed.

The work shall be installed as indicated on the drawings, however, any minor changes found essential to co-ordinate the installation of this work with the other trades shall be made without any additional cost to the Owner. The data given herein and on the drawings is as exact as could be secured, but its complete accuracy is not guaranteed. The drawings are for guidance of the Contractor and exact locations, distance levels will be governed by the building. The Contractor shall examine all Clientural, structural, plumbing and sanitary and electrical drawings before starting the work and report to the Client / Consultants any discrepancy which in his opinion appear on them and get them clarified. He shall not be entitled to any extras for omissions or defects in electrical drawings or when they conflict with other work.

1.2.1 Shop drawings:

The Contractor shall prepare and submit the Client / Consultants for approval detailed Shop drawings of All H.T. /L. T. Panels, Cable Trays, etc and any other equipment within 10 days of signing of the Contract or acceptance of work order whichever is earlier.

1.2.2 Site order book:

To record noting by the Client / Consultants / Owner the Contractor shall maintain a site order book at the site of works, when necessary the Client / Consultants / Owner will utilize the book to issue instructions to the Contractor. The Contractor shall follow these instructions in the execution of his work.

1.3 Manufacturer's instructions:

Where manufactures have furnished specific instructions relating to the materials used in this job, covering points out specifically mentioned in these documents, these instructions shall be followed in all cases.

1.3.1 Materials and equipments:

All materials and equipments shall conform to the relevant standards and shall be of the approved make and design, unless otherwise called for only the best quality of materials and equipments shall be used. The Contractor shall be responsible for the safe custody of all materials and shall insure against theft, damage by fire, earthquake etc. A list of items of materials and equipments, together with a sample of each shall be submitted to the Client / Consultants within 30 days of the award of the Contract. Any item which is proposed as a substitute shall be accompanied by all TECHNICAL DATA giving sizes, particulars of materials and the manufacture's name, at the time of the submission of proposed

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substitute, the Contractor shall state the credit, if any due to the Owner in the event the substitution is approved. All changes and substitutions shall be requested in writing and approvals obtained in writing from the Client / Consultants. Where no specific make of materials is specified, any first class product of a reputed manufacturer may be used, provided it conforms to the requirements of these specifications. The same will be accepted after the approval of Client / Consultants.

1.3.2 Guarantee:

At the close of the work and before issue of final certificate of virtual completion by the Client / Consultants, the contractor shall furnish all written guarantee indemnifying the owner against defective materials and workmanship for a period of one year after completion. The Contractor shall hold himself fully responsible for reinstallation or replace free of cost to the Owner.

- Any defective material or equipment supplied by the Contractor.
- Any material or equipment supplied by the Owner which is proved to be damaged or destroyed as a result of defective workmanship by the Contractor.

1.3.3 Safety of material:

The Contractor shall provided proper and adequate storage facility to protect all the materials and equipment including those issued by the Owner, against damage from any cause whatsoever.

1.4 Completion certificate:

On completion of the Electrical Installation a Certificate shall be furnished by the Contractor, counter signed by a Licensed Supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority. The Contractor shall be responsible for getting the Electrical Installation inspected and approved by the Local Authorities concerned.

1.4.1 Site engineer:

The Contractor shall employ minimum one competent fully licensed, degree holder full time Electrical Engineer to direct the work of electrical installation in accordance with drawings and specifications. He shall be having minimum ten years experience and shall be available at all time on the Site to receive instructions from the Client / Consultants in the day to day activities, throughout the duration of Contract. The Engineer shall co-relate the progress of the work in conjunction with all relevant requirements of the supply authorities.

1.4.2 Schedule and manner of operation:

Time being the essence of this Contract, the Contractor will be expected to furnish all labour and materials in sufficient quantities and at appropriate time, expedite and schedule the work as required and so manage the operation that the work will be completed within that time. In addition to providing a detailed Time and Progress Schedule, the Contractor shall submit an out-lined and graphic schedule of proposed procedure to the Client / Consultants and the Owner. Time of completion of work is as mentioned in the fiscal aspects.

1.4.3 Work area:

On no account shall the Contractor allow workmen, plants or materials to stray on to areas outside permitted work area. The Contractor Workers or labours will not be allowed to stay at site.

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The Contractor shall insure his labour against accidents, casualties etc. by way of workmen compensation policy for the persons employed by him in accordance with the norms laid down by Labour Laws. The Owner shall in no way be responsible for any accidents and mishaps, involving the Owner against all such claims which may be raised by his labour under Labour Laws. Apart from this he shall take out other Insurance policies listed elsewhere.

1.4.5 Electrical project data:

a) Power Distribution:

The Power Distribution to the various units of the Site shall be at 415 Volts, 50 Hz. 3 Phase, 4 Wire system, with solidly earthed neutral system.

b) Lighting Distribution:

The Lighting Distribution and small Power loads in the Site and ancillary units shall be at 230 Volts, 50 Hz. 1 Phase, 2 wire, 50 Hz. supply system.

c) Permissible variations:

The Permissible variation in supply frequency and voltages shall be as per the standards and limits laid down in the relevant sections of Indian Standard Specifications, and shall be limited to combined variations of +/- 15%.

d) Equipments:

All electrical equipments covered under this tender shall have been deemed to withstand the above voltages with their permissible variations in the voltage and frequencies and so as to ensure the continuous performance of the equipment.

Approved materials makes and drawings:

The list of approved materials and makes are listed separately under Annexure of this tender. These shall be deemed to form a part of specifications of the tender. However, in case of non-availability or larger delivery period or otherwise, the tenderer may make a specific request to the Owner / Client / Consultants towards the alternate choice. It will be then at the entire description of the aforesaid personnel to call upon the Contractor to supply the same of alternatively.

Only certain drawings are made available to the tenderers along with this tender. The rest of the drawings are marked as reference drawings. These drawings shall be made available to the tenderers at the office of the Client / Consultants Office in Mumbai.

The tenderers / bidder shall indicate clearly all other drawings, if the deems it necessary for the compliance of his offer. The tenderer / bidder then shall clearly set out the facts for including of the same in his offer. However, all such variations shall be only considered by the owner / Client / Consultants if deemed to be absolutely necessary and complied with the specifications set out herein or in accordance to the relevant Codes of Practice of Indian Standard Specifications and Insurance Tariff Advisory Committee regulations.

The tenderer / bidder shall bring out clearly the equipment offered by him in his offer. This shall form the integral part of scrutiny of his offer. In general all equipments offered shall comply with either reputed makes and/ or ISI certified and tested. These shall be subject to the final approval of the Owner / Client / Consultants. All relevant technical data and specifications of the Electrical equipment shall be brought out clearly in the Technical Data Sheets to be submitted along with the Schedule of quantities.

1.0 LT PANEL & DISTRIBUTION BOARDS

The scope of work for the Panel & Distribution Board covers the supply and Installation as described in the specification, as per drawings and schedule of

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quantities Prior to installation of Panel, the supplier/contractor shall submit for consultant's approval the shop/vendor drawing consisting of G.A. drawing, sectional elevation, single line diagram, bill of material etc. and design calculations indicating type, size, short circuiting rating of all the electrical components used, bus bar size, internal wiring size, DB dimension, color, mounting details etc.. The contractor shall submit manufacturer's catalogues of the electrical components installed in the DB's. Contractor has to submit the 3 sets of as built drawings & drawings shall be provided by the contractor after successfully completion & commissioning of entire electrical system.

2.0 LT XLPE CABLES

The scope of work covers supply, laying, testing and commissioning of medium voltage XLPE cables.

The specification provided in the technical specs gives the general requirement of cables. However, it is the responsibility of the vendor to take the joint measurement and obtain client's approval before the placement of orders to the main supplier / manufacturer.

Contractor shall submit the as built drawing of the cable laying drawing. Also,

The supplier shall submit following:

1. Data sheet indicating results of tests.
2. Test report

3.0 INTERNAL WIRING

The scope of work covers, definition of point wiring, system of wiring and supply, installation, connection, testing and commissioning of point wiring for light points, ceiling fan points, exhaust fan points, Air-conditioning units, convenience socket outlet points, power socket outlet points, bell outlet points etc. Including fixing of light fixtures, ceiling fan, exhaust fan, ACs, wall fan, bell etc.

4.0 ELV WIRING

The scope of work covers the supply, installation, connection, testing and commissioning of the wiring for Telephone / Data & Networking / Fire detection / Public Address system. Scope include supply of telephone cables, Flexible wires, Shielded Wire, CAT-6 UTP computer signal wire, Fiber optical cable, Junction boxes, Outlet boxes, and other related accessories required to complete the wiring and installation.

5.0 LIGHT FIXTURE

The scope of work covers the supply, installation and testing of various types of LED light fixtures are used in the project. Also, As per of the proposal the bidder furnish relevant descriptive and illustrative literature on lighting fixtures and accessories and following drawings/ data for the respective lighting fixtures:-

- 1 Dimensional Drawing & circuit layout
- 2 Mounting details cable entry facilities and weights.

6.0 EARTHING SYSTEM

The scope covers the Design, assembling, testing, painting, supply, delivery at site with all related accessories as per the specifications as specified in the technical specification sheet. Compliance with the provisions of this specification shall not relieve the Bidder of the responsibility of furnishing apparatus and accessories of proper design, electrically and mechanically suited to meet the operating requirements under the specified service conditions and be suitable for the purpose of which they are intended.

7.0 RODENT REPELLENT SYSTEM

The scope of work covers the supply, installation, testing and commissioning of RODENT REPELLENT system with relevant equipment and instruments. The work is to be carried out as per technical specification, BOQ & Drawings.

8.0 DATA & NETWORKING SYSTEM

The scope of the work covers the supply, installation, testing and commissioning of Data & Networking system with relevant equipment and instruments. The work is to be carried out

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as per the technical specification, BOQ & Drawings. The scope of work also covers the supply, installation, testing & commissioning of the cat-6/optical fiber cable from source network rack to Main Server room of Building.

Scope shall also include SITC of Active & Passive components i.e. network switches, Transceiver & patch panels. Consultants Approval shall be taken Prior to procurement of all materials.

Scanning of Data point to be included in installation of Data point.

9.0 PRESENCE SENSORS

The scope of work covers the supply, Installation, testing & commissioning of the presence sensors for Cabins to save energy. The presence sensors will control ON/OFF of Lights.

10.0 CABLING FOR SECURITY SYSTEMS (CCTV, ACCESS CONTROL)

The scope of work covers the supply & Laying of the Cat6 data cables & Power cables in Floor raceways, PVC Conduits for CCTV surveillance, and Networking system.

11.0 LIGHTNING ARRESTOR

The scope of work covers the supply, Installation, testing & commissioning conventional type of lightning arrestor system for every building as per building application, height, area, and risk analysis.

11.0 INSECT KILLER

The scope of work covers the supply, Installation of insect killer system for cafeteria, kitchen area as per coverage area.

12.0 HT PANELS

The scope of work for the HT Panel covers the supply, Installation, testing & commissioning as described in the specification, as per drawings and schedule of quantities Prior to installation of Panel, the supplier/contractor shall submit for consultant's approval the shop/vendor drawing consisting of G.A. drawing, sectional elevation, single line diagram, bill of material etc. and design calculations indicating type, size, short circuiting rating of all the electrical components used, bus bar size, internal wiring size, panel dimension, color, mounting details etc.. The contractor shall submit manufacturer's catalogues of the electrical components installed in the panel. Contractor has to submit the 3 sets of as built drawings & drawings shall be provided by the contractor after successfully completion & commissioning of entire electrical system.

13.0 TRANSFORMER

The scope of work for the transformer covers the supply, Installation, testing & commissioning as described in the specification. Supplier/contractor shall submit for consultant's approval required test certificates.

14.0 DG SET

The scope of work for the DG SET covers the supply, Installation, testing & commissioning as described in the specification & SLD. Supplier/contractor shall submit for consultant's approval required test certificates.

4.0 CCTV

The scope of work covers the supply, installation, connection, testing and commissioning of the CCTV / switches / NVR/ monitor/ HDD/ PoE cables as per drawings & specifications. Supplier/contractor shall submit product catalogue as per specifications for consultant's approval.

D. HVAC WORK:

1. Description of the Project

The ATS BLOCK building having Ground Floor to Seven floors & Clubhouse is Stilt & First Floor Building is located in the Gavan Land Ulwe area. The ATS Block & Clubhouse to have the new air conditioning system & ventilation system to ensure flexibility of operation, installation and maintenance of the HVAC system using latest state of the art technology and also the energy efficient one.

2. General Scope of Work

The general character and the scope of work to be carried out under this contract is illustrated in Drawings, Specifications and Schedule of Quantities. The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the Consultant / Architect/ Client.

This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings / Documents as being furnished or installed, but which are necessary and customary to be performed under this contract for completion of entire work.

The central Heating, Ventilation and Air- Conditioning (HVAC) system shall comprise of following:

- a) Ceiling Suspended Double Skin AHU as per drawing.
- b) VRV/VRF System Indoor & Outdoor Units as per drawing
- c) Precision ACs Indoor & Outdoor Units as per drawing
- d) Fresh air ducting work.
- e) Refrigerant & condensate drain piping inclusive of all valves and fittings.
- f) Cable Tray work for External Refrigeration Piping work

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- g) Control cabling between VRF Indoor to VRF Outdoor units & AHU units to VRF Outdoor units
- h) Sheet metal ducts inclusive of insulation, Grilles, Diffusers, and Dampers etc.
- i) Thermal & Acoustic Insulation of Ducting
- j) Under deck Insulation of exposed roof area
- k) Insulation of refrigeration pipes.
- l) AHU kit for connection of VRF ODU with Third Party AHU Integration
- m) Toilet Exhaust Inline Fan with sheet metal ducts & grill work
- n) Automatic controls and instruments.
- o) Vibration isolators for all HVAC equipment.
- p) Balancing, testing and commissioning of the entire HVAC system.
- q) Test reports, list of recommended spares, AS BUILT drawings, operation and maintenance manual for the entire HVAC installation.
- r) Training of Client's personnel.
- s) Comprehensive all inclusive AMC for 3 years after completion of defect liability period.
- t) Contractor to note that, if the items mentioned in the specifications, drawings are not included in the BOQ, then the Contractor is required to provide the same without any additional cost and the same need to be included in the overall offered price for the project.

2.1) Submission of program

Contractor is required to submit planned detailed execution methodology & schedule for review / approval by consultant / Client within 14 days of placement of order.

Appointment of sub-contractor/agency for HVAC work

The Principal Contractor shall propose the sub-contractor/agency which it intends to appoint for execution of HVAC works, with the submission of documentary proofs to prove the credentials of the agency and experience of earlier completed VRV/VRF systems for review and approval by the Consultant/MDL. The Principal Contractor shall appoint the sub-contractor/agency for HVAC work only after approval of the Consultant/MDL.

2.2) Dispatch of Materials to Site & their safe Custody

At the time of execution, area shall be provided taking into consideration the space available at site, for storage of delivered material/equipment upon request of contractor.

Contractor has to make his own arrangement for storage, safety & security of the material delivered at site and is responsible for the same till handing over of the work.

Program of dispatch of material shall be framed keeping in view the progress of the construction of the building and its interior work. Safe custody of all machinery and equipment supplied by the contractor shall be the responsibility of the contractor till handing over of the work.

2.3) Coordination with Other Agencies

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The contractor shall co-ordinate with all other agencies involved in the work so that the work of other agencies is not hampered due to his work. Ducting, piping, cabling or any other work, which directly affect the progress of building work, shall be given priority.

2.4) Quality of Materials & Workmanship

- i. The components of the installation shall be of such design so as to satisfactorily function under all conditions of operation.
- ii. The entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice. The entire installation shall be such as to cause minimum transmission of noise and vibration to the building structure.
- iii. All equipment's and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.

2.5) PROTECTION OF WORK & MATERIAL

- i. Copper tubes stored on site shall be supported clear of the ground and kept separate from all other stored ferrous materials & shall be suitably protected against the weather.
- ii. All equipments and materials, fixed or unfixed shall be protected against ingress of dirt or moisture into working parts by means of Polythene covers or other equivalent measures.
- iii. Precautions against mechanical damage by other trades shall be provided.
- iv. Precautions shall be taken and all necessary protection provided to safeguard the work during bad weather.
- v. The inlet and discharges of all fan coils, and other terminal units shall be kept covered until all local Plastering, Purging, etc. is completed and the units are ready to run.
- vi. Equipment and material damaged shall be replaced by contractor at the discretion of the Consultant/MDL engineer. Equipment and materials are subject to rejection and replacement, if in the opinion of the Consultant/MDL Engineer, or in the opinion of the manufacturer's engineering department, the equipment has deteriorated or been damaged to the extent that its immediate use is questionable, or that its normal life expectancy has been curtailed.

The contractor shall be solely responsible to protect all the delivered materials from the time of delivery at site till satisfactory completion & handing over of the completed works from any mode/type of damage/loss that may occur during this period.

2.6) Care of the Building

Care shall be taken by the contractor during execution of the work to avoid damage to the building. He shall be responsible for repairing all such damages and restoring the same to the original finish at his cost. He shall also remove all unwanted and waste materials arising out of the installation from the site of work from time to time.

2.7) Inspection & Testing

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All the equipments / materials shall be supplied with relevant quality / conformance / factory inspection documents.

All the works under or in course of execution or executed in pursuance of the contract shall at all times be open to inspection & supervision of the MDL engineer / executives & the contractor at all times during the usual working hours offer assistance for the inspection of work.

The contractor shall raise inspection call to MDL in the agreed format for the works undertaken at below mentioned stages –

- a) After delivery of material at site before starting of installation works
- b) Testing & commissioning of the completed works

The contractor shall submit supporting documents such as delivery challan(s), packing lists, Factory Test reports for the HVAC items in requisite sets as relevant along with the invoice for the purpose of certification by MDL engineer.

2.8) Project Execution Team

The Contractor shall ensure that senior planning and erection personnel from his organization are assigned exclusively for this project.

The Contractor shall appoint one Project manager. He shall be assisted on full time basis by erection engineers & supervisors.

The entire staff shall be posted at site on full time basis.

The Contractor shall arrange to have mechanized & modern facilities of transporting material to place of installation for speedy execution of work.

2.9) Performance Guarantee

The contractor shall carry out the work in accordance with the Drawings, Specifications, Schedule of Quantities and other documents forming part of the Contract.

The contractor shall be fully responsible for the performance of the selected equipment (installed by him) at the specified parameters and for the efficiency of the installation to deliver the required result.

Complete set of drawings is appended with this tender and reference may be made to same for any details or information. The contractor shall also guarantee that the performance of various equipment individually, shall not be less than the quoted capacity; also, actual power consumption shall not exceed the quoted rating, during testing and commissioning, handing over and guarantee period.

2.10) Drawings

The HVAC Drawings issued with tenders, are diagrammatic only and indicate arrangement of various systems and the extent of work covered in the contract.

These Drawings indicate the points of supply and of termination of services and broadly suggest the routes to be followed. Under no circumstances shall dimensions be scaled from these Drawings. Shop/execution drawings to be prepared by the Contractor based on the HVAC system configuration offered by them for approval by Consultant/Client The interiors drawings and details shall be examined for exact location of equipment, controls, grilles and diffusers. The contractor shall follow the tender drawings in preparation of his shop/execution drawings, and for subsequent installation work. He shall check the drawings of

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other trades to verify spaces in which his work will be installed. Maximum headroom and space conditions shall be maintained at all points. Where headroom appears inadequate, the contractor shall notify the Client – MDL/ Architect / Consultant before proceeding with the installation. In case installation is carried out without notifying, the work shall be rejected and contractor shall rectify the same at his own cost.

The contractor shall examine all interior, structural, plumbing, and electrical and other services drawings and check the existing works. Before starting the work, Contractor shall report to the Client / Architect / Consultant about any discrepancies and obtain clarification. Any changes found essential to coordinate installation of his work with other services and trades, shall be made with prior approval of the Client – MDL / Architect / consultant without additional cost to the Client – MDL.

2.11) Technical Data Sheet

Contractor shall submit the technical data sheet for all items after award of Contract and get it approved before procurement of the items. Technical data sheet of indoor & outdoor units to have parameters mentioned but not limited to those listed at Annexure A.

2.12) Shop/Execution Drawings

All the shop drawings shall be prepared on computer through AutoCAD System based on tender drawings, site measurements and Interior Designer's Drawings. Contractor to design & select various refrigerant piping sizes based on HVAC system configuration offered by them & accordingly incorporate in the shop drawings.

Within two week of the award of the contract, contractor shall furnish, for the approval of the Client – MDL / Architect / Consultant, three sets of detailed shop drawings in A1 color printout of all equipment and materials including detailed ducting drawings showing exact location of supports, flanges, bends, tee connections, reducers, guide vanes, silencers, distribution grids, air flow controller, VAV boxes, TFA units, volume control dampers, collars, grilles, diffusers; detailed piping drawings showing exact location and type of supports, valves, fittings etc. Acoustic lining and external insulation details for ducts, pipe insulation etc; electrical panels inside / outside views, power and control wiring schematics, cable trays, supports and terminations. These shop drawings shall contain all information required to complete the Project as per specifications and as required by the Client – MDL/ Architect / consultant.

These Drawings shall contain details of construction, size, arrangement, operating clearances, and capacity of all items of equipment, also the details of all related items of work by other contractors.

Each shop drawing shall contain tabulation of all measurable items of equipment / materials / works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings. Minimum 4 sets of drawings 'A1' size color printout shall be submitted after final approval along with softcopy.

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Each item of equipment / material proposed shall be a standard catalogue product of an established manufacturer strictly from the manufacturers given in list of preferred makes and quoted by the tendered in technical data part.

When the Client – MDL / Architect / Consultant makes any amendments in the above drawings, the contractor shall supply three fresh sets of drawings with the amendments duly incorporated along with check prints, for approval.

No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the material / equipment / installation.

No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.

Manufacturer's drawings, catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each item in each set shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.

Also, wherever directed a mockup or sample installation shall be carried out for approval before proceeding for further installation.

Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.

Where the contractor proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundation, piping, wiring or any other part of the mechanical, electrical layouts; all such re-design, and all new drawings and detailing required therefore, shall be prepared by the contractor at his own expense and gotten approved by the Client – MDL / Architect / Consultant. Any delay on such account shall be at the cost of and consequence of the Contractor.

Where the work of the contractor has to be installed in close proximity to, or will interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Client – MDL/Architect/Consultant, the contractor shall prepare composite working drawings and sections at a suitable scale, not less than 1:100, clearly showing how his work is to be installed in relation to the work of other trades.

Within two weeks of approval of all the relevant shop drawings, the contractor shall submit four copies of a comprehensive anticipated variation in quantity statement to Consultant/MDL.

2.13) Quiet Operation and Vibration Isolation

All equipment shall operate under all conditions of load without any sound or vibration which is objectionable in the opinion of the Client – MDL / Architect / Consultant. In case of rotating machinery sound or vibration noticeable outside the room in which it is installed, or annoyingly noticeable inside its own room, shall be

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considered objectionable. Such conditions shall be corrected by the Contractor at his own expense. The contractor shall guarantee that the equipment installed shall maintain the specified NC levels. Further, any noise & vibration above specified industrial Standards / values shall not be accepted.

2.14) Accessibility

The Contractor shall verify the sufficiency of the size of the shaft openings, clearances in cavity walls and suspended ceilings for proper installation of his equipments, ducting and piping.

His failure to communicate insufficiency of any of the above shall constitute his acceptance of sufficiency of the same.

The Contractor shall locate all equipment which must be serviced, operated or maintained in fully accessible positions. The exact location and size of all access panels, required for each concealed control damper, valve or other devices requiring attendance, shall be finalized and communicated in sufficient time, to be provided in the normal course of work.

Failing this, the Contractor shall make all the necessary repairs and changes at his own expense. Access panel shall be standardized for each piece of equipment / device / accessory and shall be clearly marked.

2.15) Materials and Equipment

All materials and equipment shall conform to the relevant Indian / International Standards and shall be of the approved make and design. Makes shall be strictly in conformity with list of preferred makes/manufacturers as per BOQ & attached list.

2.16) Electrical Installation

The electrical work related to air conditioning and ventilation system, shall be carried out in full knowledge of, and with the complete coordination of the contractor. The electrical installation shall be in total conformity with the control wiring drawings prepared by the contractor and approved by the Consultant/Client – MDL.

All air conditioning equipment shall be connected and tested in the presence of an authorized representative of the Contractor, Consultant & MDL.

The system shall be commissioned only after the contractor has certified in writing that the electrical installation work for air conditioning services has been thoroughly checked, tested and found to be totally satisfactory and in full conformity with the contract. Drawings, Specifications and manufacturer's instructions. It is to be clearly understood that the final

Responsibility for the sufficiency, adequacy and conformity to the contract requirements, of the electrical installation work for air conditioning services, lies solely with the contractor.

2.17) Completion Certificate:

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On completion of the Electrical installation for air conditioning, a certificate shall be furnished by the contractor, counter signed by the licensed supervisor, under whose direct supervision the installation was carried out.

2.18) Testing & Commissioning

The performance, testing & commissioning of the complete HVAC system is required to be carried out by the HVAC Contractor to comply with the various parameters specified in the tender documents. Contractor shall submit Testing & Commissioning methodology for complete HVAC system for review & approval of Client / Consultant. Testing & commissioning of HVAC system shall be done strictly in accordance with approved methodology.

Contractor shall also provide four copies of record of all safety and automatic control settings for the entire installation. The installation shall be tested again after removal of defects and shall be commissioned only after approval by the Client – MDL/ Architect / Consultant.

All tests shall be carried out for satisfactory performance in the presence of the representatives of the Client – MDL / Architect / Consultant.

All instruments, services needed for the tests shall be furnished by the Contractor themselves. All testing instruments shall be calibrated and the Contractor shall produce calibration certificates in support.

Contractor shall raise call for inspection sufficiently in advance for witness by Consultant /MDL via officially acceptable means such as e-mail & letters.

a. GENERAL FEATURES: -

BMS Compatible central controller is required for control of VRV/VRF based System and BMS Compatible VFD based PLC Panel for control of AHU Units. Following features shall be provided for central controller of VRV/VRF system & PLC based panel of AHUs.

ON / OFF Control, ON / OFF control for AHU unit & VRF Indoor & Outdoor Unit. Mode Selection Simulated COOL/FAN operation. Temperature setting range Temperature selection for AHU Unit from 19Deg to 28Deg.C in cooling mode & For Outdoor Unit from 10 Deg to 43 Deg. C in

Cooling mode. Fan Speed Setting HIGH-MEDIUM-LOW.

Timer Multiple daily time ON/OFF settings where temperature, fan

Speeds can be selected. Fault Status If a fault occurs, the screen shall display the fault details within 3 minutes and a fault log shall be created. Provision to print the log automatically shall be provided.

System Status Actual operating conditions for each indoor and outdoor unit shall be monitored on the system display graphics.

Search where many indoor units are controlled by NETWORK, a search

Function shall be available to find specific unit locations.

Language ENGLISH

Help Files Help files shall be provided in ENGLISH language.

Error Log All faults reports shall be stored with date and time information

Providing a historical record.

Unit

Registration

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Information concerning the unit models, serial numbers shall be Printed / marked on each unit for better after sales services.

Filter Maintenance An indication shall appear, at selected time intervals, when it is necessary to inspect the filter.

2.19) As Built Drawings

Contractor shall submit as built drawings as and when work in all respects is completed in a particular area. These drawings shall be submitted in the form of two sets of CD's and four set of Hard copy – 'A1' Size color printout.

These drawings shall clearly indicate complete HVAC system Equipment layouts, ducting and piping layouts, location of wiring and sequencing of automatic controls, location of all concealed piping, valves, controls, dampers, wiring and other services.

2.20) Operating Instruction & Maintenance Manual

Upon completion and commissioning of system the contractor shall submit a draft copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and equipment included in this contract.

This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of type written operating instructions and maintenance manuals; one each for retention by Consultant and Client – MDL / Architect / Consultant and two for Client – MDL's Operating Personnel.

These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for period of maintenance of each equipment.

2.21) On Site Training

Upon completion of all work and all tests, the Contractor shall depute necessary operators, labor and helpers for operating the entire HVAC installation for a period of ten (10) working days, to enable the Client's personnel to get acquainted with the operation of the system.

During this period, the contractor shall train the Client's nominated personnel in the operation, adjustment and maintenance of all equipment installed.

2.22) Servicing of HVAC System during Defect Liability Period

Contractor to arrange free of cost quarterly servicing of the entire HVAC system installed during Defect liability period to keep the system in good and trouble free operating conditions.

The servicing agency appointed should be OEM or authorized agency of OEM. It is preferred to appoint the AMC Contractor as a servicing agency/Contractor.

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E. Fire Fighting System:

1.1 Work under this section shall consist of furnishing all labour, materials, fabrication, equipment and appliances necessary and required to completely install wet riser, fire hydrant & sprinkler riser system as required by the drawings and specified here in after or given in the Bill of Quantities.

1.2 Without restricting to the generality of the foregoing,

1.3 The fire protection work shall include the following: -

a) Yard hydrants, Landing valves, hose reels, hose cabinets, branch pipe, nozzles, valves, orifice along with orifice flanges etc.

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- b) Design of orifice and furnishing the same so as to allow required flow of water at various locations and each hydrant.
- c) Fire brigade inlets
- d) Fire Hydrant pump with motor, Diesel Engine driven pump, Sprinkler pump with motor, Jockey pump with motor, Air Vessel & Priming Tank in the Fire Pump Room
- e) Fire Booster Pump with Motor at Terrace Level
- f) GI Class 'C' suction, delivery & header pipe, fittings, flanges, strainers, bellows & valves, inside the Pump Room & terrace level
- g) GI Class 'C' pipe External Fire Hydrant, Wet Riser & Sprinkler line from Pump Room to the Building shaft.
- h) Fire extinguishers & sand buckets for Pump House, Electrical Room, Lift Machine Room etc.
- i) 4 Way & 2 Way Fire Brigade Inlet & Yard Hydrant with Single Headed Hydrant Valve, Fire Hose & Hose Cabinet
- j) GI Class 'C' Wet risers, Sprinkler risers, air release valve, orifice plates etc. with fittings.
- k) Double Headed Hydrant Valve, Fire Hose & Hose Reel Drum near both staircase fire shaft.
- l) Fire Sprinklers & Flow Switches with accessories.
- m) Pressure Gauges, Pressure switches with accessories.
- n) Mounting hardwares, companion flanges, Nuts & bolts, Gaskets, etc.
- o) Supports, clamps, anchoring with wall, ceiling, slab
- p) Excavation, trenching, refilling, dewatering, etc., valve chambers & required civil work to complete the job
- q) Painting, anti corrosive tape wrapping & coating, hydraulic testing at 1.5 times the working pressure for minimum 2 hrs.
- r) Electrical System for the above installation like panel with starter, control, protections & indications, pressure switches interlocking with pumps.
- s) Comprehensive all-inclusive AMC for 3 years after completion of defect liability period for all the pumps and its accessories as per AMC scope of work.
- t) Contractor shall prepare detail drawings for FF systems and obtain prior approval of the same from the local fire authority. Contractor shall keep a constant liaison with the local fire authority to keep them aware of the progress and standards of work followed, and for the inspections to be carried out during execution work. Contractor shall obtain all NOC/Approvals/Completion certificates with respect to fire fighting system installation from the Local Fire Authority required for occupancy of the building.
- u) Latest revisions including amendments of codes and standards to be followed.
- v) Contractor to note that, if the items mentioned in the specifications, drawings are not included in the BOQ, then the Contractor is required to provide the same without any additional cost and the same need to be included in the overall offered price for the project.

Appointment of sub-contractor/agency for Fire Fighting work.

The Principal Contractor shall propose the sub-contractor/agency which it intends to appoint for execution of Fire Fighting (FF) works, with the submission of documentary proofs to prove the credentials of the agency and experience of earlier completed FF work for review and approval by the Consultant/MDL. The Principal Contractor shall appoint the sub-contractor/agency only after approval of the Consultant/MDL.

2.0 FIRE ALARM SYSTEM

The scope of work covers the Supply, installation, testing & commissioning of Intelligent Analog Addressable Fire Alarm System in accordance with the specifications, drawings & schedule of quantities. Microprocessor based addressable and intelligent (analog), fire detection and alarm system complete with addressable, intelligent (analog) heat and smoke

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sensors, Addressable Manual call point and hooters. The distributed Intelligent Fire Alarm Control Panel (FACP) shall function as fully stand-alone panel. FACP shall have its own microprocessor, software and memory complying with BS5839 Part 4 (1995) and should bear CE mark.

The Fire Alarm Panel shall have the facility to integrate an emergency voice alarm communication system. Digitally stored message sequences shall notify the building occupants that a fire or life safety condition has been reported. Message generator(s) shall be capable of automatically distributing up to eight (8) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event.

The supplier shall submit following:

- a. GA drawing.
- b. Data sheet indicating results of tests.
- c. Test reports.
- d. O & M manuals.

The detailed scope of work has been indicated in the Bill of Quantities (BOQ) Price Bid Part-II at Enclosure-1.

1. FOLLOWING OF GRIHA NORMS DURING CONSTRUCTION:

The project will be certified under IGBC norms. The contractor shall at all times follow certain methodologies for construction and product list for construction materials. The expenditure on this account shall be borne by the contractor and no extra cost shall be acceptable.

2. LIST OF TENDER DRAWINGS:

<u>3.</u> Sr. No	Drawing No.	Description of Drawing	Rev. No.
		A) TRAINING CENTER BUILDING	
1	STR/CD/003	STRUCTURAL LAYOUT & DETAILS AT FOOTINGS & COLUMNS FOR ATC BUILDING	D0
2	STR/CD/004	STRUCTURAL LAYOUT & DETAILS AT PLINTH LEVEL FOR ATC BLOCK	D0
3	STR/CD/005	STRUCTURAL LAYOUT & DETAILS AT FIRST FLOOR LEVEL FOR ATC BUILDING	D0
4	STR/CD/006	STRUCTURAL LAYOUT & DETAILS AT 2ND FLOOR LEVEL FOR ATC BUILDING	D0
5	STR/CD/007	STRUCTURAL LAYOUT & DETAILS AT 3RD FLOOR LEVEL FOR ATC BUILDING	D0
6	STR/CD/008	STRUCTURAL LAYOUT & DETAILS AT FOURTH FLOOR LEVEL FOR ATC BLOCK	D0
7	STR/CD/009	STRUCTURAL LAYOUT & DETAILS AT FIFTH FLOOR LEVEL FOR ATC BLOCK	D0
8	STR/CD/010	STRUCTURAL LAYOUT & DETAILS AT SIXTH FLOOR LEVEL FOR ATC BLOCK	D0
9	STR/CD/011	STRUCTURAL LAYOUT & DETAILS AT SEVENTH FLOOR LEVEL FOR ATC BLOCK	D0

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10	STR/CD/012	STRUCTURAL LAYOUT & DETAILS AT TERRACE FLOOR LEVEL FOR ATC BLOCK	D0
11	STR/CD/013	STRUCTURAL LAYOUT & DETAILS AT OHT LEVEL FOR ATC BLOCK	D0
		E) UG TANK & SUBSTATION	
12	STR/TD/091	STRUCTURAL LAYOUT & DETAILS AT FOOTINGS & COLUMNS FOR SUBSTATION	T0
13	STR/TD/092	STRUCTURAL LAYOUT & DETAILS AT PLINTH & TERRACE FOR SUBSTATION	T0
14	STR/TD/093	STRUCTURAL LAYOUT & DETAILS AT FIRE FIGHTING U.G. TANK	T0
15	STR/TD/094	STRUCTURAL LAYOUT & DETAILS AT FLUSHING WATER U.G. TANK	T0
16	STR/TD/095	STRUCTURAL LAYOUT & DETAILS AT STP-1 (Sheet 1 and 2)	T0
17	STR/TD/096	STRUCTURAL LAYOUT & DETAILS AT COMPOUND WALL	T1
		F) SECURITY CABIN	
18	STR/TD/097	STRUCTURAL LAYOUT & DETAILS AT FOOTING, PLINTH & ROOF LEVEL	T0

B - ARCHITECTURAL DRAWINGS MASTER LIST

SR. NO.	SHEET NO.	NUMBER	CONTENT	REVISION
(B) APPRENTICE TRAINING SCHOOL				
19	MDL-UL- ATS-TD	5410	GA PLAN GROUND FLOOR	R2
20	MDL-UL- ATS-TD	5411	MASONRY PLAN GROUND FLOOR	R2
21	MDL-UL- ATS-TD	5412	FLOORING PLAN GROUND FLOOR	R1
22	MDL-UL- ATS-TD	5413	RCP GROUND FLOOR	R1
23	MDL-UL- ATS-TD	5420	GA PLAN 1ST FLOOR	R1
24	MDL-UL- ATS-TD	5421	MASONRY PLAN 1ST FLOOR	R1
25	MDL-UL- ATS-TD	5422	FLOORING PLAN 1ST FLOOR	R1

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26	MDL-UL- ATS- TD	5423	RCP 1ST FLOOR	R1
27	MDL-UL- ATS- TD	5430	GA PLAN 2ND FLOOR	R1
28	MDL-UL- ATS- TD	5431	MASONRY PLAN 2ND FLOOR	R2
29	MDL-UL- ATS- TD	5432	FLOORING PLAN 2ND FLOOR	R1
30	MDL-UL- ATS- TD	5433	RCP PLAN 2ND FLOOR	R1
31	MDL-UL- ATS- TD	5440	GA PLAN 3RD FLOOR	R1
32	MDL-UL- ATS- TD	5441	MASONRY PLAN 3RD FLOOR	R1
33	MDL-UL- ATS- TD	5442	FLOORING PLAN 3RD FLOOR	R1
34	MDL-UL- ATS- TD	5443	RCP PLAN 3RD FLOOR	R1
35	MDL-UL- ATS- TD	5450	GA PLAN 4TH FLOOR	R2
36	MDL-UL- ATS- TD	5451	MASONRY PLAN 4TH FLOOR	R2
37	MDL-UL- ATS- TD	5452	FLOORING PLAN 4TH FLOOR	R1
38	MDL-UL- ATS- TD	5453	RCP PLAN 4TH FLOOR	R1
39	MDL-UL- ATS- TD	5460	GA PLAN 5TH FLOOR	R2
40	MDL-UL- ATS- TD	5461	MASONRY PLAN 5TH FLOOR	R2
41	MDL-UL- ATS- TD	5462	FLOORING PLAN 5TH FLOOR	R1
42	MDL-UL- ATS- TD	5463	RCP PLAN 5TH FLOOR	R1
43	MDL-UL- ATS- TD	5470	GA PLAN 6TH FLOOR	R2
44	MDL-UL- ATS- TD	5471	MASONRY PLAN 6TH FLOOR	R2
45	MDL-UL- ATS- TD	5472	FLOORING PLAN 6TH FLOOR	R1
46	MDL-UL- ATS- TD	5473	RCP PLAN 6TH FLOOR	R1
47	MDL-UL- ATS- TD	5480	GA PLAN 7TH FLOOR	R2

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48	MDL-UL- ATS- TD	5481	MASONRY PLAN 7TH FLOOR	R1
49	MDL-UL- ATS- TD	5482	FLOORING PLAN 7TH FLOOR	R1
50	MDL-UL- ATS- TD	5483	RCP PLAN 7TH FLOOR	R1
51	MDL-UL- ATS- TD	5490	GA PLAN TERRACE FLOOR	R1
52	MDL-UL- ATS- TD	5491	MASONRY PLAN TERRACE FLOOR	R1
53	MDL-UL- ATS- TD	5492	FLOORING PLAN TERRACE FLOOR	R1
54	MDL-UL- ATS- TD	5500	GA PLAN - MUMTY TOP FLOOR PLAN	R0
55	MDL-UL- ATS- TD	5502	FLOORING PLANS - MUMTY TOP FLOOR PLAN	R0
56	MDL-UL- ATS- TD	5510	SECTION AA'	R1
57	MDL-UL- ATS- TD	5511	SECTION BB'	R0
58	MDL-UL- ATS- TD	5520	ELEVATIONS - 01	R1
59	MDL-UL- ATS- TD	5521	ELEVATIONS - 02	R1
60	MDL-UL- ATS- TD	5522	ELEVATIONS - 03	R1
61	MDL-UL- ATS- TD	5523	ELEVATIONS - 04	R0
(C) ARCHITECTURAL DETAILS				
63	MDL-UL- ATS- TD	5530	DOOR DETAILS	R2
64	MDL-UL- ATS- TD	5531	DOOR DETAIL - HARDWARE SCHEDULE	R2
65	MDL-UL- ATS- TD	5532	DOOR DETAIL - DOOR SCHEDULE	R1
66	MDL-UL- ATS- TD	5535	WINDOW DETAIL/WINDOW SCHEDULE	R2
67	MDL-UL- ATS- TD	5541	GLAZING DETAILS/GLAZING SCHEDULE	R1
68	MDL-UL- ATS- TD	5542	GLAZING DETAILS/GLAZING SCHEDULE	R1
69	MDL-UL- ATS- TD	5543	GLAZING DETAILS/GLAZING SCHEDULE	R1

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70	MDL-UL- ATS-TD	5544	GLAZING DETAILS/GLAZING SCHEDULE	R1
71	MDL-UL- ATS-TD	5550	TOILET DETAILS - 1	R2
72	MDL-UL- ATS-TD	5555	TOILET DETAILS - 2	R2
73	MDL-UL- ATS-TD	5560	RAILING DETAILS	R0
74	MDL-UL- ATS-TD	5580	STAIRCASE DETAIL 01	R1
75	MDL-UL- ATS-TD	5581	STAIRCASE DETAIL 02	R1

(D) INFRASTRUCTURE

76	MDL-UL-TD	7200	SITE LAYOUT - MASTER PLAN	R1
77	MDL-UL-TD	7201	SITE LAYOUT - LANDSCAPE DETAILS	R0
78	MDL-UL-TD	7210	SUBSTATION - SUBSTATION DRAWINGS	R1
79	MDL-UL-TD	7211	SUBSTATION - DOOR DETAILS	R0
80	MDL-UL- ATS-TD	7216	UGT & PUMP ROOM DETAILS	R0
81	MDL-UL- ATS-TD	7221	PUMP ROOM FOR FLUSHING WATER TANK - LAYOUTS	R0
82	MDL-UL- ATS-TD	7222	SEWAGE TREATMENT PLANT - LAYOUTS	R0
83	MDL-UL- ATS-TD	7223	SEWAGE TREATMENT PLANT- DOOR & WINDOW DETAILS	R0
84	MDL-UL- ATS-TD	7230	SLIDING ENTRANCE GATE 01 AND 03	R0
85	MDL-UL- ATS-TD	7231	SLIDING ENTRANCE GATE 02	R0
86	MDL-UL- ATS-TD	7235	SECURITY CABIN	R0
87	MDL-UL- ATS-TD	7236	DOOR & WINDOW DETAILS	R0

C- PLUMBING WORKS

Sr.No.	Drawing No	Drawing Title	Revision	Sheet Details	Building
1	MEP/PL/TD/012	Plumbing Layout - ATS Block Typical Layout from Ground to 7th Floor	T1	1 of 2	ATS Block
2	MEP/PL/TD/013	Plumbing Layout - ATS Block Plumbing Layouts for Workshops	T1	2 of 2	

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3	MEP/PL/TD/014	Plumbing Layout - ATS Block Plumbing Layouts for Terrace	T1	2 of 2	
4	MEP/PL/TD/018	Irrigation Layout - ATS Ulwe	T0	1 of 1	Landscape

D ELECTRICAL WORKS

Sr.No.	Drawing No	Drawing Title	Revision	Sheet Details	Building
1	MEP/ATS/ELE/TD/001	Ground Floor Lighting Layout	T1	1 of 27	ATS Block
2	MEP/ATS/ELE/TD/002	First Floor Lighting Layout	T1	2 of 27	
3	MEP/ATS/ELE/TD/003	Second Floor Lighting Layout	T1	3 of 27	
4	MEP/ATS/ELE/TD/004	Third Floor Lighting Layout	T1	4 of 27	
5	MEP/ATS/ELE/TD/005	Fourth Floor Lighting Layout	T1	5 of 27	
6	MEP/ATS/ELE/TD/006	Fifth Floor Lighting Layout	T1	6 of 27	
7	MEP/ATS/ELE/TD/007	Sixth Floor Lighting Layout	T1	7 of 27	
8	MEP/ATS/ELE/TD/008	Seventh Floor Lighting Layout	T1	8 of 27	
9	MEP/ATS/ELE/TD/009	Terrace Floor Lighting Layout	T1	9 of 27	
10	MEP/ATS/ELE/TD/010	Ground Floor Power Layout	T1	10 of 27	
11	MEP/ATS/ELE/TD/011	First Floor Power Layout	T1	11 of 27	
12	MEP/ATS/ELE/TD/012	Second Floor Power Layout	T1	12 of 27	
13	MEP/ATS/ELE/TD/013	Third Floor Power Layout	T1	13 of 27	
14	MEP/ATS/ELE/TD/014	Fourth Floor Power Layout	T1	14 of 27	
15	MEP/ATS/ELE/TD/015	Fifth Floor Power Layout	T1	15 of 27	
16	MEP/ATS/ELE/TD/016	Sixth Floor Power Layout	T1	16 of 27	
17	MEP/ATS/ELE/TD/017	Seventh Floor Power Layout	T1	17 of 27	
18	MEP/ATS/ELE/TD/018	Terrace Floor Power Layout	T1	18 of 27	
19	MEP/ATS/ELE/TD/019	Ground Floor CCTV Layout	T1	19 of 27	
20	MEP/ATS/ELE/TD/020	First Floor CCTV Layout	T1	20 of 27	
21	MEP/ATS/ELE/TD/021	Second Floor CCTV	T1	21 of 27	

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		Layout			
22	MEP/ATS/ELE/TD/022	Third Floor CCTV Layout	T1	22 of 27	
23	MEP/ATS/ELE/TD/023	Fourth Floor CCTV Layout	T1	23 of 27	
24	MEP/ATS/ELE/TD/024	Fifth Floor CCTV Layout	T1	24 of 27	
25	MEP/ATS/ELE/TD/025	Sixth Floor CCTV Layout	T1	25 of 27	
26	MEP/ATS/ELE/TD/026	Seventh Floor CCTV Layout	T1	26 of 27	
27	MEP/ATS/ELE/TD/027	Terrace Floor CCTV Layout	T1	27 of 27	
28	MEP/ELE/EX/TD/001	External Electrical & CCTV Service Layout	T2	1 OF 1	External Layout
29	MEP/ELE/SLD/TD/001	Single Line Diagram-Part 1 (CISF & Hostel Building)	T4	1 OF 3	Single Line Diagram (SLD)
30	MEP/ELE/SLD/TD/001	Single Line Diagram-Part 2 (ATS & Corporate Building)	T4	2 OF 3	
31	MEP/ELE/SLD/TD/001	Single Line Diagram-Part 3 (Workshop Panel)	T1	3 OF 3	
32	MEP/ELE/SLD/TD/001	Single Line Diagram-Part 3 (Plumbing Panel)	T0	3 OF 3	

E- FIRE FIGHTING WORKS

Sr.No.	Drawing No	Drawing Title	Revision	Sheet Details	Building
1	MEP/FF/TD/001	Fire Hydrant System Layout	T0	1 OF 1	Hydrant System
2	MEP/FF/TD/005	Fire System Layout for Ground Floor	T0	1 OF 8	ATS Block
3	MEP/FF/TD/006	Fire System Layout for First Floor	T0	2 OF 8	
4	MEP/FF/TD/007	Fire System Layout for Second Floor	T0	3 OF 8	
5	MEP/FF/TD/008	Fire System Layout for Third Floor	T0	4 OF 8	
6	MEP/FF/TD/009	Fire System Layout for Fourth Floor	T0	5 OF 8	
7	MEP/FF/TD/010	Fire System Layout for Fifth Floor	T0	6 OF 8	
8	MEP/FF/TD/011	Fire System Layout for Sixth Floor	T0	7 OF 8	

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9	MEP/FF/TD/012	Fire System Layout for Seventh Floor	T0	8 OF 8	
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F – HVAC WORKS

Sr.No.	Drawing No.	Drawing Title	Revision	Sheet Details	Building
1	MEP/HVAC/TD/001	HVAC Layout (ATS Block) Ground Floor	T0	1 OF 9	ATS Block
2	MEP/HVAC/TD/002	HVAC Layout (ATS Block) First Floor	T0	2 OF 9	
3	MEP/HVAC/TD/003	HVAC Layout (ATS Block) Second Floor	T0	3 OF 9	
4	MEP/HVAC/TD/004	HVAC Layout (ATS Block) Third Floor	T0	4 OF 9	
5	MEP/HVAC/TD/005	HVAC Layout (ATS Block) Fourth Floor	T0	5 OF 9	
6	MEP/HVAC/TD/006	HVAC Layout (ATS Block) Fifth Floor	T0	6 OF 9	
7	MEP/HVAC/TD/007	HVAC Layout (ATS Block) Sixth Floor	T0	7 OF 9	
8	MEP/HVAC/TD/008	HVAC Layout (ATS Block) Seventh Floor	T0	8 OF 9	
9	MEP/HVAC/TD/009	HVAC Layout (ATS Block) Terrace Floor	T0	9 OF 9	