

NIT No. IITH/CMD/NIT/CPPP/2019-20/13

TENDER FOR
CONSTRUCTION OF 336 BOARDERS RCC PRECAST
HOSTEL BUILDING (G+6) AT IIT HYDERABAD



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Volume -3

SCOPE OF WORK USER
REQUIREMENT
&
TECHNICAL SPECIFICATIONS

INDEX

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HOSTEL BUILDING (G+6) AT IIT HYDERABAD**

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1.0 SCOPE OF WORK

336 Boarders Precast Hostel (Two Units of 84 rooms each , two seater accommodation)

Conceptual Drawings for the above Boys Hostels are attached and for G + 6 for total plinth area of 3969 Sqm with floor height 2900 mm from finished floor level to the soffit of the slab and plinth height minimum of 450 mm.

“Plinth Area” shall have the meaning as given in IS: 3861.

MINIMUM SPECIFICATIONS FOR PRECAST HOSTELS

Sl. No.	Items of Work	Specifications
1.	Building structure	
1.1	Precast Foundation & Super structure	<p>The whole structure shall be of Reinforced Cement Concrete (RCC) structure made of Precast elements comprising of suitable precast foundation system, solid core wall system and hollow core slabs, solid core lift shafts, staircases etc.,</p> <p>As per Structural design & approved drawings, building shall be earthquake resistant for the zone of location. Pre cast structure with suitable foundation system shall be designed as per the detailed soil investigation report & design.</p> <p>The precast structure should be designed with solid core walls (150 mm minimum thickness or as per design, whichever is more) in single/ multiple stages of casting, and hollow core for slab (125 mm minimum thickness or as per design, whichever is more) in single/ multiple stages of casting.</p> <p>For Toilet Block: where ever required, ledge walls of suitable thickness abutting the RCC solid core walls may be constructed using AAC blocks or clay bricks to run the concealed plumbing lines.</p> <p>Surplus excavated earth shall not be taken out of the campus and shall be used in campus itself as per direction of the Engineer-in-charge.</p>

1.2	Precast Elements	<p>Minimum grade of concrete for all the precast elements shall be M 35.</p> <p>The concrete for the precast elements and its production shall conform to IS 456. The contractor shall get the design mix approved by the Engineer-in-Charge before start of the production activities. The contractor shall submit the timelines for production of the precast elements so that the Engineer-in-charge or his representative inspect and collect samples of concrete for testing. Sampling shall be done as per the frequency specified in the Code/ CPWD Specifications.</p> <p>The reinforcement shall be FE 500 or FE 500 D grade conforming to IS 1786. The contractor shall submit the delivery challans and offer Material Inspection on receipt of the same before consuming into the works.</p> <p>Detailed requirements for precast elements is placed at the end of this section.</p>
1.2	<p>Plinth Filling :</p> <p>a) Sand filling under floor</p> <p>b) Concrete under footings</p> <p>c) Concrete under floors</p>	<p>150mm thick with river sand / crushed stone sand or fine aggregates conforming to IS 383-2016</p> <p>75 mm thick mat concrete below footing / raft in M20.</p> <p>100 mm thick RCC of grade M20 shall be laid under flooring work in ground floors with reinforcement of 8 mm dia TMT bars of Grade Fe500D @ 300 mm c/c. both ways</p>
1.3	Railing in staircases / Balcon	<p>1 meter high railing with SS 304 grade stainless steel of 50 mm dia. of 18 gauge handrail with adequate rods parallel to handrail, balusters, flanges, end caps, newel posts with caps etc. complete as per approved drawing and direction of Engineer – in – charge.</p>

1.4	Filler Walls	All the structural and non-structural wall members shall be precast members only. No brick work shall be allowed. However, in exceptional cases and only with the approval of Engineer-in-Charge, block work with AAC blocks can be executed with 200mm thick for external walls and 150mm for internal walls using AAC block joint adhesive of 3 to 5 mm thickness. RCC horizontal band of minimum 100 mm thick at window sill level & lintel level shall be provided in such case along with 100 mm thick RCC vertical mullions at specified locations.
2.	Joinery :	
2.1	Door frames	<ol style="list-style-type: none"> 1. Main Door :- Factory made 1.6 mm thick pressed steel door frame as per CPWD specifications, powder coated to the required shade. The frame shall be filled as per specifications foam concrete or with any filler material as approved by the Engineer-in-charge. 2. For all baths and WCs in Toilet Blocks:- Factory made PVC door frames.
2.2	Door shutters	<ol style="list-style-type: none"> 1. Door of hostel rooms:- 35 mm thick flush door shutters with 1.0 mm thick laminate of required shade on front face and 0.80 mm thick laminate on the rear face. Shutter shall be fixed to the frame with 125 mm stainless steel butt hinges of approved make. The door shall contain all required fittings such as stainless steel sliding door bolt, tower bolts, hanging floor door stopper etc., all of approved make and model. 2. Shutters for Wardrobes: 25 mm thick flush door shutters. Other details as mentioned above. 3. Bath and WC door shutters shall be 30mm thick Fibre reinforced Plastic (FRP) flush door shutters in wood finish. 4. Plain Glass (Frosted) louvers and SS Wire mesh of grade 304 (powder coated) with aperture 1.4 X 1.4 mm shall be provided in the top ventilator portion of door frames.
2.3	Mumty Door & Shutter:	GI door frame and shutters as per specifications mentioned at para no. 19 of "Particular Specifications" under Part "B".

2.4	Door / Cupboard/ Wardrobe/ Showcase fittings:	<p>All fittings of SS 304 of approved brand. Hostel room and Toilet main door :- Sliding door bolt – 250 mm X 16 mm (Single Shutter), 300 x 16 mm (Double Shutter); tower bolt – 250mm, door handles – 200mm</p> <p>WC/Bath: - Door Latch-150 mm, Tower bolt – 250mm, Tower bolt – 150mm, Door handles – 150mm.</p> <p>All other rooms:- As per approved drawings and directions of Engineer – in – Charge.</p> <p>Misc. fittings like door stopper, door buffer, magic eye etc.</p> <p>NOTE: This list indicated above is only indicative, but not exhaustive. The contractor has to ensure to provide fittings of all types and quantity to make the shutters function</p>
3	STEEL WORK:	
3.1	MS Grill in windows & Ventilators	Should be fitted with MS grill (minimum weight 10 kg per sqm) as per approved drawings.
3.2	UPVC Windows & Ventilators with frame	<p>Windows: Three track UPVC frame with double shutters with glazed panels & other with wire mesh (of SS grade 304 powder coated) shutter as per approved drawing and matching UPVC Extruded frames sections with minimum wall thickness 2.2 mm.</p> <p>Ventilators: UPVC Extruded frames sections with minimum wall thickness 2.2 mm.</p>
3.3	Glazing of windows, Ventilators and openings	<p>Glazing shall be with 6mm / 8mm thick toughened glass (depending on size of opening).</p> <p>Opening of windows should be sufficient enough as per ECBC norms for day light during day time. The properties of glass should meet the ECBC & NBC 2016 requirement.</p> <p>Plain frosted glass may be provided for ventilator louvers and toilet windows.</p>
3.4	Windows Sill	16 mm thick Pre moulded and Pre polished granite slab of colour & shade as approved by the Engineer in charge.
3.5	Curtain rod	Powder coated SS 304 Curtain rods of 25 mm dia of 22 gauge with finials as approved by the Engineer in charge including required supports.

3.6	Cup Boards	Separate cup board for each student of suitable size made of ferro cement shelves with suitable number of shelves as per approved design.
4.	FLOORING :	
4.1	Flooring	<ol style="list-style-type: none"> 1. All rooms: Vitrified floor tiles of size 600x600 mm laid with adhesive and with spacers, groove filled with epoxy/ cement grout. 2. Corridor area:- Flamed finish granite flooring. 3. Staircase Portion:- Flamed finish Granite stone slab 16mm thick flooring as per the approved color, design & pattern . 4. Toilets - Antiskid rectified ceramic floor tile of minimum size 300x300 mm laid with adhesive and with spacers, groove filled with epoxy grout as approved by Engineer – in – Charge. 5. Electrical room, store rooms : Antiskid vitrified tile flooring with rubber mats in front of electrical panels. 6. Platforms in shafts: FRP grating supported on suitable size MS angle supports all round the grating.
4.2	Skirting and dado	<ol style="list-style-type: none"> 1. All rooms and corridors/ common areas - Specifications for materials of skirting will be same as for flooring with matching joint pattern having 100mm height laid with adhesive. 2. Toilets - Glazed / digital / coloured rectified ceramic tiles of minimum size 450 mm x 300 mm up to 2400mm high laid with adhesive.
4.3	Cladding on Lift Well	Cladding should be done to front face of Lift well with 16 mm thick Granite slabs in approved shade, colour and pattern.
5.	ROOFING :	
5.1	False Ceiling	Toilets - Calcium silicate board of size 600x600mm (finished with PVC lamination / painted) with suitable frame work complete as per manufacturer's specifications.
5.2	Seismic Joint	The vertical & horizontal expansion joints shall be kept as per the relevant IS code and CPWD Specifications. It should be covered by stainless steel grade 304 plate of thickness 1 mm in vertical joint with polysulphide sealant. In Floor joint, tongue and groove plate system for seismic joint should be provided. At roof seismic joint treatment should be as per CPWD specification.
5.3	Water proofing treatment:-	Water Proofing Treatment on Terrace and in Toilets to be done as per specifications mentioned at para no. 12 of "Particular Specifications" under Part "B".

5.4	Rain Water Pipes :	All the RWP pipes including fittings shall be PVC Pipes exposed on walls / in the shafts to be executed as per CPWD specification 2009.
6.	FINISHING :	
6.1	Plastering on walls (Internal & External):	On brick filler walls : Cement plaster of minimum 15mm thick shall be provided (with chicken mesh on entire area, plaster mesh of aperture of 15mmx15mm made of 1.3mmx0.35mm GI strips of at junctions of RCC & masonry, fibre mesh at corners). On Precast Surface : Plastering may not be required as the same being factory made, surface of even, smooth and uniform characterization is noted. However, the same needs to be suitably rectified in case of any deficiency. Necessary drip courses shall be provided in Sunshades, Balcony, Projecting Roof, Beams etc.
6.2	Internal finishing:	All the internal surfaces including ceiling shall be finished with one coat of cement primer, two or more coats of cement based wall putty, two or more coats of premium plastic emulsion paint with low VOC. However, wherever false ceiling is provided, slabs shall be treated with one coat of cement primer.
6.3	External finishing:	External wall surface shall be finished with cement based wall putty in two coats and 2 or more coats of premium acrylic smooth weather proof exterior paint over a coat of cement premier.
6.4	Primer :	As per CPWD Specification for wood work and steel work.
6.5	Painting :	Steel work – Two or more coats of synthetic enamel paint over a coat of suitable primer. PS door frames: Powder coated.
7.	MISCELLANEOUS :	
7.1	Anti termite treatment	Providing and injecting chemical emulsion for post constructional anti termite treatment along the external wall up to depth of 300mm
7.2	Plinth Protection :	100 mm thick RMC M-15grade with nominal reinforcement of 8mm dia, TMT bar @ 300mm spacing in both ways over 75mm thick bed of sand, half brick masonry edging laid lengthwise to 150 mm depth and finishing with floating coat of neat cement punning and false squares on top and finishing the exposed brick work and concrete edge with cement plaster etc, complete.

7.3	CC in sunken portion :	Since the toilets are proposed with core cutting arrangement, 100mm depression is proposed and the same to be filled with brick bat coba after waterproofing treatment.
7.4	Open Paved area	60 mm thick factory made cement concrete Interlocking paver block of M30 grade as per Arch drawing and approved development plan over 50 mm thick sand cushion over 150 mm thick Granular sub-base (GSB) and over well compacted earth.
7.5	Miscellaneous civil and beautification works	Miscellaneous works like pathways connecting between various blocks, pergolas, Flower beds, open staircases, approach ramps etc.
8.	Internal Sanitary Water Supply Installations :	As follows. The fittings and fixtures shall be as given at Annexure-1: Sanitary and CP fittings
8.1	W.C. Pan with flushing system	
8.2	Urinals	Half stall urinals (bucket type) of approved make with push cock of approved make and design along with 16mm thick black granite partition of approved shape and pattern.
8.3	Wash basin	As shown in the list of suitable size to be provided in counter /platform of 16 mm thick machine moulded granite slab over RCC slab with Stainless steel Bottle trap.
8.4	Mirror	Full size /length float mirror over wash basin slab to be provided over 12 mm thick Compact sheet of approved make and design.
8.5	Soil & waste pipes fittings	All the sanitary pipes including fittings shall be Polypropylene Pipes of approved make.
8.6	First Manhole	Brick masonry with Flyash cement brick of class designation 75 of size 90x80x45cm with cover and frame.
8.7	Water supply line :	
8.7.1	External pipe line up to 50mm	CPVC Pipes as per IS 15778 class1 of SDR 11.00 as per approved plumbing drawing.
8.7.2	Internal piping & fittings– Concealed work	CPVC Pipes of SDR 11.00 as per approved plumbing drawing
8.7.3	Painting of Pipes : a) Exposed on buildings	Synthetic enamel paint

8.8	Fittings :	Pillar cocks, angle cocks, 2way bib cocks with health faucet, long body bib cocks, wall mixture, overhead shower, towel rod of 600mm, corner glass shelf along with other miscellaneous fittings like bottle trap, floor trap, waste couplings etc; as per approved make and model and as per the direction of Engineer – in – Charge. (The above are indicative only. However, the contractor has to provide all fixtures and fittings for functional suitability). Note: The fixtures and fittings shall be of standard equivalent to Jaguar make florentine series or more only.
8.9	Terrace Tank	RCC water storage tank (Service tank) of adequate capacity with suitable water proofing treatment with float valve, scour valve, CI cover with locking arrangement etc, complete. In addition to this, RCC water storage tank (fire fighting) of suitable capacity as mentioned at C 3.1 of Part C shall be provided exclusively for fire fighting and the inlet of service tank shall be connected from this fire fighting tank in such a way that the over flow fire fighting shall flow to the service tank (this means fire fighting storage tank remains always full).
9.0	External Service Lines towards Water Supply, Drip Irrigation and Sewerage	Water Supply:- DI pipe lines of suitable diameter from UG sump or CPVC pipe lines of suitable diameter from nearest line to Service tank of each building with control valves complete as per directions of Engineer-in-charge (the system should be conducive to Hydro Pneumatic system to be provided for all buildings). Sewerage:- NP2 pipes of suitable diameter to be laid from each building to the nearest sewerage line / STP complete as per directions of Engineer-in-charge. Drip Irrigation / Sprinkler:- CPVC pipe lines of suitable diameter with control valves, sprinkler system complete for horticulture operations specified. (Note:- The External Service Lines towards Water Supply, Drip irrigation/ sprinkler and Sewerage shall be executed as per relevant specifications attached.)
10.0	Accessibility of Buildings	All the blocks shall be accessible by differently abled persons as per GRIHA norms. Ground floor shall have at least one Divyang Toilet for differently abled people.
11.	NUMBERING OF HOUSES ETC.	
11.1	Numbering of rooms	Shall be engraved in specified shade on SS plate (grade 304) of size 150X75 mm

NOTE: The above list is only indicative and not exhaustive. The contractor has to plan and execute all the missing fittings / fixtures / item to make the premises to the full use. Nothing extra shall be paid on this account.

SPECIFICATIONS FOR PRECAST ELEMENTS:

2.0 PERFORMANCE REQUIREMENTS

2.1 **Structural Performance:** Provide structural precast concrete members and connections capable of withstanding the following design loads within limits and under conditions indicated as per relevant IS Codes and NBC 2016.

- Dead Loads
- Live Loads
- Roof Loads
- Concrete screed thickness and floor finishes
- Wind Loads
- Seismic Loads

2.2 The roof panels shall be designed to take the load of the waterproofing system, the screed to maintain the required gradient to drain off the rain water, solar water heating system etc.,

3.0 SUBMITTALS

3.1 **Design Mix:** The Contractor shall submit for approval of the Engineer-in-charge the design mixes to be adopted in the work. Minimum grade of concrete shall be M 35 and M 40 for solid panels and hollow core slabs, respectively.

3.2 **Shop (Erection) Drawings:**

- i. Detail fabrication and installation of structural precast concrete units including connections at member ends and to each adjoining member.
- ii. Indicate locations, plan views, elevations, dimensions, shapes, and cross sections of each unit, openings, support conditions and types of reinforcement, including special reinforcement.
- iii. Indicate aesthetic intent including joints, rustications or reveals, and extent and location of each surface finish.
- iv. Coordinate and indicate openings and inserts required by other trades.
- v. Indicate location of each structural precast concrete member by same identification mark placed on unit.
- vi. Indicate locations and details of joint treatment.
- vii. Provide handling procedures, erection sequences, and for special conditions provide temporary bracing and shoring plan.

3.3 **Comprehensive engineering design for all MEP services.**

3.4 **Material Test Reports**

for all materials like Cement, reinforcing steel, Structural steel, tiles, electro mechanical equipment, cables

3.5 **Material Test Certificates by manufacturers:**

- i. Cement.
- ii. Reinforcing and Structural Steel.
- iii. Admixtures.

- iv. Bearing pads.
- v. Insulation.
- vi. Waterproofing Chemicals

3.6 Testing Agency :

Shall be an independent NABL accredited testing agency as approved by Engineer-in-charge.

4.0 DELIVERY, STORAGE, AND HANDLING

- i. Deliver all structural precast concrete members in such quantities and at such times to assure compliance with the agreed upon project schedule and setting sequence to ensure continuity of installation.
- ii. Handle and transport members in a manner to avoid excessive stresses that could cause cracking or other damage.
- iii. Store units with adequate dunnage and bracing, and protect units to prevent contact with soil, staining, and to control cracking, distortion, warping or other physical damage.
- iv. Unless otherwise specified or shown on Shop Drawings, store members with dunnage across full width of each bearing point.
- v. Place stored members so identification marks are clearly visible, and units can be inspected.
- vi. Place dunnage of even thickness between each member.
- vii. Lift and support members only at designated points indicated on the Shop Drawings.

5.0 FORM MATERIALS

- i. Forms: Rigid, dimensionally stable, nonabsorptive material, warp and buckle free, that will provide precast concrete surfaces within fabrication tolerances specified in relevant Codes.; nonreactive with concrete and suitable for producing required surface finishes.
- ii. Form-Release Agent: Commercially produced form-release agent that will not bond with, stain or affect hardening of precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

6.0 SURFACE FINISHES OF PRECAST ELEMENTS

Normal plant-run finish produced in forms that impart a smooth finish to concrete. Surface holes smaller than 10 mm caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are acceptable. Fill air holes greater than 5 mm in width that occur in high concentration (more than one per 1300 mm²). Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Allowable joint offset limited to 3 mm.

7.0 QUALITY CONTROL

- i. Engineer-in-charge will employ an accredited independent testing agency to evaluate quality of structural precast concrete. Contractor shall bear all expenses towards testing including samples.
- ii. Contractor shall allow testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with the testing agency and provide samples of materials and concrete mixtures as may be requested for additional testing and evaluation.
- iii. Strength of precast concrete members will be considered deficient if units fail to comply with concrete strength requirements given in IS 456.

- iv. Testing: If there is apprehension that strength of precast concrete members may be deficient or may not comply with Code requirements, Contractor shall employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength. Patching: If core test results are satisfactory and precast concrete members comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- v. Acceptability: Structural precast concrete members that do not comply with acceptability requirements, including concrete strength, and manufacturing tolerances, are unacceptable. Chipped, spalled or cracked members may be repaired/ replaced as directed. Replace unacceptable units with precast concrete members that comply with requirements.

8.0 EXECUTION

8.1 PREPARATION

- i. Furnish loose connection hardware and anchorage devices for precast concrete members to be embedded in or attached to the building structural frame or foundation before starting that Work. Provide locations, setting diagrams, templates and instructions for the proper installation of each anchorage device.

8.2 EXAMINATION

- i. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting precast concrete performance.
- ii. Proceed with precast concrete installation only after unsatisfactory conditions have been corrected.
- iii. Contractor shall ensure that supporting cast-in-place concrete foundation and building structural framing has attained minimum allowable design compressive strength or supporting steel or other structure is structurally ready to receive loads from precast concrete members prior to proceeding with installation. He shall be solely responsible for any lapses or any other consequential damages.

8.3 ERECTION

- i. Install loose clips, hangers, bearing pads, and other accessories required for connecting structural precast concrete members to supporting members and backup materials.
- ii. Erect structural precast concrete level, plumb and square within the specified allowable erection tolerances. Provide temporary structural framing, shoring and bracing as required to maintain position, stability, and alignment of members until permanent connections are completed.
- iii. Install temporary steel or plastic spacing shims or bearing pads as precast concrete members are being erected. Surface weld steel shims to each other to prevent shims from separating.
- iv. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
- v. Remove projecting lifting devices and use plastic patchcaps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast concrete surfaces when recess is exposed.
- vi. Unless otherwise indicated provide uniform joint widths of 20 mm.
- vii. Connect structural precast concrete members in position by bolting, welding, grouting, or as otherwise indicated on approved Shop (Erection) Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and/or grouting are completed.
- viii. Disruption of roof flashing continuity by connections is not permitted; concealment within roof insulation is acceptable.
- ix. Grouting or Dry-Packing Connections and Joints: Indicate joints to be grouted and any critical grouting sequences on Shop (Erection) Drawings. Grout open spaces at keyways, connections and

joints where required or indicated. Provide reinforcing steel where indicated. Retain flowable grout in place until it gains sufficient strength to support itself. Fill joints completely without seepage to other surfaces. Alternatively, pack spaces with stiff dry pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for at least 24 hours after initial set.

- x. Trowel top of grout joints on roofs smooth to prevent any unevenness that might interfere with placing of, or cause damage, to insulation and roofing. Finish transitions due to different surface levels not steeper than 1 to 12.
- xi. At Hollow-Core Slab Ends (where shown on Drawings): Provide suitable end cap or dam in voids as required.
- xii. Field cutting of precast, prestressed concrete members is not permitted without approval of the Engineer.

8.4 CLEANING

- i. Clean mortar, plaster, fireproofing, weld slag, and any other deleterious material from concrete surfaces and adjacent materials immediately.
- ii. Clean exposed surfaces of precast concrete members after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
- iii. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

DEVELOPMENT WORKS AND BULK SERVICES

9.0 ROAD WORK

A. Planning, Designing and Construction of Road of width 6.0 m / 4.5 m / 3.0 m along with kerb etc

- 9.1 Formation of road alignment as per approved drawing including cutting and embanking as per profile, rolling and preparing the sub-grade fit for laying road.
- 9.2 Providing and Laying 100 mm thick Sub Base with plain cement concrete with RMC M-15 grade with nominal reinforcement of 8mm dia @ 300mm centre to centre in both ways.
- 9.3 Providing and fixing Factory made Kerb stone of approved brand and manufacture with M-30 grade concrete on both side of 6.0 m wide road.
- 9.4 Providing and laying Vacuum Dewatered CC pavement of mix M- 25 grade RMC of 150 mm thick with nominal reinforcement of 8mm dia @ 300mm centre to centre in both ways.
- 9.5 Cutting 6mm wide and 50 mm deep groove in Vacuum dewatered concrete pavement and filling with polysulphide etc. complete as per specification and as directed by the Engineer – in – charge.
- 9.6 75 mm wide thermo-plastic mark paint for indicating divider line and edge line, speed breakers, road crossing for pedestrians at junction etc., all complete.
- 9.7 Chambers, road longitudinal slopes etc shall be followed as per CPWD Specification
- 9.8 Details Specification of road work:. CPWD Specifications 2009, Vol. I and II shall be followed.
- 9.9 The area of road shall be measured in between kerb nearer to centimeter for Payment. All the above operations are included in this rate and nothing extra shall be paid on any account.

10.0 Storm Water Drain

Planning, Designing and Construction of Providing and laying precast storm water drain with perforated removable covers including necessary culverts etc. complete and as per direction of Engineer- in- charge.

The agency has to plan, design, prepare the drawings for Storm water drain and get the same from Engineer – In – Charge before execution.

- 10.1 300 mm wide and 200 mm (minimum depth) varying depth required to maintain slope along the Roads on both sides including excavation of earth to the required profile, laying in position and fixing with cement mortar 1 : 3 (1 cement : 3 coarse sand) in required gradient as per CPWD Specification and approved drawing by the competent authority.
- 10.2 Sides of the storm water drain shall be neatly packed, dressed and the surplus excavated earth shall be utilized for filling low level or green belt development.

11.0 Under Ground Sump

Planning, Designing and Construction of RCC Under Ground Sumps of 1.0 lack liters capacity with necessary partitions for domestic & fire fighting etc. including preparation of preliminary & detailed working drawings, structural analysis & design, planning, designing & execution of all services including Providing and laying DI pipes of required diameter up to the sump and GI/HDPE/ PP pipes from sump to OH tank etc. by incorporating stipulated specifications and integrating all services with External Development works all complete as per directions of Engineer- in- Charge.

- 11.1 The agency has to plan, design, prepare the drawings for Under Ground Sumps as per required capacities at different locations and the same get approved from the Engineer – In – Charge before execution.
- 11.2 Structural analysis and design of Under Ground Sumps shall be based on the relevant codes using, preparation of GA drawings, working & shop drawings and the complete design system shall be get approved from the Engineer – In – Charge before execution.
- 11.3 Water proofing as per CPWD specifications to be followed for water tightness.
- 11.4 Necessary vent pipes, over flow pipes with protection mess to prevent entry of insects and birds shall be provided and nothing extra shall be paid on this account.
- 11.5 Collection pit of sufficient size at bottom shall be provided for cleaning the sumps.
- 11.6 Foot rests of approved quality shall be provided to get in to the sumps and sufficient number of man holes with locking arrangement shall be provided.
- 11.7 After completion of the construction work, the underground tank and pipe lines shall be fully disinfected before commissioning. All expenditure in this regard shall be borne by the contractor.

This item is one job and this rate includes all the operations above mentioned and also not mentioned but required for making the Underground sumps functional. Nothing extra shall be paid on this account.

11.8 Guarantee Bond For Under Ground Sumps:-

Five years Guarantee bond in prescribed proforma **given in the tender document** shall be submitted by the contractor which shall also be signed by both the specialized agency and the contractor to meet their liability / liabilities under the guarantee bond. However, the sole responsibility about efficiency of water proofing treatment shall rest with the building contractor. **10% (Ten per cent) of the cost of water-proofing work shall be retained as Security Deposit and the amount so deducted would be released after 5 (Five) years from the date of**

completion of the entire work under the agreement, if the performance of the treatment is found satisfactory. If any defect is noticed during the guarantee period, the contractor shall rectify it within 15 days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor. However this security deposit can be released in full, if bank Guarantee of equivalent amount for Full **5 (Five) years** is produced and deposited with the department.

12.0 MISCELLANEOUS WORKS TO BE EXECUTED:

The contractor shall execute the following miscellaneous works for which nothing shall be paid extra. **The contractor shall consider the cost towards the said miscellaneous items along with various sub-heads of schedule of quantities and nothing extra shall be paid on this account.**

- 12.1 Route maps at strategic locations as per design and material with suitable back ground lighting
- 12.2
- 12.3 Name boards of various buildings in SS 304 grade lettering or any other suitable lettering with back ground LED lighting as per approved drawing.
- 12.4 Name boards/ Sign boards for various roads of approved design, shape and material.

13.0 SEWERAGE SYSTEM

Planning, Designing and Construction of Providing and laying Sewer lines with NP2 pipes of spigot and socket ends including Manholes of required size, shape and depth complete and as per direction of Engineer- in- charge.

- 13.1 The agency has to plan, design, prepare the drawings for Sewerage system and get the same approved from Engineer – In – Charge before execution the competent authority.
- 13.2 The sewerage lines of individual building shall be considered in buildings up to and including first manhole.
- 13.3 This item is operated from the first manhole to the nearest manhole of the existing sewer network and includes the following operations.
 - a) Excavation of trench for laying Pipes and refilling after laying pipes as per CPWD specification.
 - b) Earth excavation for Man holes and refilling after construction.
 - c) Providing, Laying and fixing NP2 pipe line for sewage disposal over M – 15 grade PCC bed of 100 mm thick as per approved design and drawing by the Engineer-in-charge
 - d) Constructing Manholes, drop manholes of required size (shape based on depth, gradient and interval) etc., as per CPWD specifications including construction of gully trap, grit chamber, screen chamber etc., complete including plastering on external surface of all manholes and chambers.

- e) Making connection from and to the manholes wherever required.

14.0 WATER SUPPLY NETWORK

Planning, Designing and Construction of Providing and laying Water supply main, branch and distribution lines including chambers and fittings/specials such as Tees, Bends, collars, Unions, tappers, caps, Sluice Valves, Gate Valves, scour valves, non-return valves, air-relief valves, thrust blocks etc. complete and as per direction of Engineer- in- charge.

The water supply network should cater to the needs of supplying water from UG sumps (from various locations) to individual buildings.

- 14.1 The agency has to plan, design, prepare the drawings for water supply system and get the same approved from Engineer – in – Charge before execution.
- 14.2 Excavation of trench for laying Pipes and refilling after laying pipes as per CPWD specification.
- 14.3 Earth work excavation for chambers, D.I. Specials, valves, thrust blocks etc. and refilling after construction/ laying.
- 14.4 Providing and laying Ductile iron Pipe line with push joint from Over head tank outlet near OHT to make outer main grid with around campus with 200 mm dia pipe and 150 mm dia pipe as per the approved drawing along with specials like Tees, Bends, sockets, Tappers, sluice valves, scour valves, Air relief valves, Non return valves, Thrust blocks etc.
- 14.5 Providing and laying Ductile iron Pipe line with push joint from UG Sump to OHT inlet chamber with 150 mm dia pipe as per the approved drawing along with specials like Tees, Bends, sockets, Tappers, sluice valves, scour valves, Air relief valves, Non return valves, Thrust blocks etc.
- 14.6 Construction of chamber for sluice valves, scour valves, Air relief valves, Non return valves as per CPWD specification and as per approved drawing.
- 14.7 Hostels are to be connected with nearest water supply lines by CPVC of schedule 80 pipes of dia 80 mm and 50 mm so that water supply should be made to the building along with fittings, Gun metal gate valves, Gun metal non return valves, masonry chambers for valves, including excavation, providing sand all-round and refilling after laying etc.
- 14.8 Treated water from the existing STP shall be used for flushing and horticulture. The contractor shall lay the piping accordingly with all necessary branch and distribution lines including chambers and fittings/specials such as Tees, Bends, collars, Unions, tappers, caps, Sluice Valves, Gate Valves, scour valves, non-return valves, air-relief valves, thrust blocks etc. complete and as per direction of Engineer- in- charge.

- 14.9 The scope of work also includes laying of distribution network along with drip irrigation system, sprinkler system with suitable number of sprinklers within the plot boundary of hostels as per approved plan and directions of Engineer – In – Charge.
- 14.10 The work shall include planning, design, installing and commissioning of required pump sets for supply of water.
- 14.11 The entire work is paid as one job.
- 14.12

LIST OF APPROVED MAKES

This section gives list of approved makes for few items. The contractor shall obtain approval of makes of all materials at time of submission of detailed design. The contractor shall submit the samples of all the materials before procurement.

1. CIVIL Works

Material / Item	Approved Make
CIVIL WORKS	
AAC Blocks	Xtralite from Ultratech, Aerocon from HIL, ECOREX, BILTECH
AAC block joining mortar	Fixoblock xtralite from Ultratech, Smartfix from Aerocon, MYK Laticrete, Ardex Endura
Acoustic Insulation (Mineral Wool)	Lloyd, Ecophone from Saint Gobain, U.P. Twiga Ltd, Rockwool India, Anuton, Knauf, Siderise
Acoustic Wooden Door	Pacific, Navair, Tesco
Acoustic Seal	Lorient, Raven, Dorma, Kelargo, Reddiplex
Acoustical Ceiling / Wall Panelling	Anutone, Ecophon - Saint Gobain, USG Boral, Armstrong,
Access panel in False ceiling	Saint Gobain, USG Boral, Knauf Denoline
Adhesive For Wood Work	Ardex Endura, Laticrete, Pidilite,
Air transfer grills	Trox, Ruskin Titus, Systemair India
Aluminium Accessories	Classic/ Argen/ Oxford/ Nulite/ Crown/ EBCO
Aluminium composite panel	Alucobond, Alstone, Alubond, Eurobond, Aludecor, Alstrong
Aluminium Sections	Hindalco, Jindal, Boruka, Indalco
Aluminium System Windows	Kaluco, Technal, Domal, ALCOI, Eternia from Hindalco, Alumak,
Aluminium Systems Glazing/ Curtain wall (Façade system)	Schuco, Reyners, Kawneer, Boruka
Aluminium D/W hardware	Alualpha, Lavaal, Giesse, Cotswold, Securistyle, Polismar
Aluminium Louvers	Hunter Douglas, Armstrong, Luxalon
Anchor Fastner, Rebar, Chemcial/ Mechanical fastner, Core - cutting, Dry stone cladding clamp, Expandable fastners	Hilti, Fischer
Anti-Termite Pesticides - (Chloropyriphos)	DE - Nocil, Bayer, Biflex-TC from FMC, Hilban from HIL
Automatic Slidding doors/ Revolving Doors	Dorma, Geze, Hafele
Acoustical Ceiling / Wall Panelling	Anutone, Ecophon - Saint Gobain, USG Boral, Armstrong, Knauf Denoline
Acoustic Wall Panel	Armstrong, Ecophon, Anutone
Access panel in False ceiling	Saint Gobain, USG Boral, Knauf Denoline, Anutone
Adhesive For Wood Work	Ardex Endura, Laticrete, Pidilite,
Aluminium Sections	Hindalco, Jindal, Boruka, Indalco, Global
Aluminium System Windows	Kaluco, Technal, Domal, ALCOI, Eternia from Hindalco, Alumak,
Aluminium Systems Glazing/ Curtain wall (Façade system)	Schuco, Reyners, Boruka or approved equivalent
Auditorium Chairs	KI Seating, Acoustika

Material / Item	Approved Make
Acoustical Doors	Signum, Hillpoint, Stairway Studio.
Backer Board	Supreme, Fosroc
Calcium Silicate Board	Hilux, Aerolite, Pamtech, Promatech
Cement OPC/ PPC	Ultratech, ACC, Lafarge
Cement - White	Birla, JK
Cement Fiber Board	Everest, NCL Industries (Bison Panel), Shera Board, Visaka Industries (V- Next), Century (Zykron),
Chemical Admixtures & Additives	BASF, Pidilite, Sika, Fosroc, Ecmas, Sunanda Chemicals, Mapei, Hycrete, Bal-Endura, MC Bauchemie, MYK Schomburg,
Commercial ply & Board	Greenply, Archidply, Century, Duroply, Uniply, Kitply, National
Crystalline Integral Waterproofing	Kryton, Penetron, Pidilite, BASF, Fosroc, Sika, Xypex
Ceramic Fritting on Glass	Art & Glass, GSC Glass, Ashai
Cement Concrete Jali	Amusement Concrete Jali, Birla or approved equivalent
Concrete Cover Blocks	Astra, Ramtec or approved equivalent. For exposed concrete only pointed type shall be approved
Ceramic Tiles	Kajaria, RAK, Restile, Somany, Jhonson, Asian
Ceramic Tiles	Kajaria, RAK, Restile, Jhonson, Asian
Compact laminated sheet	Greenlam, Marino
Cement Concrete Jali	Amusement Concrete Jal, Birla or approved equivalent
Concrete Cover Blocks	Astra, Ramtec or approved equivalent. For exposed concrete only pointed type shall be approved
Ceiling Wall Panel	Armstrong, Ecophon, Anutone
Colour Coated Galvalume Standing Seam Roofing	Agrima Roof & Façade systems, Maxroof , Optima India
Door Closer	Dorma (XLC), Hafele, Yale, Geze
Door Locks, Access Control Lock	Dorma (XLC), Geze, Kich, Hafele, Assa Abloy (Yale)
Door Hardware (other than Floor spring, Closer, Locks)	Dorma (XLC), Kich, Hafele, Assa Abloy (Yale),
Door Seal – Wool pile Weather Strip	Reddiplex, Osaka rubber, Enviro Sealz, Anand
Double Side Tape, Decorative Tape	3M
Door Hardware (other than Floor spring, Closer, Locks)	Dorma (XLC), Kich, Hafele, Assa Abloy (Yale), Dorset,
EPDM Gaskets	Anand, Osaka Rubber, Roop, Bohra, Hanu, Maharashtra polymer
Epoxy Grout/ Cementitious Grout for Flooring	Ardexl Endura, MYK Latricrete, Kerakoll, Pidilite
External Paving Tiles (Cement based)	Pavit, Basant baton, Vyara, Ultra, Eurocon, Super
Expansion Joint System	3R, Kantaflex, sandfield, Deevin, Vexcolt
Expansion Filler board - Premoulded compressible	Supreme (Capcell HD100), Shalitek -STP

Material / Item	Approved Make
Fabric (Acoustic and fire rated)	Atmosphere, Palette, D'décor Fabric, Response fabric
Fire Doors	Shakti Horman, Pacific, Navier, iCLEAN - IHMS, Promat,
Fire Rated Hardware	Dorma, Hafele, Geze, Horman, Assa Abloy (Yale)
Fire Seal, Fire smoke Seal	3M, Hilti, Dorma, Sealz, Lorient, Kelargo, Raven
Fire rated Glass	Vetrotech Saint-Gobain, Pyroguard, Glaverbel, Schott - Pyran, Pyroswiss
Fire rated Glass fixing gasket, tape	Karfani, 3M
Floor Springs	Dorma (XLC), GEZE, Haffle, Assa Abloy (Yale)
Floor hardening compound	JBA, Ardex endura, Fosroc, Basf, Sika, Sunanda chemicals
Flush Door Shutter (Factory pressed laminated)	Century, Greenply, Duroply, Kitply, Uniply, Anchor
Furniture Hardware	Hettich, Hafele
Fabric (Acoustic and fire rated)	Atmosphere, Palette, D'décor Fabric, Response fabric
Fly ash for SCC : Manuguru	HWP and for other work : NTPC Ramagundam
Floor Drain	Neer, ACO, GMGR
GRC JALI	Birla GRC, MS Engineers, Ionex engineering co
Glass, Tinted Glass, High Performance Glass, Reflective Glass	Saint Gobain, Asahi, Pilkington
Glass Processing	FG, Fuso, Asahi,
Glass, Tinted Glass, High Performance Glass, Reflective Glass	Saint Gobain, Modiguard (Gujarat Guardian), Pilkington, Asahi
Glass Processing	FG, Fuso, Asahi, Saint Gobain
Glass Doors (Motorised systems / sliding system)	DORMA, Haffle,
Glass Doors (Motorised systems/sliding system)	DORMA, Haffle
Glass Fibre Acoustical Tiles	ECOPHON, Armstrong, Anutone, AMF
Glass mosaic tiles	Italia, Bissazza, Scisis, Palidio
Grab Bars and Disabled Hardware	Cera, Jaquar, Hindware, Dorma
Gypsum plaster	Stain Gobain, Perma board or approved equivalent,
Grab Bars and Disabled Hardware	Cera, Jaquar, Hindware, Dorma
Gypsum ceiling board	Saint Gobain, Knauf, USG Boral
Gypsum plaster	Stain Gobain, Perma board approved equivalent
Glass	Saint Gobain, Modifloat, Pilkington
GI channels	Gypsteel, Anutone, Hillpoint Diamond Frames.
Honey Comb Panels	Sarey approved equivalent
Honey Comb Panels	Honeycomb India Pvt Ltd, Sarey or approved equivalent
Heavy duty Vitrified Tile 16mm	Somany , Johnson , Nitco
Laminates	Marino, Century, Greenlam, Formica, Sunmica,
Laminated Shuttering Ply	Green Ply , Century Ply, Archidply

Material / Item	Approved Make
Laminated wooden slats	Hillpoint, Anutone, Topakustik Tranquil
Masking Tapes	3M, Sun Control, Wonder Polymer. Essentra
Metal Ceilings	Luxalon, Armstrong, Hunter Douglas, Saint Gobain
Metal Doors (Non Fire rated)	Shakti Horman, Naviar, Ahlada, Metaflex, Pacific
Mineral Fibre Grid Ceilings	Armstrong, Saint Gobain (Ecophon), Anutone, USG Boral, Knauf, AMF
Mirrors	Saint Gobain, Modi Guard (Gujarat Guardian), Asahi, HNG, Pilkington
Modular Toilet Cubical - Compact laminate	Merino, Greenlam, Stylam
Metal Ceilings	Luxalon, Armstrong, Saint Gobain, Hunter Douglas, Dexune, USG Boral
Mineral Fibre Grid Ceilings	Armstrong, Saint Gobain (Ecophon), Anutone, USG Boral, Knauf, AMF, Dexune
MS Expanded metal mesh (Powder Coated)	Tata, Asian Streck Metal
Non shrink cementitious precision (anchoring) grout	Fosroc, Sika, Ardex Endura, BASF
Non shrink cementitious precision (anchoring) grout	Fosroc, Sika, Ardex Endura, BASF
Patch Fitting	Dorma (XLC), Haffle, Geze, Hettich
PAINT - Cement Based	ICI Dulux, Berger Paints, Asian, Nerolac
Paint - Acrylic, Synthetic Enamel, Acrylic emulsion- interior and exterior	Asian Paints, Akzo Nobel (Dulux), Berger, Nerolac, Jotun
Polished Concrete Flooring	JBA, Impact flooring approved equivalent
Paint - Texture Paints (Interior, Exterior)	Asian, Jotun, ICI Dulux, Berger
Paint - Anti microbial paint	Asian, Berger, Jotun
Paint - Fire Retardant paint	Jotun, Akzo Nobel, Viper-Nullifire, Asian
Paint - High Albedo paint/ Solar reflective paint	BASF, Jotun, Sika, Fosroc, Pidilite, Ecmas
Paint - Oil Bound Distemper & Dry Distemper	Asian Paints, AkzoNobel (ICI Dulux), Berger
Paint - PU paint, epoxy paint and primer	Asian, Nippon, ICI, Berger, Jotun
Parapet Drain	Neer, Chilly, Camry
Polycarbonate Sheets & Panel system	Tuflite, Gallina India, Dan Pal (Dpi daylighting)
Polish for wooden work	MRF, Asian
Polysulphide Sealant	Fosroc, Dow corning, Sika, MC-bauchemie
Polyurethane Concrete Flooring, Epoxy flooring, Self Levelling compound	BASF, Fosroc, Ardex Endura, MYK Schomburg, Sika,
Polyurethane overdeck insulation foam	BASF, Pidilite, Ecmas, Lloyd Insulations
Polyster Powder coating/ PVDF Coating	Jotun, Akzo nobel (Interpon), Valspar, Asian PPG
Precast panels for Façade	Fuji -Silvertch, Elematic, Preca
Precast concrete tiles, Interlocking Paving, Brick paver, Grass/ Grid Pavers	Vyara, Basant betons, Super Decorative floorings, Ultra Tiles, Unistone, Nimco

Material / Item	Approved Make
Pre cast Concrete Landscape elements, gratings, kerb, Drain cover	Vyara, Basant betons, Super decorative floorings, KK Manholes & Gratings, Nimco
Precoated Galvanised Sheets	Tata-Blue scope, Jindal, Everest, Interarch
PT strands	DP Wires, Tata, Usha Martin
PVB/ SGP Laminate Film, Sentry film	Dupont, Saflex, Eastman , Saint Gobain, XDS
PVC continuous fillet for periphery Packing of Glazings/ Curtain Wall	Roop, Anand, Forex Plastic or approved equivalent
PVC trims	Sanjay Polymer, Tubes & Tubings
Patch Fitting	Dorma (XLC), Haffle, Geze, Hettich, Kinlong
PAINT - Cement Based	ICI Dulux, Berger Paints, Asian, Nerolac
Paint - Texture Paints (Interior, Exterior)	Asian, Jotun, ICI Dulux, Berger,
Paint - Oil Bound Distemper & Dry Distemper	Asian Paints, AkzoNobel (ICI Dulux), Berger,
Polycarbonate Sheets & Panel system	Tuflite, Gallina India, Dan Pal (Dpi daylighting),
Polysulphide Sealant	Fosroc, Dow corning, Sika, MC-bauchemie
Polyurethane Concrete Flooring, Epoxy flooring, Self Levelling compound	BASF, Fosroc, Ardex Endura, MYK Schomburg, Sika,
Precast panels for Façade	Fuji -Silvertch, Elematic, preca
Precast concrete tiles, Interlocking Paving, Brick paver, Grass/ Grid Pavers	Vyara, Basant betons, Super Decorative floorings, Ultra Tiles, Unistone, Nimco
Pre cast Concrete Landscape elements, gratings, kerb, Drain cover	Vyara, Basant betons, Super Decorative floorings, KK Manholes & Gratings, Nimco
Plain gypsum plaster board	Gyproc, USG Boral, Knauf Gypsum.
Perforated gypsum plaster board	Gyproc, Knauf Danoline, Anutone
Perforated veneered wooden panels	Hillpoint , Anutone , Topakustik
Polyester wool	Anutone, Hillpoint, Prominent Insulations
Reinforcement Steel: Main Producers	SAIL, TATA (TISCO), RINL
Rock wool Insulation	UP Twiga, Rockwool India, Lloyd, Ecophone, Knauf,
Retro Plate System (Concrete Floor Precessing)	JBA, Impact flooring or approved equivalent
Reinforcement Steel	SAIL, TATA (TISCO), RINL,
Signage vinyl sticker	Claude Neon, Prolite 3M
Silicon Gaskets	Sree Gaurav, Roop
Silicone Sealant	Wacker, Dow Corning, GE momentive, MC-bauchemie, Pidilite
Spider Fittings/ WCP profiles	Dorma, Hefele, Hettich, Dline, Geze
Stainless Steel	SAIL, Jindal, Salem steel
Stainless Steel Bolts, Washers and Nuts, Pressure plates, screws	Kundan, Puja, Atu, GKW, knettlefoldl
Stainless Steel Friction Stay	Giesse, Securistyle, Cotswold, Hefele
Structural Silicon sealant, Weather Silicone	Dow Corning, Momentive (GE)
Structure Steel & Hallow Section Producers only	SAIL, TATA (TISCO), RINL, Jindal steel & Power (JSPL) or approved equivalent for non-structural work
Suspended ceiling system	Armstrong, Saint Gobain, USG Boral, Knauf, Anuton

Material / Item	Approved Make
Swimming pool tile (FINA approved)	Johnson Endura or approved equivalent
Stainless Steel	SAI, Jindal, Salem steel
Soft fibre tile with T grids	Anutone, Hillpoint, AMF, Armstrong, Ecophon
Tandur stone	Bhikshu Granimart LLP, Arihant Marbles, Natural Marble, Patel granite and marbles
Tensile Fabric Roofing	Ferrari, Saint Gobain, Melher
Tactile Guiding & Warning flooring	Johnson, Pelican ceramics, Maiara technologies
Tensile Fabric Roofing	Ferrari, Saint Gobain, Mehler,
Tiles/ Stone Adhesive	Pidilite, MYK- Latricrete, Ardex Endura, KeraKoll, Ultratech
Veneer - Natural	GreenLam, Century, Kitply
Vitrified Tiles	Kajaria, RAK, Jhonson, Nitco or approved equivalent
Vitrified Tiles	Kajaria, RAK, Restile, Somany, Jhonson, Asian, Nitco
Veneered plywood	Hillpoint, Greenply, Anchorply
Veneered wooden slats	Hillpoint , Anutone, Topakustik Tranquil
White cement based putty	Birla, JK
Water Proofing compound	Fosroc, Sika, BASF,
Water proofing membrane/ coating (PU/ Elastomeric cementitious coating)	SIKA, BASF, Fosroc, Pidilite, Sunanda Chemicals, MYK Schomburg
Water Stops - Hydrophilic Swellable rubber strip	Sika, BASF, Fosroc, Hydrotile, Penetron
Wood Wool board	Anutone, Armstrong, AMF, Himalaya Acoustic
Wooden Ceilings/ Wall panelling	Anutone, Armstrong
Wooden flooring - Engineered	Armstrong, Pergo, Mikasa, Junkers, Haro, Tarkett,
Wool Pile with Silent Film	Schlegel or approved equivalent
White cement based putty	Birla, JK,
Water Proofing compound	Fosroc, Sika, BASF,
Water proofing membrane/ coating (Poly urethane/ Poly Urea/ Elastomeric cementitious coating)	SIKA, BASF, Fosroc, Pidilite, Sunanda Chemicals, MYK Schomburg
Water Stops - Hydrophilic Swellable rubber strip	Sika, BASF, Fosroc, Hydrotile, Penetron
Wired Glass	From Locally approved glass manufacturer
KITCHEN EQUIPMENTS	
Citrus Juicer	CHOWDHARY, LINCON, LCJ
Hardcore Juicer	CHOWDHARY, LINCON, LJA
Insect Killer	TECHNOCRAT
Microwave Oven	LG, IFB, Samsung
Paper Roll Holder (Wall Mounted Stand)	KIMBERLY CLARKE, EURONICS INDUSTRIES
Soap Dispenser	KIMBERLY CLARKE, EURONICS INDUSTRIES
Sink Cock	Jaquare, Hindware, Cera
Weighing Scale (Floor Model)	ACZET PRIVATE LIMITED, WENSAR SCALES, PFB
Water Geyser	RACOLD, AO Smit, Jaquar
WALK IN CHILLER	CELFROST, BLUE STAR

Material / Item	Approved Make
White Board	Alko sign
Waste Bin	Nilkamal, Supreme, Sintex
Sink Unit	Nirali, Jayna, Hindware, Dimond or CUSTOM FABRICATED
Water Cooler (Bubble Bottel)	BLUE STAR
Kitchen Equipments	Ravish Engineers, Agromech industries, Crystal kitchen equipments, Nand Kitchen mart
Chapati making machine	K. M. Enterprises, JM KC Industrial, solutions, Jackson machine
Walk in cold storage	Blue trix, Blue star, Shree ram Engineers, Synergy Technologies
PLUMBING WORKS	
Sanitary Ware, CP Fittings & Washroom Accessories	
Vitreous China Sanitary ware	
European Water Closet (Type 1/ 2)	Hindware / TOTO / Kohler
European Water Closet (Type 3)	Cera / TOTO / Kohler
Indian Water Closet (Orissa Pan)	Cera / TOTO / Kohler
Concealed Cisterns	
Concealed Cistern – Type 1	Hindware / TOTO / Kohler
Concealed Cistern – Type 2	Cera / TOTO / Kohler
Wash Basin	
Under Counter White Vitreous China Wash Basin – Type 1	Hindware / TOTO / Kohler
Under Counter White Vitreous China Wash Basin – Type 2	Cera / TOTO / Kohler
Laboratory Sink	
White Vitreous China Laboratory Sink	Cera / TOTO / Kohler
Divyang Toilet Set	
Divyang Toilet Set – Type 1	Hindware / TOTO / Kohler
Divyang Toilet Set – Type 2	Cera / TOTO / Kohler
White Enamelled Acrylic Bath Tub Set	Hindware – Tiffany / TOTO / Kohler
Urinals	
White Vitreous China Urinal – Type 1	Hindware / TOTO / Kohler
White Vitreous China Urinal – Type 2	Cera / TOTO / Kohler
Ceramic Soap Dish	
White Vitreous China Recessed Type Ceramic Soap Dish	Cera / Parryware
C.P. Brass Faucets & Fittings	
C.P. Brass Faucets	Jaquar / Hindware / Kohler
C.P. Brass Fittings	Jaquar / Hindware / Kohler
Wash room accessories	Jaquar / Euronics / Kohler
Stainless Steel Ware, Fittings & Accessories	
Stainless Steel Sink	Nirali / Neelkanth / Futura
Stainless Steel Shower Seat	Euronics / Jaquar

Material / Item	Approved Make
Emergency Eye Wash & Shower	Udyogi / Vijay / Prajesh Impex
S.S. Floor Drain Grating Cover	Chilly / Neer / Futura/Camary
Internal Drainage Pipes & Fittings	
UPVC SWR Pipes & Fittings (Ring Fit & Self Fit)	Astral / Supreme / Ashirvad
P.P. Pipes & Fittings	Astral Silencio / Huliot / Poloplast / Rehau
Brass Floor Clean Out	Chilly / Camry / Neer
Air Admittance Valve	Ashirvad / Astral / Supreme
G.I. Perforated Strip	NECO / Kapilansh / Saint Gobain
G.I. Rubber Coated U-Clamps	Ashirvad / Astral / Supreme
G.I. Rubber Coated O-Clamps	Astral / Chilly / Intellotech
G.I. Threaded Rods	Hitech / Tata
C.I. Parapet Drain	Neer/GMGR/ACO
Water Supply Pipes & Fittings	
CPVC Water Supply Pipes	Astral / Supreme / Ashirvad
G.I. Pipes	Tata / Zenith / Jindal
HDPE Pipes	Jain Irrigation / Supreme / Oriplast
D.I. Pipes	Neco / Welspun
Pipe Insulation	Armaflex / Thermaflex
CPVC Ball Valve	Ashirvad / Astral / Supreme
Pressure Reducing Valves	Zoloto / Sant / Varie
Gun Metal Ball Valve	Zoloto / Sant / Leader
Gun Metal Wheel Operated Sluice Valve	Zoloto / Sant/ Leader
Gun Metal Gate Valve	Zoloto / Sant/ Leader
Gun Metal Butterfly Valve	Zoloto / Sant / Leader
Gun Metal Non-Return Valve	Zoloto / Sant/ Leader
Electrically Operated Actuator Valves	Zoloto / Sant / Equivalent
Cast Iron Y Strainer	Zoloto / Sant/ Leader
Electronic Water Meter	Krohne / Dwyer
Air Release Valve	Zoloto / Sant/ Leader
Pressure Gauge	Zoloto / Sant / Equivalent
Water Level Sensor / Indicator	Honeywell / Wika / Seimens
Pipe Clamps and Support	Intellotech / Fischer / Hitech / Hilti
Water Tank Air Vent with Mosquito Net	

2. Electrical system

Material/ Equipment	Approved Make
ACB	ABB, Schneider, Siemens, L&T, Legrand
Battery Charger	Max. Power , CALDYNE, VOLSTAT, HBL
Batton Holder, Angle Holder Ceiling Rose	Anchor , CPL, Havells
Cable Gland	Comet , Dowell's, Jainson, HMI,

Cable Lugs	Comet, Dowell's (Biller India) , Jainson , 3D
Cable Trays	OBO ,Indiana, Legrand, Profab Engineers
Ceiling Fan	Crompton, Usha , Orient, Bajaj
Control Cable(ISI Approved)	Finolex, RR Kabel, Havells, Polycab, Lapp India
Copper Conductor PVC Insulated Wires/ Stranded Flexible Wires (FRLS)	Finolex, RR Kabel, HAVELLS, POLYCAB, Lapp India
Current Transformer (Cast Resin Epoxy Coated)	Automatic Electric, Gilbert & Maxwell, Kappa, Pragati,
Cable Management System (Wire Trunking) Raceway	OBO, Legrand , MK
Distribution Boards (MCB DBs)	Legrand,Schneider, Hager, L&T,Indo Asian
Electronic Digital Meter (A/V/PF/HZ/KWH) , with LED Display.	Schneider (Conserv), Rishabh, Secure , Elmeasure
Fan Box	Cast Iron Type Only
HRC Fuse and Fuse Fitting	ABB, GE, Siemens, L&T, , Schneider
Indicating Lamps	L&T, Siemens, Schneider , ABB , RASS control
LED Lamp	Cree, Osram, Nichia, Philips.
Light Fixtures (Internal)	Philips, Wipro, Regent, Crompton, Halomax, Ligman, Havells, Alurays, P.U.K, Grok, LED LINEAR, ENDO, keselec schereder, K-lite
Light Fixtures (External)	Philips, Wipro, Regent, Crompton, Ligman, Havells, Alurays, P.U.K, Reiz, LED LINEAR, ENDO, keselec schereder, K-lite
Lighting Control	Lutron, Schneider, Crestron , ABB, Philips
Lightning Protection System	Dehn, OBO, ABB,
MCB/RCCB / SPD/RCBO	Legrand,Schneider, Hager, L&T, Indo Asian
MCCB	ABB, Schneider, Siemens, L&T, Legrand
Metal Clad Plug & Socket (Industrial)	Legrand, Schneider, Neptune, Mennekes, RR PCE,
Modular Switches with accesories, Socket Outlets And Wiring Accessories With Moulded Cover Plate.	Schneider(Opale), Legrand(Artier)s MK (Blenz), Havells (Athena Plus)
MS Black Stove Enameled ERW Conduits(ISI Approved)	AKG, BEC, Steelkraft
Ready made pole	Bajaj, Philips, Schreder, Crompton,
Fabricated pole	As per BOQ description
Power Distribution Panels (TTA) Totally Type Tested (As per IEC- 61439 - 1 & 2)	Simens , Schnieder, ABB , L&T , Legrand (Approved OEM Vendors only)
Power Distribution Panels (Non -TTA)	(Project specific Authorized / Approved OEM Vendors only)
Potential Transformer	Automatic Electric, Rishabh, Kappa, Pragati ,
Push Buttons	ABB, L&T, Schneider , Rishabh

PVC Conduit (FRLS) & Accessories(ISI Approved)	Precison ,BEC, Nihir , AKG
Power cables 1100V grade	Universal, Finolex, Polycab, KEI, Havells, Gloster
PVC Tape	Anchor, Steelgrip,
Sandwiched Type Bus Duct/Rising mains	Schneider, Legrand, IIGM-EAE, L&T (Zuchini) , C&S , Henikwon
Sealed Maintenance Free Batteries	Exide, HBL, Amar Raja, Hitachi , Global
Selector Switches (ASS/VSS)	Kaycee, ABB, Siemens,Schneider, L&T, Salzer
Sensor(Occupancy Sensor)	Honeywell, Wipro, Hager, Philips, Theben
Terminal Block	Wago, Jainson,Elmex,Connectwell
Themoplastic Boxes	Hensel, Splesberg, OBO
Timers	Schneider, Siemens,L&T, ABB , Theben, Legrand
UPS	Emerson, Schneider (APC) ,Numeric, Socomec , Eaton, GE
Elevator	Kone, Schindler , Mitsubishi
Exhaust (Fan Heavy duty)	Crompton, Khaitan , Havells, Orient
HT/ LT Jointing Kit & Termination Kits	Birla-3M, Raychem, Safe Kit M seal
VCB : 11 KV & HT Panels	ABB , Siemens, Schneider Electric ,L&T
Diesel Engine	Cummins, Caterpillar, MTU, Perkins
Alternators 11 KV, F grade	AVK (Stamford) Leroy Somer Catterpillare
Anti Vibration Mountings	Gerb Resistoflex Dunlop
Motors	ABB Crompton Siemens
Flexible Coupling	Resistoflex Kanwal
Residential Silencer	Same as Engine make
Semi Rotary type hand fuel filling pump	Rotodel Kitty Binks
Hybrid Capacitor Panels	P2 Power Solutions Schneider EPCOS
Master Plan & Parking & Plaza Light Fixtures	Bollard Lighting Preferred make Wipro - LP05-711-XXX-65XX of WIPRO Alternative make PHILIPS Street Lighting Preferred make Wipro - 71w LED - LR-02-781-XXX-57-XX of WIPRO Alternative make PHILIPS Pedestrain Lighting Preferred make Wipro - 25w LED - LR-02-261-XXX-57-XXof WIPRO Alternative make PHILIPS
Light Fixtures KC building	Table lamp light/desk light Preferred make Grok 3x9 W LED equivalent LEDS-C4
Power & Distribution Transformer	Voltamp, crompton greaves, kirloskar, bharat bijlee, EMCO

HT Cables		Universal, RPS, Polycab, KEI
		HSD
A	FUEL STORAGE TANK & AUXILIARIES	
1	Fuel Tank	Fabricated
2	Rotary Gears Pumps	Rotodel / Tushaco/ Kirloskar
3	Carbon Steel Ball valves (Flanged / Screwed ends)	Emerald/ Honeywell/ zoloto/ Sant
4	Cast Steel Check Valves (Swing type)	Castle/ Oventrop/ Advance/ Honeywell
5	Forged Steel Check Valves (Lift type)	Audco / KSB / Honeywell
6	CI/CS Y-type Strainer	Emerald/ Honeywell/ zoloto/ SM/ Sandhu
7	Petroleum Hose for Decanting	Jyoti / Padmini
8	Pipes – MS	Tata / Jindal Hissar/ SAIL
B	INSTRUMENTATIONS AND CONTROLS	
9	Pressure gauge	Feibig/ H. Guru/ Emerald
10	Fuel Oil meter	Kent /Contoil / Crown / Toshniwal
C	MISC. ITEMS	
11	Steel Flanges	Fabricated, Machined conforming to ASA-150/BS-10 Table F
12	Forged fittings (screwed / socket welded)	Metal Forge India / Unisteel
13	Butt welded seamless fittings	GIP / Neo Impex / SP
14	Welding rods	Advani (Single S /Double SS cord) / Essab
15	Insertion / Gasket 3 mm thick	Jyoti (100% Neoprene) / Fire Fly (Compressed Asbestoss)
16	Structural Steel	TATA / SAIL/ Jindal Hissar
17	Paints	ICI / Asian / Nerolac / Berger
D	ELECTRICALS	Make same as in electrical system

3. ELV SYSTEM

Material/ Equipment	Approved Makes
2 X 1.5 Sq. Mm. FRLS flexible wire/ armoured cable for Fire Detection & Alarm and PA system	FINOLEX, HAVELL'S, POLYCAB ,R.R. KABLE
F/UTP CAT6A Cabling System – Cables, IO, Patch Panels and other components	COMMSCOPE -SYSTIMAX, BELDEN, PANDUIT-PANNET, R & M
Communication Cables / Signal Cable	COMMSCOPE -SYSTIMAX, BELDEN, FINOLEX, FUSION, POLYMER
UTP CAT6 Cables (for IBMS System)	COMMSCOPE -SYSTIMAX, BELDEN, PANDUIT-PANNET, R & M
Networking Switches for IBMS System	Cisco, HP, JUNIPER

Material/ Equipment	Approved Makes
Fiber Optics Cables & Components (Data & Voice/Telecom, Single Mode – Cables, LIUs, Shelves, Pigtails, Patch-cords, Connectors, Adapters, Cassettes, Couplers, Splices/Splice closure Kit / Splice trays – Indoor / Outdoor Fiber Cabling Infrastructure	COMMSCOPE -SYSTIMAX , BELDEN, PANDUIT-PANNET, R & M
Networking Racks, Data Centre racks, Distribution Racks – from sizes 15U to 42U	APW-VERO PRESIDENT, NETRACK, PANDUIT, RITTAL
Addressable Fire Alarm System (UL/CE/FM, EN/Vds Listed)	BOSCH, EDWARD, ESSAR, MIRCOM, NOTIFIER, SIEMENS
Public Address System	ATEIS, BOSCH, HONEYWELL, TOA
IBMS Server	DELL, HP, LENOVO
IBMS Workstation/Client PC/LED Monitor	DELL, HP, LENOVO
A3 Size Laser color Printer	CANON, EPSON, HP
IBMS Software Suite	HONEYWELL-TREND, JOHNSON CONTROLS, SCHNEIDER, SIEMENS, TRANE
Standalone 32 bit BacNet Based DDCs & Modbus/ BacNet Integrators, Gateways, Routers, Network area controller	HONEYWELL-TREND, JOHNSON CONTROLS, SCHNEIDER, SIEMENS, TRANE
DDC Panel (Enclosure)	BHARTIYA CUTLER HAMMER, RITTAL, SCHNEIDER ELECTRIC
DP Sensor – Water	DWYER, HONEYWELL, HUBA CONTROL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
DP Switch – Air	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS
DP Switch - Water	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Duct / Room Humidity Sensor	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Duct / Room Temperature Sensor	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Duct Static Pressure sensor – Air	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Immersion Temperature Sensor	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Outside Air Temperature Sensor	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Pressure Sensor – Water	DWYER, HONEYWELL, HUBA CONTROL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Terminals/Lugs	PHOENIX, WAGO

Material/ Equipment	Approved Makes
Water Flow Switch	DWYER, HONEYWELL, JOHNSON CONTROLS, OMICRON, SCHNEIDER, SIEMENS, TRANE
Level Switch/Flameproof Level Switch	BANNER, GENERAL INSTRUMENTS CONSORTIUM, LEVCON INSTRUMENTS PVT. LTD.,MAGNETROL INDUSTRIAL INC., NIVELCO, OMICRON

4. HVAC System

Material/ Equipment	Approved Make
'TF' Quality expanded polystyrene	Beardsell/ Styrene/ Toshiba
2-way/ 3-way Modulating Valves and Thermostat	Johnson Controls/ Siemens/ Honeywell/ Danfoss/ Belimo
Air handling Units /treated fresh air units	Zeco/ Edgetech/ VTS/ Systemair/ Citizen
Air Washer / Scrubber	Zeco/ Edgetech/ Systemair/ Citizen
Radiant cooling system	GIACOMINI /REHAU / OVENTROP
Dehumidifier	Bryair
BTU Meter	FORBES MARSHAL, HONEYWELL, KAMSTRUP, OMICRON, SIEMENS, SHINETECH
Al. Sheets	Hindalco/ Balco/ Nalco
Aluminum tape	Johnson/Birla 3M
Anchor/Fastener	Hilti/Fisher/ Rawl Plug
Auto Air Vent	Anergy/ Rapid Cool/ SKS/ SANT/ Honeywell
Balancing Valves	Advance /Honeywell/ Danfoss/ Castle
Ball Valves set with & without Y strainer For FCU	Honeywell/ Emerald/ Zoloto/ Sant Industries
Butterfly Valves & Ball Valve	Audco/ Oventrop/ Advance/ Honeywell/Zoloto
Cabinet Fans	Zeco/ Edgetech/ Systemair/ Citizen
Centrifugal Fans for ventilation/ AHUs/ Air washer/ Scrubber	Kruger/ Nicotra/ Comefri/ Green heck
Check Valves	Advance/ Honeywell/ Oventrop/Castle/ Emerald
Closed Cell Nitrile rubber insulation/ EPDM insulation	Armacell / K- Flex/ A-Flex
Differential Pressure Switch (Water)	Johnson/ Staefa/ Honeywell/ Huba
Expansion Bellows/ Pipe Supports/ Vibration Isolators/ Duct Flexile Connections	Resistoflex/ Kanwal (Easyflex)/ Cori
Fan coil Units	Zeco/ Edgetech/ VTS/ Systemair/ Citizen
Filters (Pre, Fine, Hepa)	Spectrum/ AAF/ Camfil/ Thermadyne
Flexible Duct	Twiga/ Atco/ Kimmco
Fibre Glass Insulation	Owens corning/U.P.Twig
Flow switch	Rapid cool/ Siemens/ Anergy
FRP Material	Reichhold/ Equivalent

Material/ Equipment	Approved Make
G.I. Pipes	Sail/ Tata/ Jindal
G.I. Sheets	Sail/ Tata/ Jindal
Grills/ Diffusers/ Fire Dampers/ Louvers/ Volume Control Dampers/ Back Draft Dampers/ Sound attenuator	Systemair/ Titus/ Brightflow/ Caryaire/ Tristar/ Cosmos/Trox
GSS Factory Fabricated Ducts/ Duct Flanges	Rolastar/ Zeco/ Ductofab/ Ecoduct/ Dustech
Inline Fans	Kruger/ Green heck/ Air flow/ Caryaire/ Systemair/ Maico
M.S. Pipes	Tata/ Jindal Hissar / Sail
M.S. Sheets	Sail/ Tata/ Jindal
Motorized Actuator For Valves & Damper	Belimo/ Honeywell/ Siemens/ Johnson Controls
Motorized Butterfly valves	Johnson Controls/ Oventrop/ Belimo/ Siemens
Motors	ABB/ Siemens/ CGL/ BBL
PIBC Valves	Danfoss/ Oventrop/ Siemens/ TA
Plug Fans	Ziehlabegg/ Kruger/ Nicotra
Pot/Y-Strainers	SM/ Sandhu/ Emerald/ Zoloto/ Honeywell
PPGL sheets for Ducts	JSW/ Shreya Polymers/ Malur Tube/ HV metal Arc
PPGL Ducts Manufacturer	Corrosion Control equipment/ Sagar Plastic/ Ppi projects/ Citizen
Pressure Gauge	Feibig/ H. Guru/ Emerald
Pressure Relief Dampers	Trox/ Titus/ Systemair
Propeller Fans	Kruger/ Green heck/ Air flow/ Caryaire/ Systemair/ Maico
Puff pipe support	Malanpur/ lloyd/ Beardsell
PVC Eliminators	Munterz/ BKB extrusions
PVC Pipes	Finolex/ Prince/ Supreme/ KML Classic
Refrigerant Piping	Mandev/ Rajco/ Indigo/ RR Shramik
Rock Wool insulation	Roxul-Rockwool/ Rockwool india/ Lloyd
Spiral Round/ Oval ducts	GP Spira/ Dustech/ Ductofab
DX Split	Carrier/ Daikin/ Hitachi / Toshiba/LG/Blue star
VRF	Toshiba/Daikin/ LG/Samsung/ Mitsubishi Electric
Star bond/Lag Protective Coating	Paramount polytreat/ Pidilite
Thermometers	Feibig/ H. Guru/ Emerald
Tube Axial flow Fans	Kruger/ Green heck/ Air flow/ Nicotra/ Systemair/ Maico
Air curtain	Euronics/ Cosyst/ Systemair/Russel Airflow/ Dyna
Vane Axial flow Fans	Kruger/ Green heck/ Air flow/ Nicotra/ Systemair/ Maico
Variable frequency drive	ABB/ ALLEN BRADLEY/ DANFOSS/ Siemens
VAV Boxes	Trox/ Trane/ Johnson Controls
Water Pumps	Armstrong/ Xylem/ Grundfos
Welding Rods	Advani/ L&T/ ESAB
HVLS Fans	Nutech/ Ecoair/ RREL
Chilled water Hi wall	Bhutoria/ Cruise/ GE Tech/ Daikin
Electrostatic precipitator for Scrubber	Trion/ Rydair

Material/ Equipment	Approved Make
Note:-All electrical items makes to be considered from electrical list of makes	

5. Fire fighting system


Material/ Equipment	Approved Make
Air Vessel	Fabricated
Batteries	AMCO / Amar Raja / Exide
Sluice Valve	Audco / Leader / Sant / Zoloto
Branch pipe & Coupling	Minimax / Newage / Swati / Safex / SBJ / Winco
Fire Pumps	Grundfos / Mather & Platt - Wilo / Xylem
Coating wrapping material for underground pipe	IWL / STP / Tikidan
Diesel Engine	Caterpillar / Greaves / KOEL / Cummins
Fire Alarm Valve	HD / Newage / Tyco / Viking
Fire Bridged Inlet Connection	Minimax / Newage / Safex / Shah Bhogilal Jethalal
Fire Extinguishers	Cease Fire / Minimax / Safex
Flow Switch	Honeywell / Potter / Switzer / Danfoss / Newage
Ball Valve	Leader / Sant / Zoloto
Hydrant Valve	Minimax / Newage / Safex / Shah Bhogilal Jethalal
Hose Pipe	Minimax / Newage / Safex / Shah Bhogilal Jethalal
Hose Reel	Minimax / Newage / Safex / Shah Bhogilal Jethalal
Hose Box	Minimax / Newage / Safex / Shah Bhogilal Jethalal
Sprinklers & Flexible Hose	HD / Viking / Tyco / Newage







6. MECHANICAL WORKS




Material/ Equipment	Approved Make
Electro-mechanical Equipments & Plants	
Pumps	
Motors	Xylem / Grundfos / Wilo
Hydro Pneumatic System	Xylem / Grundfos / Wilo
Submersible Pumps	Xylem / Grundfos / Wilo
De watering Pump for Rain water	Xylem / Grundfos / Wilo
Mud pump for Drainage	Xylem / Grundfos / Wilo
Drinking Water Equipments	
Domestic RO system	Aquila / Kent / Eureka Forbes
Water Cooler	Blue Star/ Voltas/ Usha
Drinking Water Combined System of Cooler with R.O. Plant	Blue Star/ Oasis/ Voltas/ Aquatek
Hot Water Equipments	
Electric Geyser	A O Smith / Racold / Jaquar

Heat Pump H.W.S.	A O Smith / Daikin / Racold/BOSCH
Solar HWG	Racold / BOSCH/EMMVEE
Thermostat	Honeywell / Zoloto / Sant
Temperature Gauges	Honeywell / Zoloto / Sant
Hand drier	Jaquar / Euronics/Kohler




ANNEXURE –I: SANITARY WARES & CP FITTINGS





Sr No	Type of Fixture	Image/Picture
1	Type-3 - EWC CERA - Carat or approved equivalent with Seat Cover, Nuts, Bolts, and Gasket	
2	Squatting pan Cera Orissa Pan (580 X 440) or approved equivalent with trap	
3	Type-2 -Concealed cistern CERA- Chevron B1110101, Frame for cistern CERA B1130101, Flush Plate CERA- B1120102 (SHINE) or approved equivalent	
4	Type-2- Wash basin CERA COPENHAGEN S2020132 or approved equivalent	
5	Type -2- Divyang Toilet CERA CRUSE SET or approved equivalent	
6	Type – 2-Urinal CERA CARAVAN S 4020105 or approved equivalent, Pressmatic flush valve make: Jaquar - PRS-077G or approved equivalent	
7	Soap Dish CERA - S9010106 or approved equivalent	
8	Two way bib cock Jaquar-FLR-5041NG or approved equivalent AND / OR Jaquar-FUS-CHR-29041GE or approved equivalent	





9	Pressmatic Pillar cock Jaquar-PRS-031G or approved equivalent	
10	Quarter turn pillar cock Jaquar-FLR-5021 NGE or approved equivalent	
11	Sink cock quarter turn Jaquar-FLR-5357ND or approved equivalent	
12	Sink mixer quarter turn Jaquar-FLR-5357ND or approved equivalent	
13	Sink cock- Swinging cated spout Jaquar-FLR-5347NGE or approved equivalent	
14	Single lever divertor Jaquar-FLR-CHR-5421N or approved equivalent	
15	Bath Spout Jaquar-FLR-SPJ-CHR-5429G or approved equivalent	
16	Type -2 –Overhead shower Jaquar-OHS-CHR-1989GA or approved equivalent	
17	Type-2- Shower arm Jaquar-SHA-CHR-479L450 or approved equivalent	
18	Health Faucet Jaquar-ALD-573GA or approved equivalent	
19	Double coat Hook Jaquar - Queens - AQN-7761 or approved equivalent	
20	Towel Ring Jaquar-AQN-7721 or approved equivalent	




21	Towel Rail Jaquar: ACN-1111NM or approved equivalent	
22	Towel Rack Jaquar: ACN-1181FN or approved equivalent	
23	Liquid Soap Dispenser Soap Dispenser with Metallic Bottle:Jaquar -ACN - 1137N or approved equivalent	





Annexure-2




Sr.No.	Type	Philips Catalogue No.	HAVELLS	WIPRO	Technical Specification	Image
1	Type-1	BN108C LED 40S PSU CDL WH	STOUTPLUS1200B S40WLED857SPCW H	LE10-491-XXX-57-XX	Supply of LED 4ft Batten with a nominal system lumen output of 4000 lumens and a minimum system efficacy of 105 lm/W. The luminaire shall have a rated system lifetime of 40,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with THD < 10% and PF > 0.95. The luminaire housing should made of CRCA with a PC glossy diffuser. The total power consumption should not exceed 38W (including driver).	
2	Type-2	WT201C LED40S-6500 PSU L120	MAGNUMGRAND NEOIP6636WLED85 7SPC	LE20-491-XXX-57-XX	Supply Installation testing and commissioning of Integral LED 4 ft waterproof luminaire with polycarbonate housing and PC Glossy cover. The luminaire should have a color consistency SDCM < 5, CRI > 80 and CCT of 6500K. The luminaire shall be compliant with IP65 classification. Luminaire shall be designed to emit at least 4000 nominal lumens and 40W as system wattage at a system efficacy of atleast 100 lumen/watt. The luminaire shall be designed so as to ensure lumen depreciation of up to 30% over 50k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor >0.95 and THD <10% and suitable for an operating voltage range of 140-270V AC.	
3	Type-3	BN108C LED 20S PSU CDL WH	STOUTPLUS600BS 20WLED857SPCWH	LL20-221-XXX-60-NE 1	Supply of LED 4ft Batten with a nominal system lumen output of 2000 lumens and a minimum system efficacy of 105 lm/W. The luminaire shall have a rated system lifetime of 40,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with THD < 10% and PF > 0.95. The luminaire housing should made of CRCA with a PC glossy diffuser. The total power consumption should not exceed 19W (including driver).	





4	Type-4	SM251C LED20S- 6500 PSU WH	ENDURANEOHESU RFA CEDLS18WLED857 S	LD80-171- XXX-60-SM	<p>Surface mounted LED downlight fixture - Supply of Sleek LED Surface Mounted Downlighter dimension of Ø220mm X 26 mm with a nominal system lumen output of 2000 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 30,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with PF > 0.9. The luminaire housing should made of High grade polycarbonate. The total power consumption should not exceed 18W (including driver).</p>	
5	Type-5	SM250C LED12S- 6500 PSU WH	INTEGRANEOSUR FA CEDLS15WLED857 S	LD80-101- XXX-60-SM	<p>Surface mounted LED downlight fixture - Supply of Sleek LED Surface Mounted Downlighter dimension of Ø180mm X 26 mm with a nominal system lumen output of 1200 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 30,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with PF > 0.9. The luminaire housing should made of High grade polycarbonate. The total power consumption should not exceed 12W (including driver).</p>	
6	Type-6	WT140W LED7S CW PSU S1 PC	HEXAFT10WLED85 7SSYMBOPC	CRLA11008 HP57-08	<p>Supply of 6W LED Bulhead Luminaire with 700 lumen output. Luminous Efficacy should be more than 100lm/W. IP protection should be IP65. Minimum IK protection should be IK08 .Housing made of Pressure die cast aluminium for proper heat dissipation. CRI > 80 . Operating Voltage Range 140-270 V AC.</p>	
7	Type-7	BN021 LED 10S-6500 PSU GRS1	LUMILINEPLUSBS 10WLED865SPCSS	LL20-111- XXX-60NE	<p>Supply of 10W LED 2' Batten with 1000 lumen output. Luminous Efficacy should be more than 100lm/W. CRI > 80 . Operating Voltage Range 140-270 V AC.</p>	





8	Type-8	SM250C LED7S- 6500 PSU WH	LHEAAVP7IL1W00 6	LD80-350- XXX-60-SM	Surface mounted LED downlight fixture - Supply of Sleek LED Surface Mounted Downlighter dimension of Ø180mm X 26 mm with a nominal system lumen output of 750 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 30,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with PF > 0.9. The luminaire housing should made of High grade polycarbonate. The total power consumption should not exceed 6W (including driver).	
9	Type-9	Philips Joy Vision Coral Rush-0.5W LED Bulb White	LHLDAFUEULNX0 X5	Regret	Pin type 0.5W Night Lamp	
10	Type-10	BRP409 LED CW 040 MR FG S1	JETA COMPECTOFL30W LED757TG	LR02-451- XXX-57-G1	Supply of LED based Flood light, housing made up of Pressure Die Cast Housing LM 6 Alloy/ Anti Dust Exposed Lens, sturdiness and embossed brand name/logo name of manufacturer. The fixture should have a minimum system efficacy of 100 lumen/Watt and a minimum system lumen output of 4000 lumens and maximum system wattage of 40 Watts. The fixture shall have a CRI of minimum 70. The fixture shall be designed for a system life of 50,000 hours @70% lumen maintenance. Ingress Protection of IP66 (lamp and gear Compartment) and Mechanical Impact Resistance Rating of IK >=05. The fixture driver should have an operating voltage range of 140-270 V, surge protection of >=3KV, PF >0.9, THD<20% and SDCM<5. The driver should be BIS approved, fully potted and encapsulated	 GreenLine V2
11	Type-11	BGP161 LED2500/NW PSU 220-240V 7043 IN	ENDURASPRING6P T35WLED757PSYM TOTG	LP06-351- XXX-57-XX	Supply of LED Post Top with a system lumen output of 2500 lumens and a minimum system efficacy of >90 lm/W. The luminaire shall have a rated system lifetime of 25,000 burning hours at L70. The luminaire should have a color temperature of 4000K and CRI > 70. The luminaire shall meet IP65 with THD < 20% and PF > 0.9. The luminaire shall have closed diffused optics with polycarbonate diffuser board. The total power consumption should not exceed 27W (including driver).	


12	Type-12	RC380B LED36S -6500 G4 L60 W60 PSU OD	VENUSNEOHE2X2 PLR18- 42WLED857MOD (28 w)	CRCO10R03 0HP57HE	<p>Supply of LED 2x2 luminaire with CRCA housing suitable with fully diffused diffuser for general lighting in office areas. The luminaire should have a color consistency SDCM < 5, CRI > 80 and CCT of both 4000K / 6500K. The luminaire shall be compliant with IP20 and IK02 classification. Luminaire shall be designed to emit at least 3600 nominal lumens and an outstanding backlit solution efficacy of atleast 120 lumen/watt and maximum system wattage of 31 Watts. The luminaire should have outstanding backlit solution efficacy. The luminaire shall be designed so as to ensure lumen depreciation of up to 30% over 50k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor >0.95 and THD <10% and have options for DALI dimmable too. The fixture should comply with the parameters as per IS10322.</p>	
13	Type-13	DN 391B LED6S-6500 PSU WH	ORBITDLR5WLED 857S	CRDL11R008 HP57	<p>Supply of LED Recessed Downlighter with a nominal system lumen output of 600 lumens and a minimum system efficacy of 100 lm/W . The luminaire should have a color temperature of 6500K and CRI>70. The luminaire shall meet IP20 rating with THD<10% and PF > 0.9. The luminaire housing should be made of pressure die cast aluminium with a high efficiency diffuser. The total power consumption should not exceed 6.5W (including driver).</p>	
14	Type-14	DN 393B LED12S-6500 PSD WH	INTEGRANEODLR 12WLED857S	CRDL11R017 HP57	<p>Supply of DALI Dimmable LED Recessed Downlighter with a nominal system lumen output of 1300 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 50,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with THD<10% and PF > 0.9. The luminaire housing should be made of pressure die cast aluminium and the luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. The total power consumption should not exceed 13W (including driver).</p>	

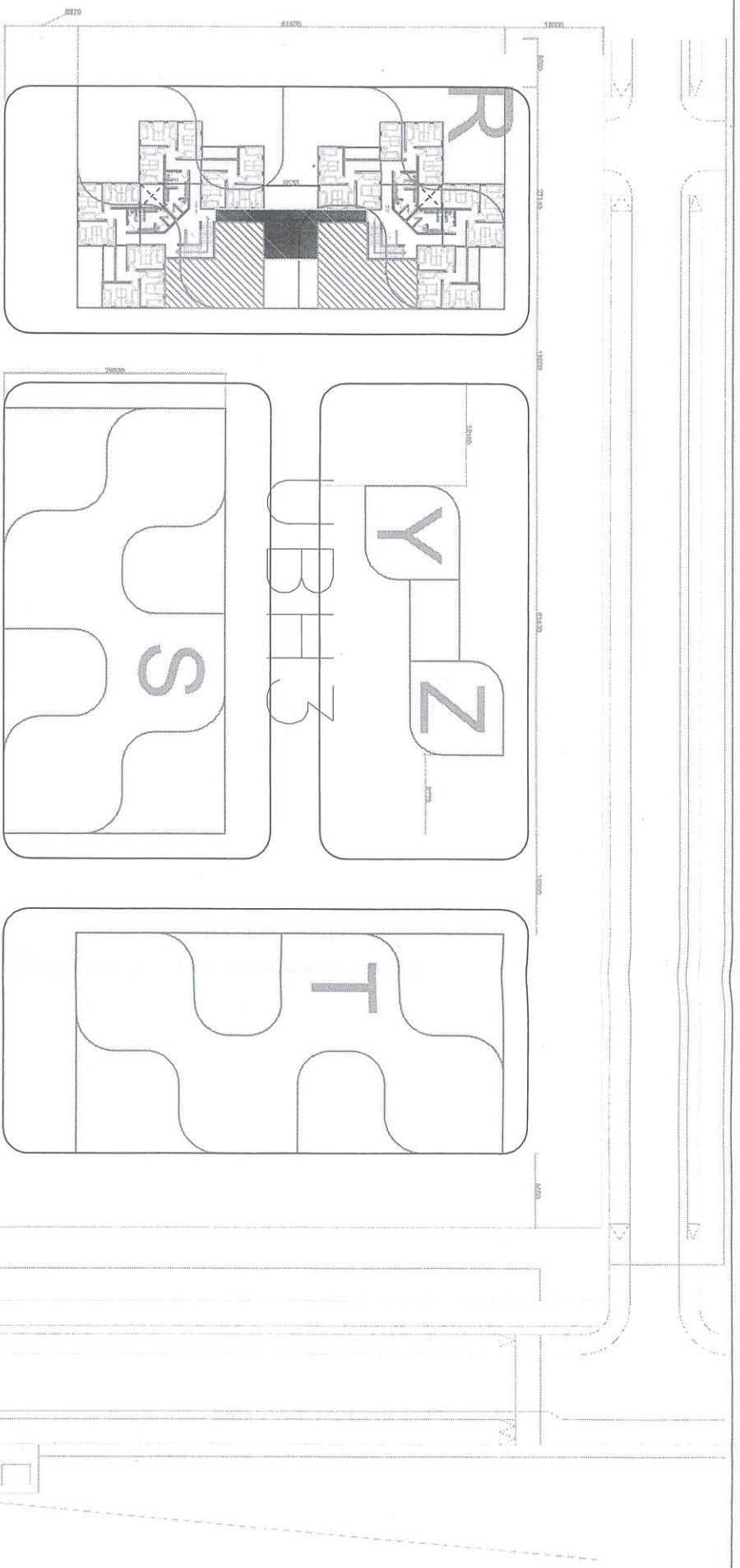
15	Type-15	DN194B LED15S-6500 PSU WH S1	INTEGRANEODLR 15WLED857S	LD91-201- XXX-65-XX	Supply of LED Recessed Downlighter with a nominal system lumen output of 1500 lumens and a minimum system efficacy of 100 lm/W. . The luminaire should have a color temperature of 6500K and CRI>70. The luminaire shall meet IP20 rating with THD<10% and PF > 0.9. The luminaire housing should made of pressure die cast aluminium with a high efficiency diffuser. The total power consumption should not exceed 15W (including driver).	
16	Type-16	DN195B LED20S-6500 PSU WH S1	INTEGRANEODLR 18WLED857S	CRDL11R023 HP57	Supply of LED Recessed Downlighter with a nominal system lumen output of 2200 lumens and a minimum system efficacy of 100 lm/W. . The luminaire should have a color temperature of 6500K and CRI>70. The luminaire shall meet IP20 rating with THD<10% and PF > 0.9. The luminaire housing should made of pressure die cast aluminium with a high efficiency diffuser. The total power consumption should not exceed 18W (including driver).	
17	Type-17	LRM1071 - PIR Based Occupancy Sensor	Regret	CRPS10R010 A	PIR Based Occupancy Sensor	
18	Type-18	RC380B LED30S -6500 G4 L60 W60 PSU OD	VENUSNEOHE2X2 PLR18- 42WLED857MOD (24w)	CRCO10R03 0HP40HE	Supply of LED 2x2 luminaire with CRCA housing suitable with fully diffused diffuser for general lighting in office areas. The luminaire should have a color consistency SDCM < 5, CRI > 80 and CCT of both 4000K / 6500K. The luminaire shall be compliant with IP20 and IK02 classification. Luminaire shall be designed to emit at least 3000 nominal lumens and an outstanding backlit solution efficacy of atleast 120 lumen/watt and maximum system wattage of 25 Watts. The luminaire should have outstanding backlit solution efficacy. The luminaire shall be designed so as to ensure lumen depreciation of up to 30% over 50k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor >0.95 and THD <10% and have options for DALI dimmable too. he fixture should comply with the parameters as per IS10322.	

19	Type-19	DN 395B LED 20S-6500 PSD WH	INTEGRANEODLR 24WLED857S	CRDL11R033 HP56 26 W	Supply of DALI Dimmable LED Recessed Downlighter with a nominal system lumen output of 2200 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 50,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 rating with THD<10% and PF > 0.9. The luminaire housing should made of pressure die cast aluminium and the luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. The total power consumption should not exceed 22W (including driver).	
20	Type-20	SM270C LED 30S 6500 PSU WH	PLUTONEO4X1PLR 30WLED857S	CRCO13S038 HP57G1 31 W	Supply of Surface Mounted 4ft. Luminaire with a nominal system lumen output of 3000 W and a minimum system efficacy of 90 lm/W. The luminaire shall have a rated system lifetime of 50000 burning hours @L70. The luminaire shall have a color temperature of 6500K and CRI>80,. The luminaire should meet IP 20 Rating with THD<20% and PF>0.9. The Total Power consumption should not exceed 32W (including Driver).	
21	Type-21	BRP409 LED 062 CW HE MR PC	ENDURAPEARLPL USSL60WLED757S ASYTOPC	LR02-671- XXX-57-XX 60 W	Supply of LED based Flood light, housing made up of Pressure Die Cast Housing LM 6 Alloy/ Anti Dust Exposed Lens, sturdiness and embossed brand name/logo name of manufacturer. The fixture should have a minimum system efficacy of 100 lumen/Watt and a minimum system lumen output of 6200 lumens and maximum system wattage of 62 Watts. The fixture shall have a CRI of minimum 70. The fixture shall be designed for a system life of 50,000 hours @70% lumen maintenance. Ingress Protection of IP66 (lamp and gear Compartment) and Mechanical Impact Resistance Rating of IK >=05. The fixture driver should have an operating voltage range of 140-270 V, surge protection of >=3KV, PF >0.9 , THD<20% and SDCM<5. The driver should be BIS approved, fully potted and encapsulated	 GreenLine V2

22	Type-22	BVP120 LED 70 CW NB FG S1 PSU GR	JETAFLAREFL 70WLED75LT G	LF19-931- 060-57-XX 80 W	Supply of LED based Flood light, housing made up of pressure die cast aluminum Alloy with effective thermal management, sturdiness and embossed brand name/logo name of manufacturer. The fixture should have a minimum system efficacy of 100 lumen/Watt and a minimum system lumen output of 7000 lumens and maximum system wattage of 70 Watts . The fixture shall have a CRI of minimum 70. The fixture shall be designed for a system life of 50,000 hours @70% lumen maintenance. Ingress Protection of IP65 (lamp and gear Compartment) and Mechanical Impact Resistance Rating of IK ≥ 05 . The fixture driver should have an operating voltage range of 140-270 V, surge protection of $\geq 3KV$, PF > 0.9 and THD $< 20\%$. The fixture should comply with the parameters as per IS10322.	
23	Type-23	WT201C LED20S-6500 PSU L120	MAGNUMGRANDI LS20WLED857SPC	Regret	Supply of Integral LED 4 ft waterproof luminaire with polycarbonate housing and PC Glossy cover. The luminaire should have a color consistency SDCM < 5 , CRI > 80 and CCT of 6500K. The luminaire shall be compliant with IP65 classification. Luminaire shall be designed to emit at least 2000 nominal lumens and 20W as system wattage at a system efficacy of at least 100 lumen/watt. The luminaire shall be designed so as to ensure lumen depreciation of up to 30% over 50k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor > 0.95 and THD $< 10\%$ and suitable for an operating voltage range of 140-270V AC.	
24	Type-24	Philips 2W Step Light 34151 for indoor	NA	Philips 2W Step Light 34151 for indoor	Recessed Type 2W step light	
25	Type-25	ST271T LED40/840 PSU-E WB 1C BK	CYLINDROTSS35W 840S38DWHT + HONEYCOMBATT A CHMENT25W/35W	LD57-501- 03640-XX 40 W	Track which delivers powerful, good-quality accent lighting, enabling product to display in the very best light delivers light with better beam control 36 degree & edge uniformity which ensures that the important features is highlighted. Maximum Wattages 47W, Minimum system Lumens 4000.	

26	Type-26	BCP151 LED150/WW PSU 220-240V 7043	BAMBOOBL8WLE D857SSYMTOPCM (1.0M)	CRLA11008 HP57-08	Supply, Installation, Testing and Commissioning of LED Ground Mounted Bollard (0.8 m height) with a system lumen output of 300 lumens and a minimum system efficacy of 35 lm/W. The luminaire shall have a rated system lifetime of 25,000 burning hours at L70. The luminaire should have a color temperature of 3000K and CRI>75. The luminaire shall meet IP65 & IK10 rating with THD < 20% and PF > 0.9. The luminaire housing should be made of pressure die cast aluminium with polycarbonate diffuser. The total power consumption should not exceed 8W (including driver).	
27	Type-27	RC380B LED25S -6500 G4 L60 W60 PSU OD	VENUSNEOHE2X2 PLR18- 42WLED857MOD (24w)		Supply of LED 2x2 luminaire with CRCA housing suitable with fully diffused diffuser for general lighting in office areas. The luminaire should have a color consistency SDCM < 5, CRI > 80 and CCT of both 4000K / 6500K. The luminaire shall be compliant with IP20 and IK02 classification. Luminaire shall be designed to emit at least 2500 nominal lumens and an outstanding backlit solution efficacy of at least 120 lumen/watt and maximum system wattage of 20 Watts. The luminaire should have outstanding backlit solution efficacy. The luminaire shall be designed so as to ensure lumen depreciation of up to 30% over 50k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor >0.95 and THD <10% and have options for DALI dimmable too. The fixture should comply with the parameters as per IS10322.	
28	Type-28	CR652B LED33S CR CW GT	BOCR2X2R34WLE D857SPCMS	LC20-551- XXX-57-XX	Supply of LED Cleanroom Luminaire with a nominal system lumen output of 3300 lumens and a minimum system efficacy of 85 lm/W. The luminaire shall have a rated system lifetime of 50,000 burning hours at L70. The luminaire should have a color temperature of 6500K and CRI > 80. The luminaire shall meet IP65 rating with THD < 20% and PF > 0.9. The luminaire housing should be made of powder coated CRCA sheet steel with toughened glass front cover. The total power consumption should not exceed 38W (including driver).	
29	Type-30	Bed Light Ultron 48027/ 17W (2 Feet)	LUMILINEBS9WLE D865SPCWH	Bed Light Ultron 48027/ 17W (2 Feet)	Supply of 2 feet LED Bed Light with fully diffused optics with power consumption not more than 17W	

30	Type-31	SM365C LED33-6500 PSU-OD WH	PLUTOSURFA CE2X2PLS34WLED 857S	CRCO10S038 HP57GL 36 W	<p>Supply of LED Surface mounted Troffer Luminaire with a nominal system lumen output of 3200 lumens and a minimum system efficacy of 100 lm/W. The luminaire shall have a rated system lifetime of 50,000 burning hours at L70. The luminaire should have a color temperature of 5000K and CRI>70. The luminaire shall meet IP20 rating with THD<10% and PF >0.9. The luminaire housing should be made of powder coated metallic CRCA with high efficiency opal diffuser with a profiled cover. The total power consumption should not exceed 31W (including driver). Similar to Philips Make CIRRUS SURFACE "SM365 LED33 6500 PSU OD GR"</p>	
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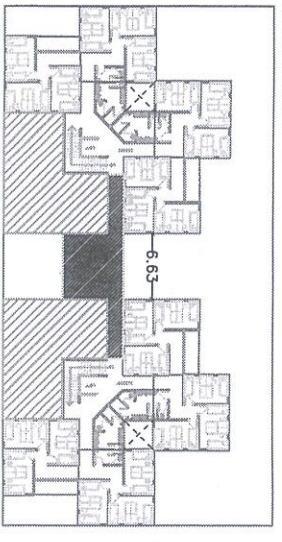
DINING PHI

DNB3

ONE UNIT = 12 ROOMS
PLINTH AREA = 283.50 SQM PER MODULE

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EE (C), IITM

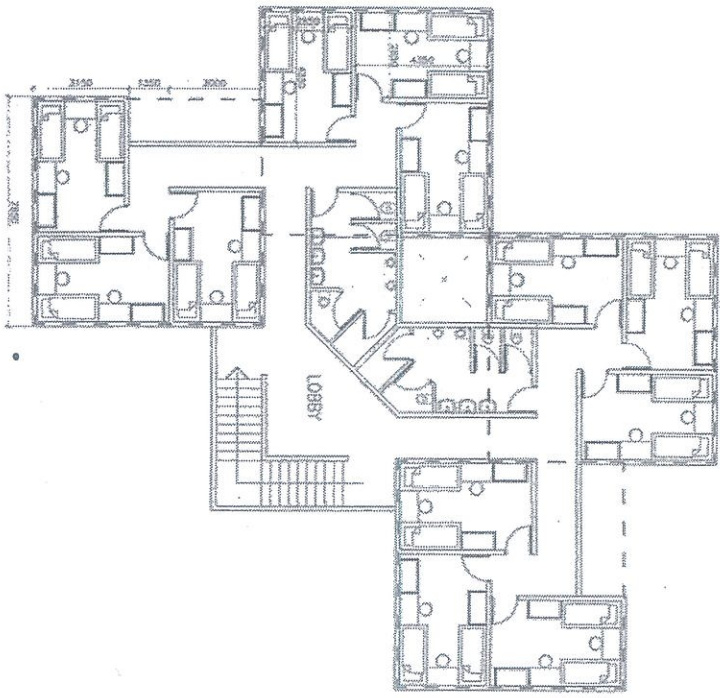
SITE LAYOUT



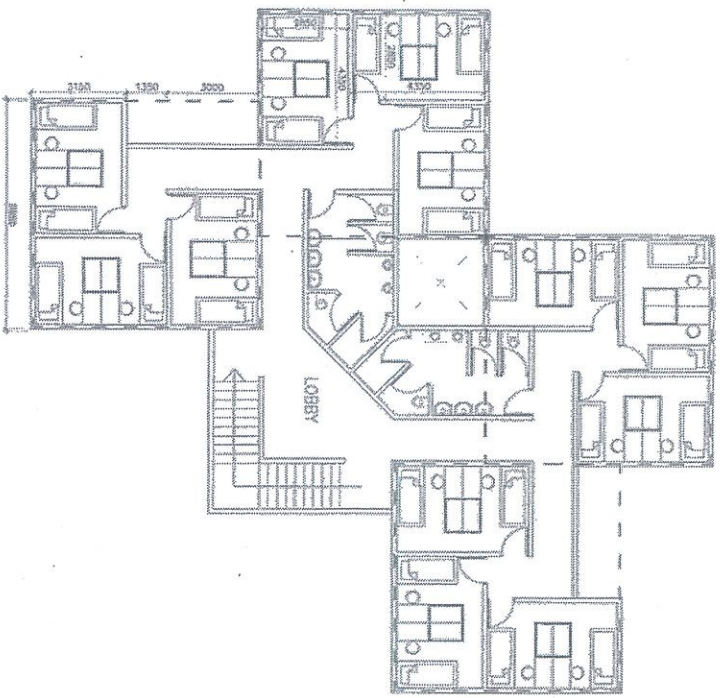
SCHMATIC SITE LAYOUT

Project Name
PROPOSED PRECAST HOSTEL BLOCK
AT CAMPUS OF
IIT HYDERABAD - Phase II

ARCHITECT
ASTUTE
ENGINEERING SERVICES PVT. LTD.
6th floor, Surya Bhawan, Pragathi College Road,
Shilphiguda, Pune-411005, Maharashtra.

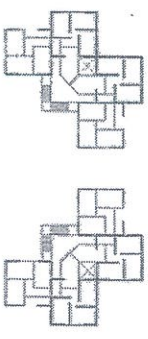


OPTION 1
DIVISION OF SPACES: LIVING AREA AND SLEEPING SPACE



OPTION 2
DIVISION OF SPACES: PER STUDENT

OPTIONS OF INTERNAL LAYOUT



SCHEMATIC SITE LAYOUT

ALTERNATIVE OF SITE DESIGN

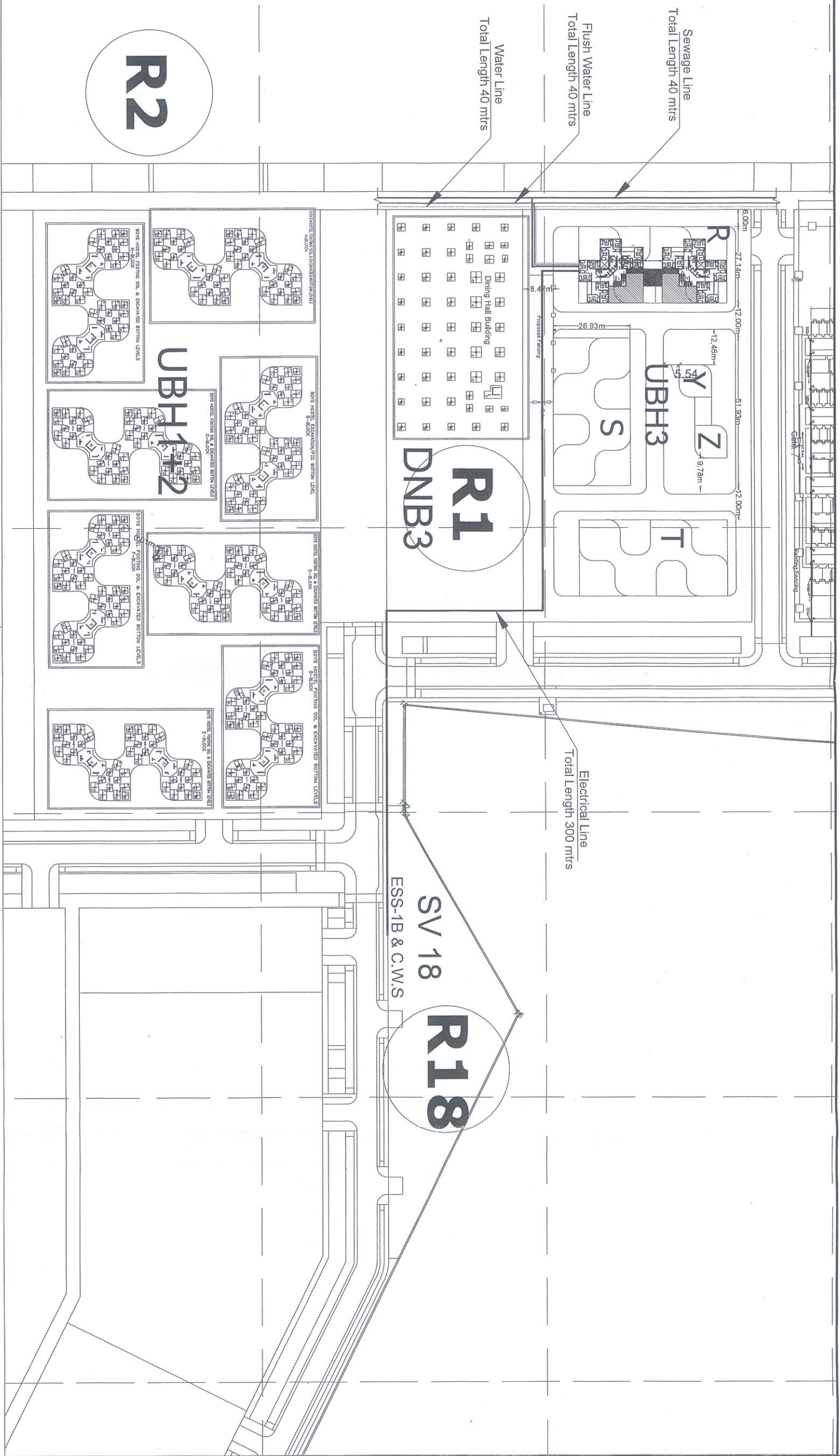
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PROJECT
ASTUTETM
ENGINEERING SERVICES PVT. LTD.
117 HIRSHAWAS + PHASE II
Dhulegaon, Keshavnagar, Ahmednagar

PROPOSED PRECAST REINFORCED BLOCK
CONCRETE FRAME AND OR
117 HIRSHAWAS + PHASE II



GENERAL NOTES
 Drawing Not to Scale
 All Dimensions are in Meters

Name of Work: "			
IITH/CMD/Drawing No.			
DRAWN BY: SYED OMER ALI	JUNIOR ENGINEER (CIVIL)	ASSISTANT ENGINEER (CIVIL)	EXECUTIVE ENGINEER (CIVIL)

[Signature]
 EE (C), IITH