

NAME OF WORK: CONSTRUCTION OF LIBRARY AT VANSDA DIST: NAVASARI

:: ITEM WISE ADDITIONAL SPECIFICATION FOR THIS WORK::

Item No: 06 Clearing and grubbing road land including uprooting rank vegetation grass bushes, shrubs, sapling and trees girth up to 300 mm removal of stumps of trees cut earlier and disposal of unserviceable materials (B) By manual in area of thorny jungle

1.0. Materials

1.1. No major construction materials shall be required for this item.

1.2. Tools, implements and equipment required for clearing and grubbing operations such as axes, spades, sickles, crowbars, pickaxes, saws, ropes and other hand tools shall be arranged by the contractor.

1.3. Safety equipment including gloves, helmets, safety shoes and protective clothing shall be provided to all workers engaged in the operation.

2.0. Workmanship

2.1. The work shall consist of clearing and grubbing the road land and adjoining areas as shown on the drawings or as directed by the Engineer-in-Charge.

2.2. Clearing shall include removal of all rank vegetation, grass, bushes, shrubs, thorny growth, saplings and trees having girth up to 300 mm measured at a height of 1.0 m above ground level.

2.3. The work shall be carried out manually using approved hand tools and equipment.

2.4. All vegetation shall be cut close to ground level and removed from the site.

2.5. Stumps of trees cut earlier and roots of bushes, shrubs and saplings shall be uprooted completely to a depth sufficient to prevent regrowth.

2.6. All excavated roots, stumps, vegetation and other unserviceable materials shall be collected and removed from the work site.

2.7. Serviceable materials, if any, shall be stacked neatly at locations directed by the Engineer-in-Charge.

2.8. Unserviceable materials shall be disposed of at approved dumping locations as directed by the Engineer-in-Charge and in accordance with local regulations.

2.9. The cleared area shall be left clean, free from roots, vegetation, rubbish and other obstructions.

2.10. Care shall be taken to avoid damage to existing structures, utilities, trees designated for preservation and other adjoining properties.

2.11. The contractor shall make good any damage caused during the execution of the work at his own cost.

2.12. All operations shall be carried out in thorny jungle areas and under conditions specified in the contract documents.

3.0. Mode of Measurements and Payment

3.1. Clearing and grubbing shall be measured in square metres or hectares, as specified in the Schedule of Quantities and actually cleared and approved by the Engineer-in-Charge.

3.2. The rate shall include cutting, uprooting, removal of stumps and roots, handling, stacking of serviceable materials, disposal of unserviceable materials, labour, tools, equipment, transportation and all incidental operations required for completion of the work.

3.3. No separate payment shall be made for removal of vegetation, disposal of debris, filling of pits formed due to uprooting, protection of adjoining property, safety measures or any incidental works.

3.4. The rate shall be for a unit of measurement specified in the Schedule of Quantities and shall include complete clearing and grubbing operations in thorny jungle areas as directed by the Engineer-in-Charge.

Item No: 07 Felling trees of the girth (measured at a height of 1 m above ground level), including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material. Beyond 60 cm girth upto and including 120 cm girth

1.0. General

1.1. The work shall consist of felling trees of girth beyond 60 cm and upto and including 120 cm measured at a height of 1.0 m above ground level, including cutting of trunk and branches, removal of roots, stacking of serviceable materials and disposal of unserviceable materials as directed by Engineer-in-Charge.

1.2. The work shall be carried out only after obtaining necessary permission from competent authorities wherever required.

2.0. Materials

2.1. No material shall be required except tools, equipment and incidental materials necessary for execution of the work.

3.0. Workmanship

3.1. Before commencement of work, the trees to be felled shall be identified and marked as directed by Engineer-in-Charge.

3.2. Necessary precautions shall be taken to prevent damage to adjoining structures, roads, utility services, buildings, fences, overhead lines and surrounding property.

3.3. The tree shall be cut carefully by approved methods in such a manner that it falls in the desired direction without causing danger to life or property.

3.4. The trunk and branches shall be cut into suitable lengths as directed by Engineer-in-Charge.

3.5. All roots, stumps and underground portions of the tree shall be completely removed from the ground.

3.6. Pits formed due to removal of roots and stumps shall be filled with approved earth and compacted properly to surrounding ground level.

3.7. Serviceable timber, logs, branches or other useful materials obtained from felling shall be stacked neatly at locations directed by Engineer-in-Charge.

3.8. Unserviceable materials, roots, leaves, twigs and debris shall be removed and disposed of at approved dumping locations.

3.9. The area shall be left clean and free from all rubbish and obstructions after completion of work.

3.10. All labour, tools, machinery, ropes, lifting devices and safety arrangements necessary for safe execution of work shall be provided by the contractor.

4.0. Mode of measurements and payment

4.1. Measurement shall be made on number basis for trees actually felled and removed.

4.2. The girth of tree shall be measured at a height of 1.0 m above ground level and classified under this item for girth beyond 60 cm and upto and including 120 cm.

4.3. The rate shall include cutting of tree, removal of branches, removal of roots and stumps, filling of pits, stacking of serviceable materials, disposal of unserviceable materials, labour, tools, plants, equipment and all incidental charges necessary for completion of work.

4.4. No separate payment shall be made for cutting branches, excavation for removal of roots, backfilling of pits, loading, unloading, transportation or disposal of materials.

4.5. The rate shall be for a unit of one number complete.

Item No: 08 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:6 (1- Cement : 6 - fine sand) (A) Modular

1.0. Materials

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6.

Bricks shall conform to M-15. Cement mortar shall conform to M-11.

2.0. Workmanship

2.1. Proportion:

2.1.1. The proportion of the cement mortar shall be 1:6 (1 cement : 6 fine sand) by volume.

2.2. Wetting of bricks:

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.

2.3. Laying:

2.3.1. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.

2.3.2. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel

or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

2.3.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

2.3.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, man son's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

2.3.5. Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

2.3.6. All fixtures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

2.4. Joints:

2.4.1. Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

2.4.2. The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

2.5. Curing:

2.5.1. Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

2.6. Preparation of foundation bed:

2.6.1. If the foundation is to be laid directly on the excavated bed, the shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

3.0. Mode of measurements & payment

3.1. The measurements of this item shall be taken for the brick masonry fully completed in foundation up to plinth. The limiting dimensions not exceeding those shown on the plinths or as directed shall be final. Battered tapered and curved portions shall be measured net.

- 3.2.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
 - (2) Opening not exceed in 1000 sq.cm.
 - (3) Wall plate sand bed plates bearing of slab, chhajjas and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
 - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
 - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
 - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.
- 3.3** Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4.** The rate shall be for a unit of one cubic meter.

Item No: 11 Carrying out plinth treatment to post construction / existing structure by spraying chemical solution for termite control treatment including labour and material consistent with I.S.I specification. Using Chlordene and Chiorpurfiles 20 EC. As Per 6131_paret-II Concentration Weight one percent is recommended i.e one litre 20 EC chemical emulsion with 19 liter give 1 % concentration inclusive of one litre chemical emulsion application at the rate of 5 Litre chemical / Sqm of surface is recommended as per I.S (The Product Performance Shall Carry Guarantee for 5 Years)

1.0. Materials

- 1.1. The anti-termite chemical shall be Chlorpyrifos 20% EC or approved equivalent chemical conforming to relevant IS specifications and approved by Engineer-in-Charge.
- 1.2. The chemical emulsion shall be prepared by mixing one litre of Chlorpyrifos 20 EC with nineteen litres of water to obtain one percent concentration by weight as specified.
- 1.3. Water used for preparation of emulsion shall be clean and free from harmful impurities.
- 1.4. The chemical shall be obtained in sealed containers from approved manufacturers and shall be brought to site in original packing.
- 1.5. The chemical shall be handled, stored and used strictly in accordance with the manufacturer's recommendations and applicable safety regulations.

2.0. Workmanship

- 2.1. The work shall consist of carrying out post-construction anti-termite treatment to existing/plinth areas of the structure by drilling, injecting and spraying chemical emulsion as required and as directed by Engineer-in-Charge.

2.2. Before commencement of treatment, the area shall be inspected and all rubbish, debris and loose materials shall be removed.

2.3. Holes shall be drilled along the wall-floor junctions, around columns, expansion joints, pipe entries and other vulnerable locations at suitable spacing as directed by Engineer-in-Charge.

2.4. The prepared one percent chemical emulsion shall be injected through drilled holes and sprayed uniformly over the surfaces to create a continuous chemical barrier against termite infestation.

2.5. The emulsion shall be applied at the rate of 5 litres of chemical solution per square metre of treated surface or as directed by Engineer-in-Charge.

2.6. Care shall be taken to ensure complete penetration of chemical solution into the soil and contact surfaces without leaving untreated gaps.

2.7. Any holes drilled for treatment shall be properly sealed with cement mortar after completion of chemical application.

2.8. During application, adequate precautions shall be taken to protect occupants, workers, electrical installations, water supply lines and adjoining finishes.

2.9. The contractor shall provide all labour, spraying equipment, pumps, hoses, drilling machines, safety equipment and accessories required for satisfactory execution of the work.

2.10. The treated area shall not be disturbed until the chemical barrier is properly established.

3.0. Mode of measurements and payment

3.1. The anti-termite treatment shall be measured in square metres of surface area actually treated.

3.2. The rate shall include cost of Chlorpyrifos 20 EC chemical, water, preparation of emulsion, drilling holes, spraying, injecting, sealing holes, labour, tools and plants, equipment, safety measures and all incidental charges necessary for complete execution of the work.

3.3. No separate payment shall be made for drilling, sealing holes, wastage of chemicals, transportation, storage, safety arrangements or any ancillary operations required for completion of treatment.

3.4. The rate shall be for a unit of one square metre complete.

Item No: 12 Providing and laying cement concrete 1:2:4 (1- Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

1.0. Materials

1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.

1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

2.0. General

2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.

2.3. The proportion of cement, sand and coarse aggregate shall be determined of weight. The weigh batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete Compressive strength of 15 cms. cubes in kg/cmt. at
28 days, conducted in accordance with I.S. 516-1959.

	Preliminary test Min.	Work Test Min.
M 150	200	150
M 200	260	200
M 250	320	250
M 300	380	300
M 350	440	350
M 400	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

3.0. Workmanship

3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted form bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All

measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

3.3. It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m³ in plain concrete and not less than 250 kg/m³ in reinforced concrete.

3.4 The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

4.0. Clearing and Treatment of forms:

4.1. All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

5.0 Stripping time:

5.1. In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.

(a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.

(b) Beam soffits, (props, left under).....7 days.

(c) Removal of props slabs:

(i) Slabs spanning up to 4.5 m.....7 days.

(ii) Spanning over 4.5 m.....14 days.

(d) Removal of props from beams and Arches:

(i) Spanning up to 6 m.....14 days.

(ii) Spanning over 6 m.....21 days.

6.0 Procedure when removing the form work :

6.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

7.0 Centering:

7.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete.

Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

8.0 Scaffolding:

8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.

8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :

- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
- (b) Filletting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
- (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
- (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
- (e) Raking or circular cutting.

9.0 Re-Use:

9.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

10.0 Mode of measurement & payment

10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

- (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.

10.2. Form work shall be measured as the area in square meters to shuttering in contact with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.

10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

10.4. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.

10.5. The rate shall be for a unit of one cubic meter.

Item No: 25 Masonry work using Aerated light weight concrete block having crushing strength not less than 35 kg/sqcm for super structure above plinth level upto floor two level in cement mortar 1:5 (1 cement : 5 fine sand) complete as per Technical Specification in Ground Floor & First Floor

Item No: 26 Masonry work using Aerated light weight concrete block having crushing strength not less than 35 kg/sqcm for super structure in cement mortar 1:5 (1 cement : 5 fine sand) complete as per Technical Specification in Second Floor

Item No: 27 Masonry work using Aerated light weight concrete block having crushing strength not less than 35 kg/sqcm for super structure in cement mortar 1:5 (1 cement : 5 fine sand) complete as per Technical Specification in Terrace Floor

1.0. Materials

1.1. Aerated Lightweight Concrete (AAC) blocks shall be factory manufactured and shall conform to IS 2185 (Part-3) or equivalent approved standards.

1.2. AAC blocks shall have a minimum crushing strength of 35 kg/sq.cm and shall be of uniform size, shape and density.

1.3. Blocks shall be free from cracks, warping, chipped edges and other defects affecting strength or appearance.

1.4. Cement shall conform to M-3 and shall be of approved make.

1.5. Fine sand shall conform to M-6 and shall be clean, hard, durable and free from organic impurities, clay, silt and deleterious substances.

1.6. Cement mortar for masonry shall be of proportion 1:5 (1 cement : 5 fine sand) unless otherwise specified.

1.7. Water used for mortar preparation and curing shall conform to M-1.

1.8. Galvanized steel wall ties, holdfasts, reinforcement mesh, anchor bars and other accessories, wherever required, shall be of approved make and quality.

2.0. Workmanship

2.1. The work shall consist of constructing masonry using Aerated Lightweight Concrete (AAC) blocks in cement mortar 1:5 for superstructure walls as shown on the drawings and directed by the Engineer-in-Charge.

2.2. AAC blocks shall be properly stacked at site and protected from damage and contamination.

2.3. Blocks shall be wetted lightly, if required, before laying as per manufacturer's recommendations.

2.4. Masonry shall be laid true to line, level and plumb in proper bond and in accordance with approved drawings.

- 2.5. Mortar joints shall be uniform and generally shall not exceed 10 mm thickness unless otherwise approved.
- 2.6. Vertical joints shall be completely filled with mortar and no hollow joints shall be permitted.
- 2.7. Blocks shall be laid with staggered vertical joints and proper interlocking to ensure structural stability.
- 2.8. Openings for doors, windows, ventilators, electrical conduits, plumbing lines and other services shall be formed accurately during construction.
- 2.9. Chases and cut-outs shall be made carefully using suitable tools without causing damage to adjacent masonry.
- 2.10. Reinforcement, mesh or wall ties at junctions of masonry and RCC members shall be provided wherever specified in drawings or directed by the Engineer-in-Charge.
- 2.11. Masonry shall be built uniformly throughout its length and height. No portion shall be raised more than 1.0 metre above adjoining work during the same day.
- 2.12. The top course of masonry below slabs, beams or lintels shall be carefully fitted and packed solidly.
- 2.13. All masonry shall be protected from rain, excessive drying and mechanical damage during construction.
- 2.14. The completed masonry work shall be cured continuously for a minimum period of seven days or as directed by the Engineer-in-Charge.
- 2.15. Any defective, cracked, bulged or out-of-plumb masonry shall be dismantled and reconstructed by the contractor at his own cost.
- 2.16. The work shall include masonry in Ground Floor, First Floor, Second Floor and Terrace Floor as specified in the respective BOQ items.
- 2.17. All work shall be executed in accordance with approved drawings, specifications and instructions of the Engineer-in-Charge.

3.0. Mode of Measurements and Payment

- 3.1. AAC block masonry shall be measured in cubic metres of finished work actually executed and approved by the Engineer-in-Charge.
- 3.2. Measurements shall be taken for the net volume of masonry excluding deductions and additions as per standard measurement practices.
- 3.3. The rate shall include supply of AAC blocks, cement, sand, mortar preparation, laying, scaffolding, curing, labour, tools, plants, transportation, handling and all incidental operations required for complete execution of the work.
- 3.4. The rate shall also include forming openings, cutting blocks, raking joints, embedding fixtures, providing wall ties and all operations necessary for proper completion of the masonry work.
- 3.5. No separate payment shall be made for wastage, curing, scaffolding, temporary supports, cutting, fitting around services or any incidental work required for satisfactory completion.

3.6. The rate shall be for one cubic metre of completed AAC block masonry work executed as specified and approved by the Engineer-in-Charge.

Item No: 31, 32, 33 & 34 Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand) including GI Galvanized 0.3Wide Hexagonal Wire Mesh on RCC & Brick Joints Internal Wall Plaster for Ground Floor, First Floor, Second floor & Terrace

1.0. Materials

1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-11.

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back ground :

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the readers if left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

2.2.4. For external plaster, the peasting operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be-started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Application of plaster :

2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

2.3.2. Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags oh the outside of the plaster and keeping them wet.

2.3.5. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:4.

The smooth concrete shall be suitably say read to provide necessary bond before plastering.

for Floating Coat

2.3.6. The relevant specification shall be followed for materials and workmanship except that this work is providing smooth cement finish with floating coat of neat cement slurry.

2.3.7. The coat of cement and fine sand mortar of proportion V1 (1 5 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the bas;. coat is still plastic.

2.3.8. In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions.

2.3.9. Curing : All the plaster work shall be kept damp continuously for a period 7 days.

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.

3.3. Thickness of the plaster shall be exclusive of he thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 15 mm at any point on this surface.

3.4. This item includes plastering for all floors.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings

exceeding 0.5 sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.

(b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.

3.10 The payment shall be made for a unit of 1.0 sq.mt of work done over and above the finishing of work of base coat.

4.0. The rate shall be for a unit of one sq. meter.

Item No: 35 Applying two coats of acrylic lapi (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.

Materials:

Cement primer shall be Asian, Nerolac or Berger-make. Lapi (putty) shall be of Birla or J . K. White

Workmanship:

Preparation of surface:

The undecorated surface to be paint shall be thoroughly brushed off from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth.

All un-necessary nails shall be removed; painting in plaster shall be made good with plaster of Paris mixed with colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. For any unevenness shall be made good by applying putty made of plaster of Paris mixed with water on entire surface including filling up the undulation and the sand papering the same after it is dry. Application of primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. The mixed lapi shall be applied with M. S . plate. After applying the lapi surface shall be kept for dry. After surface become dry the sand papering shall be done for preparing the even surface.

The second coat of Birla lapi shall be applied and after drying second coat the final sand papering shall be done to prepare the surface for carrying out the paint work. This entire operation will

constitute two coats. The surface shall be finished as uniformly or possible leaving no brush marks.

Mode of measurement & Payment :

The rate shall be including the cost of materials and labour. The rate shall be consolidated for above item. **The rate shall be for a unit of one Square metre.**

Item No: 38 Washed stone grit plaster on exterior walls height upto 10 metre above ground level, in two layers, under layer 12 mm cement plaster 1:4 (1cement : 4 coarse sand), furrowing the under layer with scratching tool,applying cement slurry on the under layer @ 2 Kg of cement per square metre, top layer 15 mm cement plaster 1:1/ 2:2 (1 cement: 1/2 coarse sand : 2 stone chipping 10 mm nominal size), in panels with groove all around as per approved pattern, including scrubbing and washing the top layer with brushes and water to expose the stone chippings ,complete as per specification and direction of Engineer-in-charge (payment for providing grooves shall be made separately).

37.1 Scaffolding shall be as specified in 13.1.1.

37.2 Preparation of surface shall be as specified in 13.1.2 and 13.4.2.

37.3 Materials

37.3.1 Stone chippings obtained by crushing hard stone shall be free of dust and deleterious material. 10 mm nominal size stone chippings, where specified, shall pass 100% through 12.5 mm sieve and fully retained on 6.3 mm sieve. Stone chippings shall be thoroughly washed with water and sieved before use.

37.3.2 Mortar : Cement mortar for under coat and cement mortar to be mixed with stone chippings for top coat shall be as specified in 3.5.

37.4 Application of Plaster

37.4.1 12 mm Under Coat : Under coat of cement mortar 1:4 (1 cement : 4 coarse sand) shall be applied as specified in 13.1.3 except that the finishing, after the mortar has been brought to level with the wooden straight edge, shall be done with wooden float only. The surface shall be further roughened by furrowing with a scratching tool. Furrowing shall be done diagonally both ways and shall be about 2 mm deep to provide a key for the top coat. The scratched lines shall not be more than 10 cm apart. The surface shall be kept wet till top coat is applied.

37.4.2 15 mm Top Coat : Top coat comprising cement mortar and stone chippings shall have an overall proportion of 1:0.5:2 (1 cement : 0.5 coarse sand : 2 stone chippings 10 mm nominal size) or as specified. The top coat shall be applied a day or two after the under coat has taken the initial set.

The surface of the under coat shall be cleaned and a coat of cement slurry at 2 kg of cement per sqm shall be applied before the application of coat. The top coat shall be applied in uniform thickness on the under coat after the application of slurry and sufficiently pressed with wooden float for proper bonding with the under coat. Vacant space, if any shall be filled with the specified mix.

37.5 Finish

The top coat of plaster shall be finished to a true and plumb surface. The surface shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds. All the corners angles and junctions shall be truly vertical or horizontal as the case may be. Rounding or chamfering of corners junctions etc. Where required shall be true to template.

Finished surface of the top coat after the mix has taken the initial set, shall be scrubbed and washed with suitable brushes and plain water. Scrubbing and washing shall continue till the stone chippings are sufficiently exposed. Stone chippings which may come out while scrubbing shall be replaced using the specified mortar mix. A sample of the washed stone grit plaster shall be got approved from the Engineer-in-Charge.

37.6 Grooves

Grooves of size 15 mm x 15 mm or as specified shall be provided as shown on the drawing or as required by the Engineer-in- Charge. Tapered wooden battens to match the size and shape of the grooves shall be fixed on the under coat with nails before the application of the top coat and these shall be removed carefully so that the edges of the panels of top coat are not damaged. Damage, if any, shall be made good by the contractor.

37.7 Curing

Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the Engineer-in-Charge may approve.

37.8 Measurements

37.8.1 Length and breadth shall be measured correct to the nearest cm and the area shall be calculated in sqm correct to two places of decimal.

37.8.2 Measurements shall be taken for the work actually done with deductions for all openings and addition for all jambs soffits and sills. However, no deduction is to be made for the grooves provided as specified in 13.42.6.

37.8.3 Washed stone grit plaster on circular surfaces not exceeding 6 m in radius and on external surfaces at a height greater than 10 m shall be measured separately.

37.9 Rates

The rates shall include the cost of all labour and materials involved in all the operations described above except for providing grooves. The length of grooves shall be measured in running metres and paid for separately.

Item No: 39 Extra for washed grit plaster on exterior walls of height more than 10 m from ground level for every additional height of 3 m or part thereof.

1. Scope of Work

This item covers the additional costs involved in the execution of washed grit plaster on external walls at heights greater than 10 meters above ground level. The rate covers every additional height of 3 meters, or part thereof, over the baseline height of 10 meters. This includes the provisions for specialized double-scaffolding, safety staging, vertical lift of materials, increased labor efforts, protection of lower surfaces from slurry wash, and compliance with high-elevation safety protocols.

2. Operational & Material Requirements

Baseline Condition: The basic item for washed grit plaster covers the work up to a standard height (typically up to 10 meters or up to floor two/three level depending on the local PWD schedule). This item is strictly an additive rate applied to the base plastering area.

Scaffolding Staging: Requires heavy-duty, multi-tier steel tubular scaffolding (cup-lock system) anchored securely to the structural concrete frame. It must include fully planked working platforms, toe-boards, and double guardrails.

Safety Equipment: Provisions for safety nets spanning the perimeter, life-lines, and mandatory personal protective equipment (PPE) like full-body safety harnesses for all plasterers and helpers.

Water & Slurry Management: At high elevations, the water washing process for grit plaster creates significant down-wash. The item includes installing temporary tarpaulin sheets or catch-platforms to prevent the cement-grit slurry from defacing already finished plaster or openings on lower floors.

3. Workmanship & Execution

Material Hoisting: All raw materials (cement, sand, graded stone grit/pebbles), mixing water, and tools must be hoisted safely using mechanical winches or builders' hoists. Manual passing of materials over staging lines is strictly prohibited beyond 10 meters.

Application Continuity: To avoid visible patches, cold joints, or color variations in the grit plaster, the application must be seamless. The scaffolding must be configured so that plasterers can work across a continuous architectural facade panel without interruption.

Washing Process: The timing of the surface washing (using a fine spray of water or a wet sponge to expose the aggregate grit) must be precisely managed despite faster evaporation rates caused by higher wind velocities at elevated levels.

4. Mode of Measurement & Payment Protocol

Unit of Measurement: Square Meter (Sqm)

Item No: 40 Forming groove of uniform size in the top layer of washed stone grit plaster as per approved pattern using wooden battens, nailed to the under layer, including removal of wooden battens, repair to the edges of panels and finishing the groove complete as per

specifications and direction of the Engineer-in-charge :. @20 mm wide and 15 mm deep groove

1. Scope of Work

Providing and forming architectural grooves of a true, uniform size (15 mm wide and 15 mm deep) in the top layer of washed stone grit plaster. The grooves shall be executed according to the approved pattern/grid using seasoned wooden battens nailed to the plaster under-layer. The work includes the subsequent removal of the battens, rectangular edge repairs of the panels, and finishing the inner surfaces of the grooves across all floors and heights. [1]

2. Material Specifications

- **Wooden Battens:** Seasoned, straight-grained hardwood or high-quality soft wood battens. They must be planed true to the exact dimensions of 15 mm x 15 mm with a slight taper (1 to 2 mm) to facilitate easy removal without chipping the plaster edges.
- **Fixing Nails:** Standard steel wire nails or headless pins of appropriate length to securely hold the battens to the under-layer coat without shifting during plastering.
- **Groove Finishing Mortar:** Cement mortar mix matching the specification of the base plaster under-layer (typically CM 1:3 or 1:4) using fine, sieved sand passing through a 1.18 mm IS sieve. [1, 2]

3. Execution & Workmanship

- **Layout and Alignment:** The contractor must mark out the approved grid pattern on the cured plaster under-layer using a chalk line, spirit level, and plumb bob to ensure absolute horizontal and vertical accuracy.
- **Fixing Battens:** Securely nail the wooden battens along the marked layout lines onto the fresh or cured under-layer coat. Ensure the joints between different batten pieces are perfectly flush and mitered neatly at 90-degree intersections. [1]
- **Plastering Application:** Apply the top layer of washed stone grit plaster flush against the sides of the fixed wooden battens. Pack the grit mix tightly around the edges to avoid structural voids.
- **Batten Removal:** Carefully remove the wooden battens after the stone grit plaster has achieved its initial set but before it hardens completely. Use specialized pry bars to avoid fracturing the sharp panel edges.
- **Edge Rectification & Finishing:**
 - o Repair any minor edge spalling, chips, or honeycomb patches immediately using a fine cement mortar mix.
 - o Finish the inner surfaces of the groove to a perfectly smooth, straight, and uniform finish using a customized steel groove tool or trowel.
 - o Maintain sharp, clean, unblemished rectangular profile margins throughout the line matrix.

4. Curing

- The repaired groove channels and panel edges must be kept continuously damp by water spraying or misting for a minimum period of 7 days alongside the primary plaster matrix.

5. Quality Control Standards

- The grooves must be perfectly straight. A maximum deviation of ± 1.5 mm over a 3-meter straight edge is acceptable.
- The depth and width must remain uniform at 15 mm throughout the layout line. Any structural waviness or variations will result in rejection.

Item No: 41 40 mm thick rubbed stone flooring over 20 mm (average) thick base of cement mortar 1:5 (1 cement : 5 coarse sand) with joints 3 mm thick, side buttered with cement mortar 1:2 (1 cement : 2 stone dust) admixed with pigment to match the shade of stone and pointing with same mortar. Red sand stone

1. Material Specifications

Red Sandstone Slabs: Shall be of the best quality, obtained from approved quarries. The stone must be hard, sound, durable, uniform in texture, free from cracks, soft veins, flaws, or structural defects. All slabs must be machine-cut to required dimensions and have their top surface finely rubbed/dressed to a smooth, non-slip finish before laying.

Thickness: The finished thickness of the stone slabs shall be a minimum of 40 mm, with a permissible tolerance of 2 mm.

Bedding Mortar: Cement shall conform to IS: 8112 or IS: 12269. Coarse sand shall be clean, sharp, well-graded, and conform to IS: 383. The mix ratio shall be 1:5 (1 cement : 5 coarse sand) by volume.

Jointing Mortar & Pigment: The mortar for side-buttering and pointing shall consist of 1:2 (1 cement : 2 fine stone dust). It must be admixed with premium-quality, UV-resistant dry mineral pigment (such as red oxide) in exact proportions to seamlessly match the natural color shade of the selected Red Sandstone.

2. Workmanship & Execution

Preparation of Sub-Grade: The structural concrete base slab (PCC or RCC) must be thoroughly cleaned of all dirt, loose mortar laitance, and debris. The surface shall be lightly roughened, watered, and slurred with a neat cement grout (2.75 kg/Sqm immediately before spreading the bedding mortar.

Laying the Bedding Mortar: The 1:5 cement mortar bedding shall be spread evenly over the base to an average thickness of 20 mm (varying locally from 15 mm to 25 mm to maintain the required floor gradient). It must be properly rammed and leveled.

Fixing Slabs & Side-Buttering: The dressed Red Sandstone slabs shall be soaked in water prior to laying.

- Each slab shall be lower-positioned onto the mortar bed, tapped firmly with a wooden mallet until it is fully bedded and aligned true to level and slope.
- The vertical side joints shall be strictly maintained at a uniform width of 3 mm.

- Before butting adjacent slabs together, the vertical edges must be fully side-buttered with the shade-matched 1:2 cement-stone dust mortar, ensuring no hollow voids are left within the joints.

Pointing & Finishing: The joints shall be raked out to a depth of 10 mm while the mortar is green. The joints shall then be cleanly pointed, flush or slightly grooved, using the same pigment-admixed 1:2 mortar. Any surplus mortar on the stone surface must be wiped clean immediately with a wet cloth or sponge to prevent staining.

Curing: The finished flooring must be protected from traffic and kept continuously wet by ponding or covering with damp gunny bags for a minimum period of 7 days.

3. Mode of Measurement

Unit of Measurement: Square Meter (Sqm)

Item No: 42 Providing and fixing eco-friendly light weight calcium silicate false ceiling tiles having Tegular edge & 15 mm Thick Densified edges on the Tile Periphery for Extra Strength The Light weight calcium silicate ceiling tiles shall have , light reflection 85% non-combustible as per B.S. 476 part IV, 100% humidity resistance and also having thermal conductivity 0.043° w/m KC. for the best thermal Insulation . The Light weight calcium Silicate tile shall be of approved texture Fine fissured/ Spintone/Cosmos having NRC value of 0.5 & Globe having NRC value of 0.75 NRC or equivalent of size 595 X 595 mm to be laid on true horizontal level suspended inter locking metal grid of hot dipped galvanized steel sections (galvanizing @120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and size of 24X38mm made from 0.30 mm thick (minimum) sheet, 1200mm centre to centre, and cross 'T' of size 24X28mm made out of 0.33mm (Minimum) sheet spaced 1200mm along spaced between main 'T' at 600mm centre to centre to form a grid of 1200X600mm and secondary cross 'T' of length 600mm and size 24x28mm made of 0.30 mm thick (Minimum) sheet to be interlocked at middle of the 1200X600mm panel to form grid of size 600X600mm resting on periphery walls/partitions on a perimeter wall angle pre-coated steel of size (24X24X3000mm made of 0.40mm thick (minimum) sheet with the help of rawl plugs at 450mm centre to centre with 25mm long dry wall screws @ 230mm interval and laying 15mm thick Densified edges light weight calcium silicate ceiling tiles of approved texture (Fine Fissured/Cosmos/Spintone) in the grid including, cutting /making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required, Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25X35X1.6mm fixed to ceiling with 12.5mm dia and 50mm long dash fasteners, 4mm G.I. adjustable rods with galvanized steel level clips of size 85X30X0.8mm, spaced at 1200mm centre to centre long main 'T' bottom exposed with 24mm of all T-sections shall be pre-painted with polyester baked paint, for all heights, as per specifications, drawings and as directed by engineer-in-charge .

Note:- Only calcium silicate false ceiling area will be measured from wall to wall. No deduction shall be made for exposed frames/opening (cut outs) having area less than 0.30 sqm. The calcium silicate ceiling tiles shall have NRC. Value of 0.50 (Minimum) for Fine fissured/Spintone/Cosmos and 0.75 NRC for Globe, light reflection 85% non-combustible as per B.S. 476 part IV, 100% humidity resistance and also having thermal conductivity. 0.043° w/m KC. for the best thermal Insulation

1. Material:

- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

Fixtures and fastenings shall confirm M-43 of GTS Booklet for building works.

2. Workmanship:

The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

- Work complete as per relevant specification of Item No: 16, page No -102 in General specification R & B booklet for building works.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, finishing, labour, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.

The rate shall be for a unit of one square meter.

Item No: 43 Providing and fixing stainless steel railing 50mm dia.(16 gauge-Grade 304) TOP RAIL with 1 mtr c/c VERTICAL SUPPORT 37.5mm dia.(16 gauge-Grade 304), 3 NO. 25mm dia.(16 gauge-Grade 304) HORI. MEMBER .for up to 1.2mt height at any floor, including welding, grinding, buffing, polishing and making curvature (wherever required) ,for staircase on the side of waist slab with suitable arrangement as per drwaing (for payment purpose only hand rail Running meter will be consider, and other stainless steel members shall are inclusive of fixing accessories such as Baluster, supports, horizontal members, nuts, bolts, fasteners etc.)Rate includes for all lead & lift. etc, complete as per drawings and design supplied by architect and instruction given by authority and E.I.C.

1. Scope of Work

The work consists of providing, fabricating, transporting, assembling, and fixing in position Stainless Steel (Grade 304) railing for staircases, balconies, or corridors up to a height of 1.2 meters from the finished floor/tread level. The assembly includes a 50 mm dia. top rail, 37.5 mm dia. vertical supports spaced at 1.0 meter center-to-center, and 3 nos. of 25 mm dia. horizontal intermediate runners. The rate includes side-mounting on the waist slab/floor using heavy-duty fixtures, welding, grinding, buffing, polishing, forming curves, and all associated hardware.

2. Material Specifications

Stainless Steel Tubing: All stainless steel sections, pipes, and sheets shall strictly conform to Grade 304 (18-8), ensuring high corrosion resistance.

Wall Thickness: All pipes (50 mm, 37.5 mm, and 25 mm nominal outer diameter) must have a uniform wall thickness of 16 gauge (1.65 mm). No underweight or commercial-grade pipes will be permitted.

Fixing Accessories: All anchor bolts, expansion fasteners, base plates, screws, nuts, and internal sleeves must be of Stainless Steel Grade 304 or higher to prevent galvanic corrosion.

3. Workmanship & Execution

Fabricating & Assembly: The vertical posts (37.5 mm dia) shall be accurately spaced at intervals not exceeding 1.0 meter center-to-center. They must be perfectly plumb and aligned.

Jointing & Welding: Jointing shall be done by continuous, TIG (Tungsten Inert Gas) welding. The welds must be deep-penetrating to ensure structural stability under standard crowd-load conditions.

Finishing (Grinding & Buffing): All welded joints must be ground smooth using appropriate abrasive wheels to match the parent pipe surface. The entire assembly shall be systematically buffed and polished to achieve a uniform, flawless, mirror-like or satin-matte finish (as dictated by the architectural drawings). No external weld scars, pitting, or discoloration shall be visible.

Curvature: Wherever the staircase or landing turns, the pipes must be smoothly bent or curved using specialized pipe-bending machinery without crimping, buckling, or flattening the cross-section.

Fixing Arrangement: The vertical balusters shall be securely anchored to the side of the concrete waist slab or stringer beam using a robust side-mounting arrangement. This involves heavy-duty SS base plates, anchor fasteners, and decorative SS cover caps to hide the bolted connections completely.

4. Mode of Measurement & Payment

Unit of Measurement: Square Meter (Sqm)

Item No: 44 Providing and Laying Waterproofing System is Two Components, Polymer modified, Highly Flexible Cementitious Waterproofing Membrane system. It Comprises of Superior quality cement, Other Additives and Liquid Polymers. When both liquid and powder mixed together and applied it forms a tough, Flexible and seamless Waterproof barrier which also provides excellent bonding and crack bridging ability on masonry Substrates, Providing and applying Waterproofing, treatment to RCC bore packing (Sleeves for Plumbing / other services in RCC Slab etc. complete as per Approved by Engineer in charge. (FIVE YEARS PERFORMANCE WARRANTY)

1.0. Materials

1.1. The waterproofing system shall be a two-component, polymer modified, highly flexible cementitious waterproofing membrane system consisting of a powder component and a liquid polymer component.

1.2. The powder component shall consist of superior quality cement, graded fillers and special additives designed to provide waterproofing properties.

1.3. The liquid component shall consist of synthetic polymers capable of imparting flexibility, adhesion, crack bridging and waterproofing characteristics to the system.

1.4. The waterproofing material shall be of approved make and shall be applied strictly in accordance with the manufacturer's specifications.

1.5. The material shall be suitable for waterproofing of RCC bore packings, pipe sleeves, service penetrations, plumbing sleeves and other openings through RCC slabs.

1.6. The waterproofing system shall be capable of forming a seamless, flexible and durable waterproof membrane with excellent adhesion to concrete and masonry substrates.

1.7. Water used for surface preparation and mixing shall be clean and free from harmful impurities.

2.0. Workmanship

2.1. The work shall consist of providing and applying a two-component polymer modified cementitious waterproofing treatment to RCC bore packings, pipe sleeves, plumbing sleeves and all service penetrations through RCC slabs.

2.2. The surface shall be thoroughly cleaned before application. All dust, dirt, grease, laitance, loose particles, curing compounds and foreign materials shall be removed completely.

2.3. Honeycombs, cracks, voids and damaged concrete surrounding the sleeves shall be repaired with approved polymer modified repair mortar before application of the waterproofing system.

2.4. The surface shall be pre-wetted to a saturated surface dry condition prior to application of the waterproofing treatment.

2.5. The liquid polymer component and powder component shall be mixed mechanically in the proportion recommended by the manufacturer to obtain a homogeneous lump-free slurry.

2.6. The mixed material shall be applied uniformly by brush, trowel or spray in the required number of coats as recommended by the manufacturer.

2.7. Special attention shall be given to the junction between RCC slab and pipe sleeves, service penetrations, corners and vulnerable areas to ensure complete waterproofing.

2.8. The waterproofing membrane shall extend adequately around the sleeve and surrounding RCC surface to create a continuous waterproof barrier.

2.9. Successive coats shall be applied only after the previous coat has sufficiently cured as per the manufacturer's recommendations.

2.10. The finished membrane shall be seamless, flexible and free from pinholes, cracks, blisters and other defects.

2.11. The treated area shall be protected from damage, vibration, traffic and adverse weather conditions during curing.

2.12. The contractor shall carry out water ponding or leakage testing wherever directed by the Engineer-in-Charge to verify the effectiveness of the waterproofing treatment.

2.13. Any defects, leakage or failure observed during testing or the warranty period shall be rectified by the contractor at his own cost.

2.14. The work shall be carried out through a specialized waterproofing agency approved by the Engineer-in-Charge and in accordance with the manufacturer's recommendations.

3.0. Mode of Measurements and Payment

3.1. Waterproofing treatment shall be measured in Sqm.

3.2. The rate shall include surface preparation, cleaning, repair of minor defects, supply and application of polymer modified cementitious waterproofing system, labour, tools, equipment, scaffolding, curing, testing and all materials required for complete execution of the work.

3.3. The rate shall also include treatment of pipe penetrations, sleeve junctions, corners, overlaps and all incidental works required to ensure complete waterproofing.

3.4. No separate payment shall be made for mixing, testing, curing, protection, warranty obligations, rectification of defects or any incidental operations necessary for satisfactory completion of the work.

3.5. The rate shall include providing a **Five (5) Year Performance Warranty** against leakage, seepage and failure of the waterproofing system from the date of completion and acceptance of the work.

3.6. The rate shall be for one complete waterproofed bore packing/sleeve treatment executed and approved by the Engineer-in-Charge.

Item No: 45 Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.

1.0. Materials

1.1. Granite stone slabs shall be 18 mm thick, machine cut, mirror polished and of approved quality, colour, shade and pattern as shown in architectural drawings or as approved by Engineer-in-Charge.

1.2. The granite stone shall be hard, sound, dense and free from cracks, cavities, flaws, veins and other defects impairing strength, durability and appearance.

1.3. The slabs shall be of uniform thickness and accurately cut to required sizes and shapes including straight, curved and irregular profiles wherever required.

1.4. Cement shall conform to relevant I.S. specifications.

1.5. Coarse sand shall be clean, hard and free from organic and deleterious matter.

1.6. Cement mortar for bedding shall consist of 1:4 (1 cement : 4 coarse sand) by volume.

1.7. White cement used for pointing shall be of approved quality.

1.8. Pigments used for matching the shade of granite shall be colour fast and approved by Engineer-in-Charge.

1.9. Water used for mixing mortar, slurry and curing shall be clean and free from harmful impurities.

2.0. Workmanship

- 2.1. The base surface shall be thoroughly cleaned and prepared before laying the granite flooring.
- 2.2. The flooring shall be laid in required design, pattern, alignment and levels as shown in architectural drawings including straight, diagonal, curved and other special layouts.
- 2.3. A bed of 20 mm average thickness cement mortar 1:4 shall be laid evenly and brought to proper line, level and slope as required.
- 2.4. Granite slabs shall be thoroughly cleaned and wetted before laying.
- 2.5. Cement slurry shall be spread uniformly over the mortar bed and the granite slabs shall be laid carefully in position.
- 2.6. Each slab shall be properly bedded by gentle tapping with wooden mallet to achieve full contact and uniform levels.
- 2.7. The flooring shall be truly level, even and free from irregularities, depressions and projections.
- 2.8. Joints between slabs shall be kept as thin as possible and shall be uniform throughout the work.
- 2.9. The joints shall be filled and pointed with white cement slurry admixed with approved pigment matching the shade of granite.
- 2.10. Curvilinear portions, border pieces, edge pieces, cut-outs, grooves, patterns and special shapes shall be executed neatly as shown on drawings.
- 2.11. After laying, the flooring shall be kept continuously moist and cured for a minimum period of seven days.
- 2.12. After curing, the surface shall be rubbed and polished to obtain a smooth, uniform and mirror finished appearance.
- 2.13. The finished flooring shall be truly level, free from lipping, cracks, stains and other defects.
- 2.14. Any damaged, stained or defective slab shall be removed and replaced by the contractor at his own cost.
- 2.15. The finished surface shall be cleaned thoroughly and protected from damage until completion of the work.

3.0. Mode of measurements and payment

- 3.1. The granite flooring shall be measured in square metres of finished surface area.
- 3.2. Length and breadth shall be measured correct to the nearest centimetre and the area calculated accordingly.
- 3.3. No separate payment shall be made for cutting, shaping, curved work, edge finishing, patterns, grooves, wastage, matching of grains, polishing, pointing or curing.
- 3.4. The rate shall include cost of granite stone slabs, cement mortar bedding, cement slurry, white cement pointing with matching pigment, rubbing, polishing, curing, labour, tools and plants, scaffolding and all materials and operations necessary for completion of the work.

3.5. The rate shall be for a unit of one square metre.

Item No: 46 & 50 Providing and laying Vitrified tiles 8 to 10 mm thick, in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) and jointed with white cement slurry

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. Colour glazed tiles size 30 x 45 cm or 30cm x 60cm 6 mm to 8mm thick shall conform to relevant Indian standard code 15622-2017. (Kajaria, Asian, Bell, Nitco, Somani or equivalent std. quality)

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 8 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying ;

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement plaster 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed. They shall be cut to the required size and the edges be smoothened.

2.2.3. The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above.

Risers of steps : skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo including curves, where special such as covers internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

3.2. The rate shall be for a unit of one sq. meter.

Item No: 49 P & L 24" x 24" vitrified 8 mm thick tile flooring over 20 mm (average) base of cement mortar 1:6 (1 cement: 6 coarse sand) on new surface or fixing on existing flooring by adhesive material including dismantling of existing flooring and jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complete for antiskit

1. Material:

- 8 mm thick Vitrified tiles shall be used and as per sample approved by EIC/Architect.
- Epoxy grouting shall be used of Laticrete or equivalent approved material by EIC/Architect.
- All type of material shall be used for flooring work as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

2. Workmanship:

- **Bedding:**

- Bedding shall be cleaned, wetted and mopped. The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the monsoon to place wooden planks across and squat on it.

- The Vitrified tiles shall be laid on cement mortar bedding of 20 mm. thick in CM.1:6. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The bedding shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 20 mm. at any place and average 20 mm thickness. The proportion of the cement mortar shall be as specified in the item.

- **Fixing tiles:**

- The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 33 kg/Cement/Sqmt. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles shall be smeared with neat cement slurry.

- The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles.' There shall be no hollows in bed or joints. The joints between the tiles shall be as in straight line or as per pattern as per detailed drawing.

- The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nahni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with laticrete grouting with wire brush or trowel to a depth of 6 mm. and loose material removed. Laticrete shall be used for pointing the joints. After fixing the tiles finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

- **Cleaning:**

- The surplus grouting material that may have come out of the joints shall be cleaned off before it sets. Once the floor has set, it shall be carefully washed, cleared and dried. Proper precautions and measures shall be taken to ensure that the tiles are not damaged in any way till the completion of the construction.

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, finishing, labour, scaffolding, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- The work done shall be measured in square meter for visible area of work done. The length and width of the flooring shall be measured between the faces of Skirting or dedo or plastered face of wall as the case may be. The paving under dedo or skirting shall not be measured. No deduction shall be made not extra paid for any opening in the floor of area Up to 0.1 sqmt. Nothing extra shall be paid for laying the floors at different levels in the same rooms. The rate shall be for a unit of one square meter.

Item No: 51 Providing & Fixing 18MM Mirror Polished granite Washbasin platform of 45 cm width and 70 cm height and platform as per design including cost of cement, jari adhesive, Edge round Moulding etc as per approved by engineer in charge.

1.0. Materials

- 1.1. Granite stone shall be of approved make, colour and shade, free from cracks, cavities, veins, patches and other defects affecting strength, appearance or durability.
- 1.2. Granite slab shall be 18 mm thick, machine cut, mirror polished and of approved quality.
- 1.3. Cement shall conform to M-3 and shall be of approved make.
- 1.4. Adhesive, if used, shall be of approved make suitable for fixing granite slabs on masonry or RCC surfaces.
- 1.5. Jari, fillers and jointing materials shall be of approved quality and matching shade.
- 1.6. Water used for fixing and curing shall conform to M-1.
- 1.7. All accessories required for fixing, supporting and finishing the granite platform shall be of approved quality.

2.0. Workmanship

- 2.1. The work shall consist of providing and fixing 18 mm thick mirror polished granite wash basin platform of approved colour, shade and design as shown in the drawings and directed by the Engineer-in-Charge.
- 2.2. The wash basin platform shall generally be 450 mm wide and fixed at a height of 700 mm from finished floor level or as indicated in the approved drawings.
- 2.3. The supporting surface shall be properly prepared, cleaned and made true to line and level before fixing the granite slab.
- 2.4. Granite slabs shall be accurately cut to required dimensions and shapes, including openings for wash basins, taps, waste fittings and other fixtures wherever required.

- 2.5. The granite slab shall be fixed using cement mortar, approved adhesive or combination thereof as directed by the Engineer-in-Charge.
- 2.6. Joints shall be kept to a minimum and shall be neatly filled with matching colour filler or approved jointing compound.
- 2.7. All exposed edges shall be machine polished and provided with rounded edge moulding (bullnose edge) or profile moulding as shown in the drawings.
- 2.8. The platform shall be fixed true to line, level and slope wherever required to facilitate proper drainage.
- 2.9. Any cut-outs, grooves, notches or openings required for installation of wash basins and accessories shall be neatly executed without causing damage to the granite.
- 2.10. The finished surface shall be smooth, even, mirror polished and free from scratches, chips, stains or other defects.
- 2.11. After completion, the surface shall be thoroughly cleaned and protected until handing over of the work.
- 2.12. Any damaged or defective granite slab shall be removed and replaced by the contractor at his own cost.

3.0. Mode of Measurements and Payment

- 3.1. Granite wash basin platform shall be measured in square metres of finished surface area actually executed and approved by the Engineer-in-Charge.
- 3.2. Measurement shall be based on the net exposed plan area of the granite platform. No deduction shall be made for openings up to 0.10 sq.m.
- 3.3. The rate shall include supply of granite, cutting, polishing, edge moulding, fixing, adhesive, cement mortar, fillers, finishing, labour, tools, equipment, transportation and all materials required for complete execution of the work.
- 3.4. The rate shall also include making cut-outs for wash basins, taps, waste fittings and other fixtures, rounded edge moulding, polishing and cleaning.
- 3.5. No separate payment shall be made for wastage, edge finishing, cut-outs, joint filling, transportation, handling, protection or any incidental work required for satisfactory completion.
- 3.6. The rate shall be for one square metre of completed 18 mm thick mirror polished granite wash basin platform as approved by the Engineer-in-Charge.

Item No: 52 Providing and laying 18mm thick granite of specified size colour, shade and of approved make, in Wall, column cladding, risers of steps, dedo and , sill and jambs of door, window & ventilation frame with mini. two coat of construction chemical and as per manufacture specification incl. rubbing and polishing, rounding edge and All joints filled with coloured cement putty as per architect detail and wiped to give sharp joints with flush pointing and washed clean with acid As per drawings and design supplied by architect and instruction given by authority and E.I.C. incl. cost of steel fastener of approved make at every 1/3 span if required etc. complete colour and shed as approved by architect engineer in charge.

1.0. Materials

1.1. Water shall conform to M-1. Lime mortar shall conform to M-10. Cement mortar shall conform to M-11. machine cut matt finished polished 16 to 18 mm thick Granite stone in single piece (Max. 1.5m) shall conform to M-52.

2.0. Workmanship

2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides trust dressed shall have a full contract if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving a plane surface. The thickness shall be 20 mm. (Average) as specified in the item but not less than 25 mm. at any place of the slab.

2.2. Bedding for the machine cut matt finished polished 16 to 18 mm thick Granite stone in single piece (Max. 1.5m) shall be of cement mortar 1:1 (1 cement : 1 coarse sand) or L.M. 1:1.5 of average thickness 20 mm given in the description of the item. Sub grade shall be cleaned wetted and mopped mortar of the specified mix and thickness shall then be spread on an area sufficient to receive one Granite stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. If shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey-like consistency shall be applied. The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining, the walls shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wan and floor shall be finished neatly. The finished surface shall be true to levels and slopes as directed.

2.3. The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly

2.4. Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shah be done with carborundum stones of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone of 220 to 350 grade grit fitted in heavy machine. Water shall be properly used during polishing. The stone shall then be washed clean with water When directed by the Engineer-in-charge, wax polish of approved quality shall be applied on the surface with the help of soft cloth over a clean and dry surface. Then the polishing machine fitted with bobs shall be run over it.

2.5. The holes required for Nahni traps, pipes and any other fittings shall be made, without any extra cost.

3.0. Measurement & payment

3.1. The rate shall include the cost of all materials and labour involved in all the operations described above. The Granite stone flooring shall be measured in square meters correct to two

places decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dedo plaster and no deduction shall be made nor extra paid for any opening in floor of areas upto 0.1 sq.

3.2. The rate shall be for a unit of one sq. meter.

Item No: 53 Green marble (Marble Slab stone 25mm thick double polished) Machine cut 7.5cm Strip on Ramp and Ramp Skirting Wall.

1.0. Materials

1.1. Green marble stone shall be of approved make, colour and shade, free from cracks, flaws, cavities, veins and other defects affecting strength, appearance or durability.

1.2. Marble slabs shall be 25 mm thick, machine cut and double polished on exposed surfaces.

1.3. The marble strips shall be accurately cut to 75 mm width and required lengths as per approved drawings.

1.4. Cement shall conform to M-3 and shall be of approved make.

1.5. Fine sand shall conform to M-6 and shall be clean, hard and free from deleterious materials.

1.6. Cement mortar for fixing shall be of proportion 1:3 (1 cement : 3 coarse sand) unless otherwise specified.

1.7. White cement slurry with matching pigment shall be used for filling joints wherever required.

1.8. Water used for fixing, polishing and curing shall conform to M-1.

2.0. Workmanship

2.1. The work shall consist of providing and fixing 25 mm thick double polished green marble strips of 75 mm width on ramps and ramp skirting walls as shown on the drawings and directed by the Engineer-in-Charge.

2.2. The base surface shall be properly cleaned and prepared before fixing the marble strips.

2.3. Marble strips shall be machine cut to accurate dimensions and laid true to line, level, slope and alignment.

2.4. The strips shall be fixed over a bed of cement mortar 1:3 of suitable thickness or approved adhesive as directed by the Engineer-in-Charge.

2.5. Joints shall be kept as thin as possible and shall be filled with white cement slurry mixed with matching pigment to achieve a uniform appearance.

2.6. Marble strips on ramps shall be laid in straight lines and firmly bedded to prevent movement or displacement.

2.7. Ramp skirting marble shall be fixed plumb, level and in proper alignment with adjacent finishes.

2.8. All exposed edges shall be neatly finished, rounded or chamfered wherever shown in the drawings or directed by the Engineer-in-Charge.

2.9. The finished surface shall be smooth, even and free from lipping, cracks, stains, scratches or other visible defects.

2.10. After fixing, the marble surface shall be cleaned thoroughly and protected from damage until completion of the work.

2.11. Any damaged, stained or defective marble shall be replaced by the contractor at his own cost.

3.0. Mode of Measurements and Payment

3.1. Green marble strips shall be measured in running metres of finished work actually executed and approved by the Engineer-in-Charge.

3.2. Measurement shall be taken along the centre line of the marble strips fixed on ramps and ramp skirting walls.

3.3. The rate shall include supply of marble, cutting, double polishing, fixing, mortar bed, white cement slurry, pigments, edge finishing, labour, tools, plants, transportation, handling, curing and all materials required for complete execution of the work.

3.4. No separate payment shall be made for cutting, wastage, polishing, joint filling, edge finishing, scaffolding, protection, cleaning or any incidental operations required for satisfactory completion of the work.

3.5. The rate shall be for one running metre of 25 mm thick double polished green marble strip, 75 mm wide, complete as approved by the Engineer-in-Charge.

Item No: 54 Providing and fixing structural glazing with using the 17 micron anodised of approved colour aluminium section as transium, mullium of size 63mm x 38mm x 2 mm with using 6 mm thick reflective structural glass of approved make, colour, toughned and shade and fixed with silicone sealant and spacer tap and at corner sealed neoprene foam dust and air sealed gasket mirred including scaffolding, cleaning of glass etc.complete at all heights anf lifts with all necessary fitting and fixtures, anchore fasteners, necessary m.s. or aluminium brackets, suitable design for openable window as per architectural drawing and as directed by engineer-in-charge. Grooves between the glasses to be filled with sealant of dow corning - structural sealant 995, weather sealant 789. The entire façade should be water proof. The mullions are to be connected to bracket by ss-304 nut bolts. Measurement shall be given as per actual execution of the work.

1.0. Materials

1.1. Aluminium sections used for structural glazing shall be extruded aluminium alloy sections of approved make conforming to relevant I.S. specifications and shall be anodized with minimum 17 micron coating thickness in approved colour and finish.

1.2. The transoms and mullions shall be of size 63 mm × 38 mm × 2 mm or as approved by Engineer-in-Charge and shall be capable of safely resisting design wind loads and dead loads of glazing.

1.3. Structural glazing glass shall be 6 mm thick reflective toughened glass of approved make, colour, shade and performance characteristics as approved by Engineer-in-Charge.

1.4. The toughened glass shall be free from scratches, bubbles, distortions, cracks and other defects affecting strength or appearance.

1.5. Structural silicone sealant shall be Dow Corning 995 or approved equivalent specifically designed for structural glazing applications.

1.6. Weather sealant shall be Dow Corning 789 or approved equivalent suitable for exterior weatherproof sealing.

1.7. Spacer tapes, setting blocks and glazing accessories shall be compatible with structural silicone sealant and approved by the sealant manufacturer.

1.8. Neoprene foam gaskets, dust seals and air seals shall be of approved quality and suitable for long-term exposure to weather conditions.

1.9. Stainless steel fasteners, nuts, bolts and washers used for fixing mullions and transoms shall be SS-304 grade.

1.10. Aluminium or M.S. brackets, anchor fasteners and supporting accessories shall be of approved design and adequate strength to withstand imposed loads.

1.11. All materials shall be sourced from approved manufacturers and shall be accompanied by relevant test certificates wherever required.

2.0. Workmanship

2.1. The work shall be carried out strictly in accordance with approved architectural drawings, structural design calculations, shop drawings and manufacturer's recommendations.

2.2. Prior to fabrication, all dimensions at site shall be verified and coordinated with structural and architectural requirements.

2.3. Aluminium mullions and transoms shall be accurately fabricated, assembled and erected to true line, level and plumb.

2.4. The mullions shall be fixed to structural members through approved aluminium or M.S. brackets using SS-304 nuts, bolts and anchor fasteners.

2.5. Adequate provisions shall be made for thermal expansion, building movements, wind pressure and seismic movements without affecting performance of the façade.

2.6. Reflective toughened glass panels shall be cut, processed and installed strictly as per manufacturer's recommendations and approved shop drawings.

2.7. The glass panels shall be positioned accurately using approved setting blocks and spacer tapes to maintain uniform joints throughout the façade.

2.8. Structural silicone sealant Dow Corning 995 shall be applied in specified dimensions to achieve permanent structural bonding between glass and aluminium framing members.

2.9. All external weather joints shall be sealed using Dow Corning 789 weather sealant to provide complete protection against water penetration and air leakage.

2.10. Neoprene foam gaskets and approved dust and air seals shall be installed continuously at all joints, corners and interfaces.

2.11. Openable window units wherever shown in architectural drawings shall be incorporated into the glazing system complete with approved aluminium sections, hardware, locking arrangements, hinges, handles and weatherproof sealing systems.

2.12. The entire façade system shall be designed and executed to be completely watertight and weather resistant.

2.13. Any gaps, voids or discontinuities in the sealant system shall be rectified immediately before final acceptance.

2.14. The contractor shall provide all necessary scaffolding, lifting equipment, safety arrangements and temporary supports required for execution of work at all heights and levels.

2.15. Upon completion, all aluminium surfaces, sealants and glass panels shall be cleaned thoroughly and protected from damage until handing over.

2.16. Any damaged glass, sealants, aluminium members or accessories shall be replaced by the contractor at his own cost.

3.0. Mode of measurements and payment

3.1. Structural glazing shall be measured in square metres based on actual completed area of façade installed and accepted by Engineer-in-Charge.

3.2. The measurement shall be taken on the visible finished face of glazing including fixed and openable portions.

3.3. No separate payment shall be made for mullions, transoms, brackets, anchor fasteners, SS-304 nuts and bolts, silicone sealants, spacer tapes, neoprene gaskets, weatherproofing arrangements, openable window provisions, scaffolding, lifting equipment, cleaning or protection.

3.4. The rate shall include cost of anodized aluminium sections, reflective toughened glass, structural sealant Dow Corning 995, weather sealant Dow Corning 789, gaskets, brackets, fasteners, fabrication, transportation, erection, testing, labour, tools and plants and all incidental items required for complete execution of the work.

3.5. The rate shall include providing a fully weatherproof, dustproof and watertight façade system complete in all respects.

3.6. The rate shall be for a unit of one square metre.

Item No: 55 Providing & fixing 12mm thick toughened glass door with fittings & also with floor spring & Locking system of Approved Make. .note:- flooring cutting covered in this item so no extra claim for vitrified / kotah/Granite flooring.

1.0 Materials

1.1 Toughened glass door shutter shall be manufactured from 12 mm thick clear toughened safety glass conforming to relevant I.S. specifications.

1.2 Toughened glass shall be free from bubbles, waviness, scratches, distortion and other visible defects.

1.3 All exposed edges of glass shall be machine polished and smoothly finished.

1.4 Floor spring shall be of Enox make or approved equivalent and suitable for the weight and size of glass door shutter.

1.5 Patch fittings, handles, connectors, pivots, clamps and all hardware fittings shall be of Enox make or approved equivalent.

1.6 Locking system shall be heavy duty approved make compatible with toughened glass door assembly.

1.7 Stainless steel fittings shall be corrosion resistant and of approved finish.

1.8 Fasteners, screws, anchor bolts, bushes and accessories shall be of stainless steel or approved non-corrosive material.

1.9 Sealant, gaskets and packing materials wherever required shall be compatible with glass fixing application.

2.0 Workmanship

2.1 The work shall be executed strictly as per approved drawings and instructions of Engineer-in-Charge.

2.2 Toughened glass shall be factory processed and accurately cut to required size and shape before tempering.

2.3 Necessary holes and cut-outs required for fittings and locking system shall be factory made only.

2.4 Floor cutting required for fixing floor spring shall be carried out carefully without damaging adjoining flooring.

2.5 Floor spring shall be fixed firmly in proper alignment and level to ensure smooth operation of door shutter.

2.6 Glass door shutter shall be installed true to line, level and plumb with proper clearances.

2.7 Enox patch fittings, pivots, handles and locking system shall be fixed securely and neatly.

2.8 Necessary gaskets, bushes and packing shall be provided to avoid direct metal to glass contact.

2.9 Door shutter shall open and close smoothly without vibration, rubbing or misalignment.

2.10 All fittings shall be properly aligned and adjusted for smooth functioning of door assembly.

2.11 Exposed surfaces of glass and fittings shall be cleaned thoroughly after installation.

2.12 Damaged glass or defective fittings shall not be accepted and shall be replaced by contractor at no extra cost.

3.0 Mode of Measurement & Payment

3.1 Toughened glass door shall be measured in square meter of finished shutter area.

3.2 The rate shall include toughened glass, Enox floor spring, patch fittings, locking system, handles, pivots, connectors, floor cutting, fixing accessories, sealants, labour, tools & plants and all incidental works required for complete installation.

3.3 No separate payment shall be made for floor cutting in vitrified tile, Kota stone or granite flooring, holes, polishing, hardware fixing or cleaning.

3.4 The rate shall be for complete toughened glass door assembly fixed in position and functioning properly.

Item No: 56 Providing and fixing window having extruded aluminum Colour anodized section frame main outer size 95mm x 24mm x 1.17mm @ wt.of 0.738 Kg/mt , horizontal Three track member size 92mm x 31.75mm x 1.30mm,@Wt.1.07 Kg/mt , vertical member of size 92mm x 31.75mm x 1.50mm @ Wt. 1.06 Kg/mt with sliding shutters of horizontal member size 40 mmx18mmx1.29mm @ wt.of 0.456 Kg/mt, vertical member of size 40mm x 18mm x 1.29 mm @ wt.of 0.456Kg/mt/ with 5mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc with Mosquito jali window with extra track

1.0. Material

1.1. Alluminium standard section: Alluminium used in the manufacture of sliding window section shall confirm to IS designation HEA- WP- of IS 733-1975 and also designation W.V.G.- WP of IS 1285-1975 section shall be as specification in the drawing and design. All section shall be free from any scratches or any damage on surface. All section shall have finished luster surface on wall sides.

1.1.1. The work includes window having extruded aluminum Colour anodized section frame main outer size 95mm x 24mm x 1.17mm @ wt.of 0.738 Kg/mt , horizontal Three track member size 92mm x 31.75mm x 1.30mm,@ Wt.1.07 Kg/ mt, vertical member of size 92mm x 31.75mm x 1.50mm @ Wt. 1.06 Kg/ mt with sliding shutters of horizontal member size 40 mmx18mm x1.29mm @ wt.of 0.456 Kg/mt, vertical member of size 40mm x 18mm x 1.29 mm @ wt.of 0.456Kg/mt/ with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc

1.2 Glass : The transparent tinted (bronze colour) float glass shall be of approved make having thickness of 5mm thick. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with transparent silicon gasket.

1.3 Rubber Gasket : Rubber gasket shall be approved make quality.

1.5. Fixtures

1.5.2 Screw : All Screw shall be approved make.

1.5.3 Conceal Lock

Conceal Lock shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

1.6. Workmanship :

The work of window having extruded alluminium colour anodized section frame shall be exactly right angel and fixed with screw at surface done with extreme finishing. The Glass shall be fixed in specified Aluminium frame member with rubber gasket as directed by engineer in charge. All the fixtures and fastening shall be fitted at right place and as directed by Engineer in charge.

Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

The work Window having extruded aluminum colour anodized section frame main outer size Three Track Member size 92mm x 31.75 mm x 1.30 mm (of Jindal Section No. 20620 @ Wt. of 1.07 Kg./mt.), Vertical member of size 92mm x 31.75mm x 1.50mm (of Jindal Section No. 20831, @ Wt. 1.06 Kg./mt.), with sliding shutter of horizontal member of size 40mm x 18 mm x 1.29 mm (of Jindal Section 20844 @ Wt. 0.456 Kg./mt.) Vertical member of size 40mm x 18mm x 1.29mm (of Jindal Section No. 20846 @ wt. of 0.456 Kg./mt.) with 5mm thick transparent tinted (bronze colour) float glass including glazing clips and rubber gasket with colour anodized aluminium fittings and fixtures having one wire mesh jali shutter & two glazed shutter as shown in drawing and transparent silicon sealant glass fixing to frame as per details etc. complete as directed by Engineer in charge.

1.7 Mode of measurement and payment

The unit rate of window having extruded alluminium colour anodized section frame shall include the cost of all material, cost of anodizing. Cost of all necessary fixture and fastening. Labour charge for fixing frame and fixing window in wall at the place shown drawing and instructed by engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of Engineer in charge and all other incidental expenses for preparing window frame and shutter of specified size complete the window structure or its components as shown on the drawing and according the these specification. They shall include the cost of making, fixing and making walls good by plaster colour etc. as directed.

The window having extruded aluminum colour anodized section frame shall be measured for its width and height, limiting dimension to those specification on plan or as directed.

The rate shall be for a unit of one sq.mt.

Item No: 57 Providing and fixing standared extruded of alluminium section of size 63mm x 38.10mm x 1.2mm , @ Wt. 0.643 Kg/mt with colour Powder Coated alluminium frame for ventilation with 5 mm thick frosted glass as details etc complete for Ventilation

1. Material:

- Aluminum section shall be used as per sample approved by EIC/Architect.
- 5 mm thick frosted glass shall be used as per sample approved by EIC/Architect.
- Hardware and accessories shall be used as per sample approved by EIC/Architect
- All type of material shall be used for work as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.
- Aluminum ventilation shall confirm M-31 of GTS Booklet for building works.
- Fixtures and fastenings shall confirm M-43 of GTS Booklet for building works.

2. Workmanship:

- Work complete as per as described above specification.
- Work should be properly leveled without any sagging and with smooth opening and closing. There should be no variation or deviation of any kinds.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, finishing, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.

- No extra payment will be given for any of the reasons.
- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors. Clear opening area shall be measured & paid in Square Meter.
- The rate shall be for a unit of Square meter.

Item No: 58 Providing and fixing in position collapsible steel shutters with vertical channels 20 x 10 x 2 mm braced with flat iron diagonals 20 x 5 mm size with top and bottom rails of T_rin 40x 40 x 6 mm with 38mm dia, steel pulleys complete with bolts, nuts, locking arrangements, stoppers handles including applying a priming coat of red lead paint.

1.0. Materials

1.1. The collapsible steel shutter shall consist of double vertical channels of size 20 mm × 10 mm × 2 mm thick, fabricated from mild steel conforming to relevant I.S. specifications.

1.2. The vertical channels shall be braced with flat iron diagonals of size 20 mm × 5 mm arranged in a scissor pattern and securely riveted or bolted to permit smooth opening and closing.

1.3. Top and bottom rails shall consist of M.S. T-iron sections of size 40 mm × 40 mm × 6 mm conforming to relevant I.S. specifications.

1.4. Rollers or pulleys shall be of steel, 38 mm diameter, mounted on suitable steel pins and designed to provide smooth and noiseless movement.

1.5. Bolts, nuts, rivets, locking arrangements, stoppers, handles and other accessories shall be of approved quality and suitable for heavy-duty operation.

1.6. Mild steel sections shall be free from cracks, bends, twists, laminations and other defects.

1.7. Red lead primer or approved anticorrosive metal primer shall conform to relevant I.S. specifications.

2.0. Workmanship

2.1. The work shall consist of providing and fixing collapsible steel shutters at locations shown on the drawings and as directed by the Engineer-in-Charge.

2.2. The shutter shall be fabricated accurately to the required size and shape and shall operate smoothly without distortion, binding or excessive play.

2.3. The double channels shall be assembled with flat iron diagonals to form a strong and rigid collapsible arrangement.

2.4. The top and bottom rails shall be fixed true to line and level and shall be capable of carrying the shutter load without deformation.

2.5. Steel pulleys shall be properly aligned within the guide rails to ensure smooth operation of the shutter.

2.6. Necessary locking arrangements, handles, stoppers and accessories shall be provided complete in all respects.

2.7. All welds shall be continuous, neat and properly finished. Welded surfaces shall be cleaned and dressed smooth.

2.8. Before application of primer, all steel surfaces shall be thoroughly cleaned of rust, mill scale, oil, grease and other foreign matter.

2.9. One coat of red lead primer or approved anticorrosive primer shall be applied uniformly to all steel surfaces before erection.

2.10. The shutter shall be fixed securely in position with approved anchor fasteners, holdfasts, bolts and other fixing arrangements.

2.11. Any damage caused to adjoining masonry, plaster or finishes during installation shall be made good by the contractor without extra cost.

2.12. The completed shutter shall be tested for smooth operation and proper functioning of locking arrangements before acceptance.

3.0. Mode of Measurements and Payment

3.1. Collapsible steel shutters shall be measured in square metres of finished shutter area.

3.2. The area shall be calculated by multiplying the clear width and height of the shutter opening covered by the shutter.

3.3. The rate shall include supply of all steel sections, flat iron diagonals, T-iron rails, pulleys, bolts, nuts, rivets, handles, locking arrangements, stoppers, primer coating, fabrication, erection, fixing, labour, tools, plants, transportation and all incidental works required for complete installation.

3.4. No separate payment shall be made for welding, cutting, drilling, primer coating, accessories, holdfasts, anchor fasteners, testing, wastage or making good damaged surfaces.

3.5. The rate shall be for a unit of one square metre of completed collapsible steel shutter fixed in position and approved by the Engineer-in-Charge.

Item No: 59 Providing and fixing 38mm thick shutter flush door shutters, solid core finished with 1mm thick laminate on both side with guled PVC edge beading as patten & Selection hinges, Hydraulic Pelmet Arm Door Closer with Double Speed for Heavy Door/Soft Door Closer (ISO 9001 Certified) (Capacity 120 Kg, Silver) with necessary screw,s.s handle,s.s Aldrop,s.s Stopper for door 200CM x 210CM- D1 Single Shutter

☐ The Materials shall be used as per the general specifications.

☐ The Materials shall be used as per description of item given and as directed by the engineer in charge.

☐ Design of item & make shall be approved by engineer and architect in charge.

Workmanship:

☐ Workmanship shall be as per description given above and to the satisfaction of the engineer in charge.

Mode of Measurement and Payment.

- ☐ The rate shall includes cost of all materials and labor required for satisfactory

Completion of this item as described above.

- ☐ The Work shall be measured for the finished work.
- ☐ The Rate shall be for a unit of Sqm.

Item No: 60 Providing and fixing 38mm thick shutter flush door shutters, solid core finshed with 1mm thick laminate on both side with guled PVC edge beading as patten & Selection hinges, Hydraulic Pelmet Arm Door Closer with Double Speed for Heavy Door/Soft Door Closer (ISO 9001 Certified) (Capacity 120 Kg, Silver) with necessary screw,s.s handle,s.s Aldrop,s.s Stopper for door 120CM x 210CM- D2 Single Shutter

- ☐ The Materials shall be used as per the general specifications.
- ☐ The Materials shall be used as per description of item given and as directed by the engineer in charge.
- ☐ Design of item & make shall be approved by engineer and architect in charge.

Workmanship:

- ☐ Workmanship shall be as per description given above and to the satisfaction of the engineer in charge.

Mode of Measurement and Payment.

- ☐ The rate shall includes cost of all materials and labor required for satisfactory

Completion of this item as described above.

- ☐ The Work shall be measured for the finished work.
- ☐ The Rate shall be for a unit of Sqm.

Item No: 61 Providing and fixing 38mm thick shutter flush door shutters, solid core finshed with 1mm thick laminate on both side with guled PVC edge beading as patten & Selection hinges, Hydraulic Pelmet Arm Door Closer with Double Speed for Heavy Door/Soft Door Closer (ISO 9001 Certified) (Capacity 120 Kg, Silver) with necessary screw,s.s handle,s.s Aldrop,s.s Stopper for door 100CM x 210CM- D4 Single Shutter

- ☐ The Materials shall be used as per the general specifications.
- ☐ The Materials shall be used as per description of item given and as directed by the engineer in charge.
- ☐ Design of item & make shall be approved by engineer and architect in charge.

Workmanship:

- ☐ Workmanship shall be as per description given above and to the satisfaction of the engineer in charge.

Mode of Measurement and Payment.

- ☐ The rate shall include cost of all materials and labor required for satisfactory

Completion of this item as described above.

- ☐ The Work shall be measured for the finished work.
- ☐ The Rate shall be for a unit of Sqm.

Item No: 62 Providing and fixing FRP frame size 125x65 mm and 35mm thick FRP shutter having extra reinforcement on sides & edges in polish finish. The core of the shutter & frame is to be filled up with injected polyurethane foam done in situ along with embedded wooden pieces for stiffening & also taking hinges & fixtures. The whole FRP frame & shutter is to be water proof, weather proof, termite proof & resistance to mild acid/alkali. Rates are to be inclusive of S.S hinges with necessary screws & aluminium S.S fixtures & fastenings & fastener sleeve.

1.0 SHUTTER MATERIAL :

35 mm thick FRP shutter in depress panel design shall be having 1.5 to 2.0 mm FRP thickness fire extinguishing grade FRP skin and embedded wooden pieces for stiffening as well as holding hinges and fixtures all moulded into one piece shutter. Core material shall be injected fire extinguishing grade rigid polyurethane foam done in situ having density 32 to 36 Kg/m³, compressive strength 1.8 to 2.0 kg/cm², flexural strength 3.5 to 4.5 kg/cm². Whole shutter shall be water proof, weather proof, termite proof and mild acid / alkali resistance.

2.0 SHUTTER :

35 mm thick depress panel FRP shutter shall be jointless. It shall be straight and smooth and of standard shape finished in gel coat. All necessary fixtures and fastening shall be fixed where wooden piece provided.

3.0 SHUTTER WORKMANSHIP :

Shutter shall be fixed in line, level and proper manner having 2.0 to 3.0 mm play i.e. air space for smooth and easy working. Three S.S. hinges 100 mm size shall be fixed properly with necessary screws.

4.0 SHUTTER TOLERANCE :

1.5 mm tolerance will be allowed in thickness of shutter.

5.0 SHUTTER FIXTURES AND FASTENING :

All fixtures & fastening like S.S. aldrop, tidi or baby-latch, stopper, handle shall be fixed with shutter in usual manner. The shutter shall be fixed to frame using fixing necessary Khila or screws including drilling in granite frame as directed. During fixing of shutter if the granite frame is damaged the same will be replaced by contractor's own cost without any extra payment. Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

6.0 MODE OF MEASUREMENT AND PAYMENT :

Rate include the cost of all materials, S.S. fixtures and fastening with necessary screws for fixing in position, labour, tools, equipments etc. required for satisfactory completion of item as directed by the Engineer in charge with all lead and lift. The payment shall be made on unit of smt. basis.

Item No: 63 Providing & fixing laminate finish partition up to false ceiling ht (thickness of partition is 82 mm or as specified in drawing) having 12 mm thick marina plywood IS 710 grade both side on aluminum framing of gauge 16. Aluminum framing size for vertical & horizontal support is 50 mm x 25 mm. Grid of aluminum framing is 600 mm x 600 mm. All exposed surfaces finished with 1 mm thick Laminate of approved shade complete with mat finish. Necessary framing to be erected above false ceiling. No extra cost to be paid for the same. Before installation, make hole/face plate for conduit pipes of electrical / networking cables with open able stud from partition Including all materials and labor etc. Make necessary grooves as per shown in drawing. Using of 12 mm thick clear glass with proper crystal edges & with suggested frosted films on glass. All joints are covered with teakwood beading Patti finished with polish matching with laminate. Including door of same design if required Complete with all necessary hardware & adhesives as per details given in drawing and as per instructions of Architect/consultant/Engineer In charge. Contractor has to provide all necessary cut outs (race ways.) for Electrical works & no extra payment shall be made for it.

MATERIALS

Partition framework shall be fabricated from approved aluminium sections. Cladding shall consist of 12 mm thick marine plywood finished with 1 mm thick decorative laminate. Glazed portions shall comprise 12 mm thick clear toughened glass with polished edges. Teakwood beading, sealants and fixing accessories shall be of approved quality.

WORKMANSHIP

Framework shall be erected true to line, level and plumb. Laminate finish shall be smooth and properly bonded. Glass panels shall be securely installed with neat joints and proper sealing. The completed partition shall be rigid, stable and free from visible defects.

FIXTURES & ACCESSORIES

Aluminium framework, glass fixing systems, teakwood beading, sealants, brackets, fasteners and all accessories required for complete installation shall form part of the item.

INSTALLATION

Partition shall be erected up to false ceiling level as shown in approved drawings. Necessary openings and cut-outs for electrical and communication services shall be provided. The completed partition shall be cleaned and protected until handover.

MEASUREMENTS

Measurement shall be made in Square Metres (Sq.m.) of completed partition work. Rate shall include materials, labour, glazing, laminate finish, hardware, transportation, installation and all incidental works necessary for complete execution.

Item No: 68 Providing in position PVC pipe sleeves of 6Kg/cm² and length as per design for following diameters for services wherever pipes pass through walls/ slabs/beam in mtrs length. All pipes shall be accurately cut to the required sizes, laid as per drawing, kept in the position while concreting, and burrs removed before laying. Open ends of the pipe shall be closed as the pipe is installed to avoid clogging while concreting. Rate shall be inclusive of removal of sleeves before waterproofing or grouting. For all floors/all levels /all heights.

(a) 50mm Diameter

1. Material:

- All type of material shall be used as per approved make & Sample and confirming to relevant IS codes and approved by EIC/Architect.
- 50mm Dia PVC pipe sleeves shall be used as per approved by EIC/Architect/Client.

2. Workmanship:

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.
- The piping system must be clamped properly as required, pipes passing through walls, beams, slabs, columns should pass through sleeves which are padded with insulation material internally (between pipe and sleeve) covering the pipe to avoid transfer of body and structural borne sounds (refer manufacturer's installation guide lines). The piping must not touch any wall, structure, paneling, false ceiling etc..
- Cut-outs in the floor slab for installing the various pipes area are indicated in the drawings. Contractor shall carefully examine the cut-outs provided and clearly point out wherever the cut-outs shown in the drawings, do not meet with the requirements.
- Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fiberglass and finished with retainer rings

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, scaffolding, finishing, labour, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.

- The work done shall be measured and Paid in Running meter for visible area of work done.

The rate shall be for a unit of one Running meter.

Item No: 69 Providing in position PVC pipe sleeves of 6Kg/cm² and length as per design for following diameters for services wherever pipes pass through walls/ slabs/beam in mtrs length. All pipes shall be accurately cut to the required sizes, laid as per drawing, kept in the position while concreting, and burrs removed before laying. Open ends of the pipe shall be closed as the pipe is installed to avoid clogging while concreting. Rate shall be inclusive of removal of sleeves before waterproofing or grouting. For all floors/all levels /all heights.
(a) 75mm Diameter

1. Material:

All type of material shall be used as per approved make & Sample and confirming to relevant IS codes and approved by EIC/Architect.

75mm Dia PVC pipe sleeves shall be used as per approved by EIC/Architect/Client.

2. Workmanship:

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.
- The piping system must be clamped properly as required, pipes passing through walls, beams, slabs, columns should pass through sleeves which are padded with insulation material internally (between pipe and sleeve) covering the pipe to avoid transfer of body and structural borne sounds (refer manufacturer's installation guide lines). The piping must not touch any wall, structure, paneling, false ceiling etc..
- Cut-outs in the floor slab for installing the various pipes area are indicated in the drawings. Contractor shall carefully examine the cut-outs provided and clearly point out wherever the cut-outs shown in the drawings, do not meet with the requirements.
- Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fiberglass and finished with retainer rings

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, scaffolding, finishing, labour, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- The work done shall be measured and paid in Running meter for visible area of work done
- The rate shall be for a unit of one Running meter.

Item No: 70 Providing in position PVC pipe sleeves of 6Kg/cm² and length as per design for following diameters for services wherever pipes pass through walls/ slabs/beam in mtrs length. All pipes shall be accurately cut to the required sizes, laid as per drawing, kept in the position while concreting, and burrs removed before laying. Open ends of the pipe shall

be closed as the pipe is installed to avoid clogging while concreting. Rate shall be inclusive of removal of sleeves before waterproofing or grouting. For all floors/all levels /all heights.

(a) 110mm Diameter

1. Material:

- All type of material shall be used as per approved make & Sample and confirming to relevant IS codes and approved by EIC/Architect.
- 110mm Dia PVC pipe sleeves shall be used as per approved by EIC/Architect/Client.

2. Workmanship:

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.
- The piping system must be clamped properly as required, pipes passing through walls, beams, slabs, columns should pass through sleeves which are padded with insulation material internally (between pipe and sleeve) covering the pipe to avoid transfer of body and structural borne sounds (refer manufacturer's installation guide lines). The piping must not touch any wall, structure, paneling, false ceiling etc.

Cut-outs in the floor slab for installing the various pipes area are indicated in the drawings. Contractor shall carefully examine the cut-outs provided and clearly point out wherever the cut-outs shown in the drawings, do not meet with the requirements.

- Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fiberglass and finished with retainer rings

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, scaffolding, finishing, labour, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- The work done shall be measured and paid in Running meter for visible area of work done

The rate shall be for a unit of one Running meter.

Item No: 71 Providing in position PVC pipe sleeves of 6Kg/cm² and length as per design for following diameters for services wherever pipes pass through walls/ slabs/beam in mtrs length. All pipes shall be accurately cut to the required sizes, laid as per drawing, kept in the position while concreting, and burrs removed before laying. Open ends of the pipe shall be closed as the pipe is installed to avoid clogging while concreting. Rate shall be inclusive of removal of sleeves before waterproofing or grouting. For all floors/all levels /all heights.
(a) 160mm Diameter

1. Material:

- All type of material shall be used as per approved make & Sample and confirming to relevant IS codes and approved by EIC/Architect.

- 160mm Dia PVC pipe sleeves shall be used as per approved by EIC/Architect/Client.

2. Workmanship:

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.
- The piping system must be clamped properly as required, pipes passing through walls, beams, slabs, columns should pass through sleeves which are padded with insulation material internally (between pipe and sleeve) covering the pipe to avoid transfer of body and structural borne sounds (refer manufacturer's installation guide lines). The piping must not touch any wall, structure, paneling, false ceiling etc.
- Cut-outs in the floor slab for installing the various pipes area are indicated in the drawings. Contractor shall carefully examine the cut-outs provided and clearly point out wherever the cut-outs shown in the drawings, do not meet with the requirements.
- Pipe sleeves, larger diameter than pipes, shall be provided wherever pipes pass through walls and slab and annular space filled with fiberglass and finished with retainer rings.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, scaffolding, finishing, labour, etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.

The work done shall be measured and paid in Running meter for visible area of work done.

The rate shall be for a unit of one Running meter.

Item No: 72 Core cutting: Providing and wet drilling accurate and clean holes of specified diameter in RCC walls, slabs, beam or any other RCC member without vibration by core cutting (diamond drilling) machine including scaffolding, safety majors, disposing the debris, cleaning for all levels/ all height as per structural consultant's drawing, after approval of engineer in charge etc compete. Rate shall be inclusive of filling the hole with non-shrink grout/Chemical Anchoring in good manner. Measurement shall be taken for the depth of holes in running meter for specified diameter. Holes shall made by authorised approved agency. (a) Holes from 100 dia.

1. Material and Workmanship:

- Marking of holes is to be approved by Employer's representative/employer Holes in RCC walls, slabs, beams or any other RCC member by Core cutting machine of HILTI or as per approved list of make is to be done.
- RCC surface is cleaned after drilling including disposing of debris as specified in the disposal item. Necessary platform for the machine location and electrical wire management shall be adhere to safety standards. Bidder shall be responsible for the any type of damage work at the time of execution.
- The work include for epoxy based waterproofing compound for sealing the joints around the pipes at all heights as per instruction of Employer's representative/employer

- All work should be carried out as per detailed drawing and instruction of EMPLOYER'S

REPRESENTATIVE/EMPLOYER/Architect

- Bidder shall be responsible for the any type of damage work at the time of execution.
- The whole work is to be completed as per design & any other requirement shall be as per instruction of Employer's representative/employer

2. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, fixtures, joineries, labour, scaffolding, etc.to complete the whole work satisfactorily as per instruction of Employer's representative/employer
- No extra payment will be given for any of the reasons.

The rate shall be for a unit of Numbers.

Item No: 73 Acrylic Signages (Name Plate 150 mm high) Providing and fixing ACRYLIC SIGNAGES of 10 mm Acrylic name plate with vinyl cut work on top of brand Ptglass, astari etc., with all laser and cnc work, including all material, labour, studs for mounting and other hardwares, waste of materials etc. and complete the work satisfactorily as per instruction of Architect or engineer-in charge.

1.0. Materials

1.1. The signage shall consist of 10 mm thick acrylic sheet of approved make such as Ptglass, Astari or equivalent approved by Engineer-in-Charge.

1.2. The acrylic sheet shall be clear, uniform in thickness, free from scratches, cracks, bubbles, waviness and other manufacturing defects.

1.3. Vinyl graphics, lettering, logos and symbols shall be computer cut from premium quality self-adhesive vinyl of approved colour, shade and finish.

1.4. Laser cutting, CNC routing and engraving materials shall be suitable for achieving precise and smooth edges as per approved drawings.

1.5. Studs, spacers, mounting brackets, anchor fasteners, screws and other fixing hardware shall be of stainless steel or approved non-corrosive material.

1.6. Adhesives, tapes and fixing accessories shall be of approved quality and suitable for long-term interior or exterior application as required.

1.7. The signage shall conform to approved architectural drawings, artwork, colour schemes and design details.

2.0. Workmanship

2.1. The signage shall be fabricated strictly in accordance with approved drawings, artwork and instructions of Architect or Engineer-in-Charge.

2.2. The acrylic sheet shall be cut accurately to the required size and shape using laser cutting or CNC routing machines.

2.3. All edges shall be smooth, uniform and neatly finished without chipping, cracks or visible defects.

2.4. Vinyl lettering, logos, symbols and graphics shall be accurately positioned and applied on the acrylic surface without wrinkles, air bubbles or distortions.

2.5. Laser engraving, CNC engraving or decorative cutting work wherever specified shall be executed neatly and accurately.

2.6. The completed signage shall be mounted using approved stainless steel studs, spacers, brackets or other approved fixing systems.

2.7. Fixing shall be carried out in true alignment and level to ensure a neat appearance.

2.8. Holes required for fixing shall be drilled carefully without causing damage to the acrylic sheet.

2.9. The contractor shall verify all dimensions, artwork details, spelling, fonts and locations before fabrication and installation.

2.10. Necessary templates shall be used to ensure proper positioning and alignment during installation.

2.11. Any damaged, scratched or defective signage shall be replaced by the contractor at his own cost.

2.12. After installation, the signage shall be thoroughly cleaned and all protective films removed.

2.13. The completed signage shall present a smooth, attractive and professional appearance to the satisfaction of the Architect and Engineer-in-Charge.

3.0. Mode of measurements and payment

3.1. Acrylic signages shall be measured in numbers of completed signboards installed and approved by Engineer-in-Charge unless otherwise specified in the schedule.

3.2. The rate shall include cost of 10 mm thick acrylic sheet, vinyl graphics, laser cutting, CNC routing, engraving work, studs, spacers, mounting hardware, anchor fasteners, adhesives, labour, transportation, installation, tools and plants and all materials necessary for complete execution of the work.

3.3. No separate payment shall be made for artwork preparation, wastage of materials, templates, fixing accessories, drilling, alignment, cleaning or protection of completed work.

3.4. The rate shall include all labour, materials and incidental charges required for satisfactory completion of the work as directed by Architect or Engineer-in-Charge.

3.5. The rate shall be for a unit of one number complete.

Item No: 74 Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A)In beams and joists,

channels angles Tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins conneted to common rafters and the like.

1. Material:

- Material brackets shall be used as per approved sample and confirming to relevant IS codes and approved by EIC/Architect.
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.
- Oil paints / Enamel Paints shall confirm M-44 of GTS Booklet for building works.

2. Workmanship:

- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.
- Work complete as per relevant specification of Item No: 11.4 (a), page No - 70 in General specification R & B booklet for building works.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, finishing, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.

The rate shall be for a unit of one quintal.

Item No: 77 Providing and laying polythene sheet / Low-Density Polyethylene (LDPE) film of approved brand and manufacturer, having a true thickness of 300 microns (conforming to IS: 2508 standards) over consolidated sub-grade, under cement concrete flooring, or for damp-proofing courses, including straightening, cutting, overlapping by a minimum of 100 mm, jointing and sealing laps securely with heavy-duty adhesive tape where necessary, and turning up at walls/sides to form an effective, puncture-resistant moisture barrier, complete at all levels as per architectural drawings and directions of the Engineer-in-charge.

1.0. Materials

1.1. The polythene sheet shall be Low-Density Polyethylene (LDPE) film conforming to IS 2508 (latest revision) or equivalent approved standard.

1.2. The LDPE film shall have a true thickness of 300 microns and shall be manufactured from virgin polyethylene material unless otherwise approved by the Engineer-in-Charge.

1.3. The sheet shall be waterproof, puncture resistant, durable and free from holes, tears, wrinkles, folds, cracks and other manufacturing defects.

1.4. The material shall be supplied in rolls of suitable width and length to minimize joints and overlaps.

1.5. Heavy-duty adhesive tape used for sealing overlaps and joints shall be of approved make and compatible with LDPE film.

1.6. All materials shall be of approved brand and manufacturer and shall be subject to inspection and approval by the Engineer-in-Charge.

2.0. Workmanship

2.1. The work shall consist of providing and laying 300-micron thick LDPE polythene sheet over prepared and consolidated sub-grade, under cement concrete flooring, damp-proof courses or at locations shown on the drawings and directed by the Engineer-in-Charge.

2.2. The surface on which the sheet is to be laid shall be properly leveled, compacted, cleaned and made free from sharp projections, stones, debris and other materials likely to damage the membrane.

2.3. The polythene sheet shall be laid smoothly and evenly without wrinkles, folds or air pockets.

2.4. Adjacent sheets shall be overlapped by a minimum of 100 mm or as specified in the drawings.

2.5. Overlaps and joints shall be sealed securely using approved heavy-duty adhesive tape or other approved sealing methods to ensure continuity of the moisture barrier.

2.6. The sheet shall be turned up at walls, columns, foundations, plinth beams or sides as required to form a continuous and effective damp-proof barrier.

2.7. Care shall be taken during placement of reinforcement, concrete or other construction activities to prevent puncturing, tearing or displacement of the membrane.

2.8. Any damaged portion of the membrane shall be repaired by providing an additional patch extending at least 150 mm beyond the damaged area on all sides and securely sealed.

2.9. The completed membrane shall provide a continuous, puncture-resistant and waterproof barrier against moisture migration.

2.10. The work shall be carried out at all levels and in accordance with architectural drawings, specifications and instructions of the Engineer-in-Charge.

3.0. Mode of Measurements and Payment

3.1. LDPE polythene sheet shall be measured in square metres of actual area laid and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the net surface area covered. No separate measurement shall be made for overlaps, turn-ups, patches or wastage.

3.3. The rate shall include supply of 300-micron LDPE sheet, adhesive tape, cutting, laying, overlapping, sealing joints, turn-ups at edges, repairs to damaged portions, labour, tools, plants, transportation and all materials required for complete execution of the work.

3.4. No separate payment shall be made for overlaps, sealing materials, wastage, cutting, patching, protection or incidental works necessary for satisfactory completion of the moisture barrier.

3.5. The rate shall be for one square metre of completed 300-micron thick LDPE moisture barrier laid and approved by the Engineer-in-Charge.

Item No: 79 Providing and laying broken chine mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall,clearing with water and oxalic acid etc. as directed. (The Product Perfomance Shall Carry Guarantee for 5 Years Against Any Leakage)

1.0 MATERIAL - WATER

- 1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall confirm to the Standard Specification in I.S. 455 - 1978.
- 1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness charge in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

2.0 CEMENT

- 2.1 Cement shall be ordinary Portland cement as per I.S. 12269 - 2013 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

3.0 SAND

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky particles shall alkali salts, organic matter, learn mica or other deleterious

substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand

COARSE SAND - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

3.2 FINE SAND : The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.

1.4 WATER PROOFING COMPOUND

Water proofing compound shall be of approved quality and make as approved by Engineer in charge.

1.5 CHINA MOSAIC TILE PIECES

China mosaic tiles pieces shall be of 12 mm to 20 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

1.7 WHITE CEMENT

White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

WORKMANSHIP

A First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debries shall be removed thoroughly from the entire surface of the terrace.

All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.

Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

- B** 40mm thick Cement concrete 1:2:4 (1 part of cement and 2 part of coarse sand and 4 part coarse aggregate 20mm nominal size by volume) admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (Specification of C.C. 1:2:4 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.
- C** After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.
- D** The entire surface shall be finished with 20 mm thick C.M. 1:3 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).
- E** Finishing the surface with 20 mm thick C.M. 1:3 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- F** After two days proper curing the terrace shall be flooded for 15 days.

7.0 MODE OF MEASUREMENT AND PAYMENT

- 7.1** The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. Item shall also include the cost of making, fixing of all scaffolding and forms required for the work.

The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.

- 7.2** The plaster work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.

- 7.4** [A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.](#)

- 7.3** The payment will be made on **Square Meter** basis of the finished work.

FORM OF GUARANTEE BOND

Contractor I / We _____) here by guarantee that work will remain unaffected and will not be in anyway damaged by water

rain and will not leak from surface for a period for 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contract and damage that might be caused on account of water rain and or other similar type of dampness of leakage from walls or above floor.

The guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 years. The deposit at the rate of 20% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed which ever is later and 10% shall be retained for the balance of the guarantee period and shall be returned only after completion of the guarantee period.

MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plans. No deduction shall be made not extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion of work & measurement shall be paid on unit of Sq.m. of finished work.

Item No: 95 Providing 10mm thick cement plaster in single coat on brick/concrete walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand) including with 1 X 1 cm Grooves Ceiling Plaster For Ground Floor

1.0. Materials

1.1. Cement shall conform to M-3 and shall be of approved make.

1.2. Sand shall conform to M-6 and shall be clean, hard, durable and free from clay, silt, organic matter and other deleterious substances.

1.3. Cement mortar shall be of proportion 1:4 (1 cement : 4 sand) and shall be prepared with approved materials in the required consistency.

1.4. Water used for mixing and curing shall conform to M-1.

1.5. All materials shall be subject to approval by the Engineer-in-Charge before use.

2.0. Workmanship

2.1. The work shall consist of providing 10 mm thick cement plaster in a single coat on brick masonry and concrete surfaces for interior ceiling plastering up to Floor Two Level and as directed by the Engineer-in-Charge.

2.2. The surfaces to be plastered shall be thoroughly cleaned of dust, dirt, loose mortar, laitance, grease and other foreign matter.

2.3. RCC surfaces shall be roughened where necessary and provided with suitable bonding treatment as directed by the Engineer-in-Charge.

2.4. Masonry joints shall be raked out to a depth of approximately 10 mm and the surface shall be properly wetted before commencement of plastering.

2.5. Cement mortar in proportion 1:4 shall be mixed and applied uniformly to achieve a finished thickness of 10 mm.

2.6. The plaster shall be laid true to line, level and plumb and finished even, smooth and free from waviness, cracks, blisters and other defects.

2.7. The ceiling plaster shall include forming **1 cm × 1 cm grooves** at locations shown in the drawings or as directed by the Engineer-in-Charge.

2.8. Grooves shall be formed neatly with straight edges and uniform depth and width throughout the work.

2.9. Junctions of walls and ceilings shall be finished neatly and all arrises shall be straight and true.

2.10. The plastered surface shall be protected from damage and shall be cured continuously for a minimum period of seven days.

2.11. Any defective plaster showing cracks, hollowness, debonding or uneven finish shall be removed and redone by the contractor at his own cost.

2.12. The work shall include all labour, scaffolding, tools, equipment and incidental operations necessary for satisfactory completion.

3.0. Mode of Measurements and Payment

3.1. Ceiling plaster shall be measured in square metres of finished plastered surface actually executed and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the net area plastered. No separate measurement shall be made for grooves, arrises, corners or junctions.

3.3. The rate shall include preparation of surfaces, raking of joints, scaffolding, supply and application of cement mortar, formation of 1 cm × 1 cm grooves, finishing, curing, labour, tools, plants and all materials required for complete execution of the work.

3.4. No separate payment shall be made for grooves, curing, scaffolding, surface preparation, wastage, protection of finished work or incidental operations necessary for satisfactory completion.

3.5. The rate shall be for a unit of one square metre of 10 mm thick cement plaster in cement mortar 1:4 on ceiling surfaces including grooves, complete and approved by the Engineer-in-Charge.

Item No: 96 Providing 15mm thick cement plaster in single coat on Rough (Similar)side of single or half brick walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand) including with 1 X 1 cm Grooves and GI Galvanized 30cm Wide Hexagonal Wire Mesh on RCC & Brick Joints Internal Wall Plaster for Ground Floor

1.0. Materials

1.1. Water shall conform to M-1. The cement mortar of proportion 1:4 shall conform to M-11.

2.0. Workmanship

2.1. Scaffolding:

Wooden bullies, bamboos, planks, trestles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back ground :

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be toughened by wire brushing if it is not hard and by hacking if it is hard. In case of concrete surface, if a chemical retarded has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the readers if left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such area shall be moistened again.

2.2.4. For external plaster, the peasting operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3. Application of plaster :

2.3.1. The plaster about 15x15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a smooth or a sandy granular texture is required Excessive troweling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Hounding or chamfering, corners, arises junctions etc. shall be carried out with proper templates to be size required.

2.3.2. Cement plaster shall be used within half an hour after addition of water and mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matting or gunny bags on the outside of the plaster and keeping them wet.

2.3.5. The plastering work shall be in single coat on rough side of half brick wall for interior plastering up to floor two level, finished even and smooth in C.M. 1:4.

The smooth concrete shall be suitably sawed to provide necessary bond before plastering.

for Floating Coat

2.3.6. The relevant specification shall be followed for materials and workmanship except that this work is providing smooth cement finish with floating coat of neat cement slurry.

2.3.7. The coat of cement and fine sand mortar of proportion V1 (1 5 mm thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.

2.3.8. In any continuous face of wall the finishing treatment should be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly Junctions.

2.3.9. Curing : All the plaster work shall be kept damp continuously for a period 7 days.

3.0. Mode of measurements & payment

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square meters unless otherwise specified. Length breadth or height shall be measured correct to a centimeter.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 15 mm at any point on this surface.

3.4. This item includes plastering for all floors.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings, following soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. met each in area for ends of joints beams, posts, girders, steps etc. not exceeding 0.5 sq.mt each in area and for openings exceeding 0.5. sq.mt and not exceeding 3.00 sq.mt. in each area deductions and additions shall be made in the following manners.

(a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, for finish to plaster around ends of joints, beams posts etc.

(b) Deduction for openings exceeding 0.5 sq. mt but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings, (i) When both faces of all wall are plastered with same plaster, deduction shall be made

for one face only, (ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from areas of plaster and / or pointing as the case may be.

3.8. For openings having door frames equal to or projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq.mt. each, deduction shall be made for openings but jambs, soffits and sills shall be measured.

3.10 The payment shall be made for a unit of 1.0 sq.mt of work done over and above the finishing of work of base coat.

4.0. The rate shall be for a unit of one sq. meter.

Item No: 98 & 99 Providing and laying Vitrified tiles 10 mm thick , 24"x 24" in flooring treads of steps and landing laid on a bed of 12mm thick cement mortar 1:3 (1-cement : 3-coarse sand) finishing with flush pointing in white cement.

1.0. Materials

Water shall conform to M-1. Cement mortar shall conform to M-11. Colour glazed tiles size 30 x 45 cm or 30cm x 60cm 6 mm to 8mm thick shall conform to relevant Indian standard code 15622-2017. (Kajaria, Asian, Bell, Nitco, Somani or equivalent std. quality)

2.0. Workmanship

2.1. Preparation of Surface:

In case of brick masonry wall, the joints shall be raked out to a depth of least 8 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

2.2. Laying ;

2.2.1. The wall surface shall be covered with 10 mm. thick plaster of cement plaster 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

2.2.2. Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed. They shall be cut to the required size and the edges be smoothened.

2.2.3. The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

3.0. Mode of measurements and payment

3.1. The rate shall include the cost of all materials and labour required for various operations described above.

Risers of steps : skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo including curves, where

special such as covers internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

3.2. The rate shall be for a unit of one sq. meter.

Item No: 100 Green marble (Marble Slab stone 25mm thick double polished) frame as per detail drawing on four sides of the window and Three side of Door. The size of marble frame on all sides shall be 6 mm more than thickness of wall Etc complete.(Composite Item)

Item No: 101 Green marble (Marble Slab stone 25mm thick double polished) frame as per detail drawing on Bottom side of Door. The size of marble frame on all sides shall be 6 mm more than thickness of wall Etc complete.(Composite Item)

1.0. Materials

1.1. Green marble shall be of approved quality, colour and shade, free from cracks, cavities, veins, patches and other defects affecting appearance, strength or durability.

1.2. Marble slabs shall be 25 mm thick, machine cut and double polished on exposed surfaces.

1.3. Cement shall conform to M-3 and shall be of approved make.

1.4. Fine sand shall conform to M-6 and shall be clean, hard and free from deleterious materials.

1.5. Cement mortar for fixing shall be of proportion 1:3 (1 cement : 3 coarse sand) unless otherwise specified.

1.6. White cement slurry with matching pigment shall be used for filling joints wherever required.

1.7. Water used for fixing, polishing and curing shall conform to M-1.

1.8. All materials shall be approved by the Engineer-in-Charge before incorporation into the work.

2.0. Workmanship

2.1. The work shall consist of providing and fixing 25 mm thick double polished green marble frames around door and window openings as shown in the drawings and directed by the Engineer-in-Charge.

2.2. For window openings, the marble frame shall be provided on all four sides of the opening.

2.3. For door openings, the marble frame shall be provided on three sides of the opening excluding the bottom portion unless otherwise specified.

2.4. For door bottom frames, marble shall be provided at the threshold location as specified in the drawings.

2.5. The width of the marble frame shall be equal to the wall thickness plus 6 mm projection on both exposed sides or as detailed in the approved drawings.

2.6. Marble pieces shall be machine cut to accurate dimensions and neatly finished to obtain true lines, levels and right angles.

2.7. The supporting masonry or concrete surface shall be cleaned and prepared before fixing the marble.

2.8. Marble frames shall be fixed in cement mortar 1:3 or approved adhesive and properly aligned with adjoining plaster, stone or wall finishes.

2.9. Joints between marble pieces shall be kept to a minimum and filled with matching coloured white cement slurry to achieve a uniform appearance.

2.10. Exposed edges shall be neatly finished and polished as per approved details.

2.11. The completed marble frame shall be true to line, level and plumb and free from cracks, stains, chips, scratches or other visible defects.

2.12. All cutting, fitting, chasing and making good required for proper fixing shall form part of the work.

2.13. The finished surface shall be cleaned and protected until completion of the project.

2.14. Any damaged or defective marble shall be removed and replaced by the contractor at no extra cost.

3.0. Mode of Measurements and Payment

3.1. Green marble frame work shall be measured in running metres of finished marble frame actually fixed and approved by the Engineer-in-Charge.

3.2. Measurement shall be taken along the centre line of the marble frame provided around door and window openings.

3.3. The rate shall include supply of green marble, machine cutting, double polishing, fixing in cement mortar or adhesive, joint filling, edge finishing, labour, tools, plants, transportation, handling, curing and all materials required for complete execution of the work.

3.4. The rate shall also include all necessary cutting, fitting, making openings, corner joints, threshold fixing, scaffolding and making good adjoining finishes.

3.5. No separate payment shall be made for polishing, edge finishing, joint treatment, wastage, cutting, transportation, protection or incidental operations required for satisfactory completion of the work.

3.6. The rate shall be for one running metre of 25 mm thick double polished green marble frame complete in position and approved by the Engineer-in-Charge.

Item No: 102 Providing and fixing window having extruded aluminum Colour anodized section frame main outer size 63.50 x 38.10 x 1.95 mm, @ Wt 1.094 Kg / Rmt, horizontal two track member size 61.85 mm x 31.75 mm x 1.20mm @ wt.of 0.695 Kg/mt, vertical member of size 61.85 mm x 31.75mm x 1.30 mm @ wt.of 0.659 Kg/mt with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt, vertical member of size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt, @ Wt.0.457 Kg/mt with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc complete for window with Mosquito jali window with extra track

1.0 MATERIAL

1.1 Aluminum standard section

1.1.1 Anodized Aluminium Four track window

Aluminum alloy used in the manufacture of aluminium four track window section shall confirm to I.S. designation HEA-WP of I.S. 733-1975 and also designation WVG-WP of I.S. 1285-1975 section shall be as specified in the drawing and design.

The works shall consist of standard extruded aluminum Colour anodized section frame main outer size 63.50 x 38.10 x 1.95 mm, @ Wt 1.094 Kg / Rmt, horizontal two track member size 61.85 mm x 31.75 mm x 1.20mm @ wt.of 0.695 Kg/mt, vertical member of size 61.85 mm x 31.75mm x 1.30 mm @ wt.of 0.659 Kg/mt with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt, vertical member of size 40mm x 18mm x 1.29mm @ wt.of 0.456Kg/mt directed by Engineer in charge.

All sections shall be free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

1.1 Glass : The transparent bronze coloured tinted float glass shall be of approved make having thickness of 5mm. The glass shall be clear and free from scratches and cracks. The glass shall be provided on wall panel and fixed with transparent silicon gasket

1.2 Glazing clips: Glazing clips (structural glass) shall be of size as directed by the Engineer in charge around the glass allover shall be free from any scratches or holes or any damage of on surface all section shall have finished luster surface on all sides.

1.3 Rubber Gasket

Rubber gasket shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

1.4 Fixtures

Hinges shall be of approved make shall be free from any scratches or holes or any damages on surface and shall have finished luster surface on all sides.

1.5 Handles

Handles shall be of approved make shall be free from any scratches or holes or any damages on surface, and shall have finished luster surface on all sides.

1.6 Bolts

All Bolts shall be of approved make shall be free from any scratches or holes or any damages on surface and shall have finished luster surface on all sides.

Product is from reputed company having ISO 9001-2000 certificate and with three years performance guarantee.

2.0 WORKMANSHIP

The work of standard window having extruded aluminium colour powder coated section frame shall be done with extreme finishing the partial board shall be fixed in the bottom panel and glass shall be fitted on top panel as directed by Engineer in charge, using glazing clips and rubber gaskets as required. All the fixtures and fastenings shall be fitted at right place and as directed by Engineer in charge floor spring shall be fitted properly so as to align the window properly and shall be given trial of opening and closing properly.

3.0 Mode of Measurement & Payment

3.1. The unit rate of standard window having extruded aluminium colour powder coated section frame shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, shutters and fixing the window in wall at the place shown in drawing and as instructed by Engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for preparing frame and shutter of specified size to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and making walls good by plaster patch colour etc. as required.

3.2. The Window shall be measured for its improvising and fixing standard window having extruded aluminium colour powder coated section frame having bracket, stoppers, 5mm thick transparent bronze coloured tinted float glass panel of approved make with S.S. fixtures and transparent silicon sealant glass fixing to frame with rubber gasket, air lock strip & fixtures with mosquito net as per details including PVC T in frame silicon based linings handles, locks two nos. PVC gasket screws aluminum joints special runner etc. complete.

3.3 The rate shall be for a unit of one square meter.

Item No: 103 Providing and fixing 38mm thick shutter flush door shutters, solid core finished with 1mm thick laminate on both side with guled PVC edge beading as patten & Selection hinges with necessary screw,s.s handle,s.s Aldrop,s.s Stopper. Etc as per E. I. C

- ☐ The Materials shall be used as per the general specifications.
- ☐ The Materials shall be used as per description of item given and as directed by the engineer in charge.
- ☐ Design of item & make shall be approved by engineer and architect in charge.

Workmanship:

- ☐ Workmanship shall be as per description given above and to the satisfaction of the engineer in charge.

Mode of Measurement and Payment.

- ☐ The rate shall includes cost of all materials and labor required for satisfactory

Completion of this item as described above.

- ☐ The Work shall be measured for the finished work.
- ☐ The Rate shall be for a unit of Sqm.

Item No: 107 20 mm thick sand faced cement plaster with Gutka finish on walls upto height 10 meters consisting of 12 mm thick backing coat of c.m. 1:3 (1 cement :3 fine) and 8 mm thick finishing coat of c.m. 1:1 (1 cement :1sand) etc. complete with 1CM x 1CM Grooves and GI Galvanized 30cm Wide Hexagonal Wire Mesh on RCC & Brick Joints

1.0. Materials

- 1.1. Cement shall conform to M-3 and shall be of approved make.
- 1.2. Fine sand shall conform to M-6 and shall be clean, hard, durable and free from clay, silt, organic matter and other deleterious substances.
- 1.3. Cement mortar for backing coat shall be of proportion 1:3 (1 cement : 3 fine sand).
- 1.4. Cement mortar for finishing coat shall be of proportion 1:1 (1 cement : 1 fine sand).
- 1.5. Galvanized Iron (G.I.) Hexagonal Wire Mesh shall be 300 mm wide and of approved quality, free from rust, damage and manufacturing defects.
- 1.6. The wire mesh shall be hot dip galvanized and suitable for fixing over RCC and brick masonry junctions to control plaster cracks.
- 1.7. Water used for mixing and curing shall conform to M-1.
- 1.8. All materials shall be approved by the Engineer-in-Charge before use.

2.0. Workmanship

- 2.1. The work shall consist of providing 20 mm thick sand faced cement plaster with Gutka finish on walls up to a height of 10 metres as shown on drawings and directed by the Engineer-in-Charge.
- 2.2. The surface to be plastered shall be thoroughly cleaned of dust, dirt, grease, loose mortar, laitance and other foreign matter.
- 2.3. Masonry joints shall be raked out and RCC surfaces shall be roughened where necessary to provide proper bond.
- 2.4. Before plastering, the surface shall be adequately wetted and prepared to receive the plaster.
- 2.5. A 300 mm wide G.I. galvanized hexagonal wire mesh shall be fixed centrally over all RCC and brick masonry junctions, beam-wall junctions, column-wall junctions and other dissimilar material joints.
- 2.6. The mesh shall be securely fixed with approved fasteners, nails or hooks to prevent displacement during plastering.
- 2.7. The backing coat shall consist of 12 mm thick cement mortar 1:3 applied evenly and finished rough to receive the finishing coat.
- 2.8. The finishing coat shall consist of 8 mm thick cement mortar 1:1 applied over the backing coat and finished with approved sand faced Gutka finish.
- 2.9. The total finished thickness of plaster shall be 20 mm.
- 2.10. The plaster shall be finished true to line, level and plumb and shall be free from cracks, blisters, waviness, hollowness and other defects.
- 2.11. The work shall include forming **1 cm × 1 cm grooves** at locations shown on the drawings or as directed by the Engineer-in-Charge.
- 2.12. Grooves shall be straight, uniform in width and depth and neatly executed with sharp edges.

2.13. Junctions, corners, arrises and edges shall be finished neatly and accurately.

2.14. The completed plaster shall be kept continuously moist and cured for a minimum period of seven days.

2.15. Any defective plaster found loose, cracked, hollow or damaged shall be removed and redone by the contractor at no extra cost.

2.16. Scaffolding, staging and all arrangements required for work up to 10 metres height shall be included in the item rate.

3.0. Mode of Measurements and Payment

3.1. Sand faced cement plaster shall be measured in square metres of finished plaster surface actually executed and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the net plastered area. No separate measurement shall be made for grooves, arrises, corners, junctions or G.I. wire mesh.

3.3. The rate shall include surface preparation, fixing of 300 mm wide G.I. galvanized hexagonal wire mesh at RCC and masonry junctions, scaffolding, backing coat, finishing coat, Gutka finish, groove formation, curing, labour, tools, plants and all materials required for complete execution of the work.

3.4. No separate payment shall be made for wire mesh, grooves, scaffolding, curing, surface preparation, wastage, protection of finished work or incidental operations required for satisfactory completion.

3.5. The rate shall be for one square metre of 20 mm thick sand faced cement plaster with Gutka finish including 1 cm × 1 cm grooves and 300 mm wide G.I. galvanized hexagonal wire mesh at RCC and brick masonry junctions, complete and approved by the Engineer-in-Charge.

Item No: 109 Providing and laying broken chine mosaic wirh 50mm Beding of cement concrete flooring 1:2:4 (1cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall,clearing with water and oxalic acid etc. as directed. (The Product Perfomance Shall Carry Guarantee for 5 Years Against Any Leakage)

1.0 MATERIAL - WATER

1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall confirm to the Standard Specification in I.S. 455 - 1978.

1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness charge in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

2.0 CEMENT

- 2.1 Cement shall be ordinary Portland cement as per I.S. 12269 - 2013 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

3.0 SAND

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand

COARSE SAND - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :

I.S. Sieve Designation% by wt. passing

4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

- 3.2 FINE SAND :The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:

I.S. Sieve Designation% by wt. passing

4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50

- 3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.

1.4 WATER PROOFING COMPOUND

Water proofing compound shall be of approved quality and make as approved by Engineer in charge.

1.5 CHINA MOSAIC TILE PIECES

China mosaic tiles pieces shall be of 12 mm to 20 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

1.7 WHITE CEMENT

White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

WORKMANSHIP

- A First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debris shall be removed thoroughly from the entire surface of the terrace.

All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.

Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

- B 40mm thick Cement concrete 1:2:4 (1 part of cement and 2 part of coarse sand and 4 part coarse aggregate 20mm nominal size by volume) admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (Specification of C.C. 1:2:4 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.

- C After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.

- D The entire surface shall be finished with 20 mm thick C.M. 1:3 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).

- E Finishing the surface with 20 mm thick C.M. 1:3 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.

- F After two days proper curing the terrace shall be flooded for 15 days.

7.0 MODE OF MEASUREMENT AND PAYMENT

- 7.1 The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high all over the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. Item shall also include the cost of making, fixing of all scaffolding and forms required for the work.

The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.

- 7.2 The plaster work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.
- 7.4 A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.
- 7.3 The payment will be made on Square Meter basis of the finished work.

MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plans. No deduction shall be made not extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion of work & measurement shall be paid on unit of Sq.m. of finished work.

Item No: 110 Box cutting the road surface to proper slope and camber for making a base for road work including removing the excavated stuff and depositing on the road side slope as directed upto 50 Mt. Lead

The sub grade / sub base / base to receive the water bound macadam course shall be prepared to the specified grade and camber and made of dust and other extraneous materials. Any nets of soft places shall be corrected in on approved manner and rolled until firm.

Cutting shall be paid on cross section area as established by the longitudinal level and cross sections for this purpose. The work shall be started after the initial longitudinal section of the ground and cross sections are taken and recorded.

The final surface shall confirm to proper profile, camber and super elevation etc. as directed by the Engineer. The earthwork shall be paid on sectional measurements, cross sectional etc. taken.

No allowance or payments shall be made for materials excavated prior to the taking of level by the Engineer.

The rate is inclusive of cutting in all soil and murrum including removal of all shrubs, jungle cutting, cutting stuff in slopes, side drain bank etc. complete.

This item also includes the clearing the sides and demarking the line as per requirement and cutting out the existing trees on the road side, not extra payment will be paid for.

At the time of preparing final bill, the road formation in embankment and cutting shall have be perfect condition true to grade, camber and side slope duly dressed and damages due to rain cuts etc. during entire working period shall have to be done by the contractor.

The work taken in length shall be completed in all respects viz. width, grades, camber, side drains, side slopes etc. and measurements for incomplete work shall not be taken otherwise.

1.0 Mode of Measurement & Payment :

The unit rate box cutting shall include the cost of all materials, tools and plant required for excavation in all type of soils in grade and camber, line and levels and finishing as per direction of the Engineer-in-charge, excavation and all other incidental expenses for producing item of box cutting of specified breadth and depth and grade to complete the item or its components as shown on the drawings and according to these specifications.

The box cutting shall be measured for its cross section area and compacting volumes in cubic metres by the method of average areas.

The rate will be made on **Cubic Meter** basis of the finished work.

Item No: 111 Jungle clearance (Ganda Baval etc) of Light/heavy dence (work done by manually or by machinery) including grabbing of & removing the roots & girth completely from the ground & back fill with earth & making surface good (a) In Earth as directed including depositing & removing the material away from the site of work at own risk and cost as and where directed etc completed for following.

1.0. Materials

1.1. No major construction materials shall be required for this item except approved earth required for backfilling of pits formed after removal of roots and stumps.

1.2. All tools, tackles, machinery, equipment and safety appliances required for jungle clearance operations shall be arranged by the contractor.

1.3. Earth used for backfilling, wherever required, shall be free from organic matter, roots, vegetation and other deleterious materials.

2.0. Workmanship

2.1. The work shall consist of jungle clearance of Ganda Baval and other vegetation of light, medium or heavy density by manual means, mechanical means or a combination thereof as directed by the Engineer-in-Charge.

2.2. The work shall include cutting, uprooting, grubbing and complete removal of bushes, shrubs, thorny vegetation, small trees, creepers and other unwanted growth from the specified area.

2.3. Roots, stumps and underground portions of vegetation shall be completely removed to prevent future regrowth.

2.4. The contractor shall ensure complete removal of all roots and stumps irrespective of girth as encountered within the work area.

2.5. Excavated pits resulting from grubbing operations shall be backfilled with approved earth, compacted properly and brought to the surrounding ground level.

2.6. The surface shall be dressed, leveled and left neat, clean and free from depressions, vegetation and debris.

2.7. All cleared vegetation, roots, stumps and unserviceable materials shall be collected and removed from the work site.

2.8. Disposal of the cleared materials shall be carried out at locations approved by the Engineer-in-Charge and at the contractor's own risk and cost.

2.9. Burning of vegetation within the project premises shall not be permitted unless specifically approved by the competent authority.

2.10. Adequate precautions shall be taken to avoid damage to existing structures, utilities, roads, drains, fences, trees designated for preservation and adjoining properties.

2.11. Any damage caused during the execution of the work shall be made good by the contractor at his own cost.

2.12. The work shall be carried out in accordance with environmental regulations and directions of the Engineer-in-Charge.

3.0. Mode of Measurements and Payment

3.1. Jungle clearance shall be measured in square metres, hectares or as specified in the Schedule of Quantities and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the actual area cleared, grubbed and made good.

3.3. The rate shall include cutting, uprooting, grubbing, complete removal of roots and stumps, excavation, backfilling with earth, compaction, surface dressing, loading, transportation, disposal of materials, labour, machinery, tools, tackles and all incidental operations required for completion of the work.

3.4. No separate payment shall be made for excavation of roots, backfilling, compaction, transportation, disposal of vegetation, machinery deployment, safety measures, protection of adjoining property or any incidental works.

3.5. The rate shall be for a unit of measurement specified in the Schedule of Quantities and shall include complete jungle clearance, grubbing, root removal, backfilling and disposal of materials as directed by the Engineer-in-Charge.

Item No: 112 Providing , Laying, Spreading and Compacting stone aggregates of specific size to water bound macadam (GRADE - II) (63 mm to 45 mm) specification including spreading in uniform thickness , hand packing , rolling with 3- wheeled steel / vibratory roller 8 - 10 tonnes in stages to proposer grade and camber , applying and brooming requisite type of screending / binding materials to fill up the interstices of coarse aggregates , watering and compaction to the required density.

1.0. Materials

- 1.1. Coarse aggregates shall consist of crushed stone conforming to relevant MORTH specifications for Water Bound Macadam (WBM) Grade-II and shall be of size ranging from 63 mm to 45 mm.
- 1.2. Aggregates shall be hard, durable, sound, clean and free from clay, organic matter, soft fragments, dust and other deleterious substances.
- 1.3. Screening material shall consist of approved quarry screenings, stone dust or other approved material capable of filling the voids in the coarse aggregate layer.
- 1.4. Binding material, where required, shall consist of approved fine-grained material free from organic impurities and deleterious matter.
- 1.5. Water used for compaction shall be clean and free from harmful impurities.
- 1.6. All materials shall conform to the requirements of relevant IRC, MORTH and applicable specifications and shall be approved by the Engineer-in-Charge before use.

2.0. Workmanship

- 2.1. The work shall consist of providing, laying, spreading and compacting Water Bound Macadam (WBM) Grade-II using stone aggregates of size 63 mm to 45 mm as shown on the drawings and directed by the Engineer-in-Charge.
- 2.2. The prepared sub-grade, sub-base or underlying layer shall be brought to the required line, level, grade and camber and approved before commencement of WBM work.
- 2.3. Coarse aggregates shall be spread uniformly over the prepared surface to the specified thickness without segregation.
- 2.4. The aggregates shall be hand packed wherever necessary to achieve proper interlocking and a uniform surface.
- 2.5. Rolling shall be carried out with an approved three-wheeled steel roller or vibratory roller of 8 to 10 tonnes capacity commencing from the edges and progressing towards the centre, except on super-elevated sections where rolling shall proceed from the lower edge upwards.
- 2.6. Rolling shall continue until the aggregates are firmly keyed, properly compacted and do not move under the roller.
- 2.7. Approved screening material shall be applied gradually and broomed into the voids of the coarse aggregates during rolling operations.
- 2.8. Water shall be sprinkled uniformly during rolling and screening operations to facilitate compaction and proper filling of interstices.
- 2.9. Binding material, where specified, shall be spread uniformly and broomed into the surface voids followed by watering and rolling until a dense and compact surface is obtained.
- 2.10. Rolling shall continue until all interstices are filled and the layer achieves the required density, stability, grade and camber.
- 2.11. The finished surface shall be true to line, level and cross-fall and shall not show depressions, corrugations, waviness or loose aggregates.
- 2.12. Defective areas shall be rectified by loosening, adding fresh material, reshaping and recompacting as directed by the Engineer-in-Charge.

2.13. Traffic shall not be permitted on the completed layer until it has been approved by the Engineer-in-Charge.

3.0. Mode of Measurements and Payment

3.1. Water Bound Macadam Grade-II shall be measured in cubic metres of compacted work actually executed and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the compacted dimensions of the completed layer.

3.3. The rate shall include supply of coarse aggregates, screening material, binding material, water, spreading, hand packing, watering, rolling, compaction, labour, tools, plants, machinery, transportation and all incidental operations required for completion of the work.

3.4. The rate shall also include preparation of surface, correction of irregularities, maintenance during construction and rectification of defective areas.

3.5. No separate payment shall be made for watering, rolling, screening, binding materials, wastage, testing, traffic control, maintenance or incidental works required for satisfactory completion.

3.6. The rate shall be for one cubic metre of completed Water Bound Macadam Grade-II (63 mm to 45 mm aggregate size) laid, compacted and approved by the Engineer-in-Charge.

Item No: 113 Providing and laying controlled cement concrete M.200 for curing complete including cost of formwork and Trimix process providing extra labour charges for the trimix vacuum dewatering service process on cement concrete road surface by using vacuum dewatering pump floater surface vibrator including making groves and rough finish to concrete surface

1.0. Materials

1.1. Cement shall conform to M-3 and shall be of approved make.

1.2. Fine aggregate shall conform to M-6 and shall be clean, hard, durable and free from clay, silt, organic matter and other deleterious substances.

1.3. Coarse aggregate shall consist of machine crushed stone of approved quality conforming to relevant I.S. specifications and shall be well graded.

1.4. Concrete shall be of grade M-200 and shall be designed, batched and mixed to achieve the specified strength and durability requirements.

1.5. Water used for mixing and curing shall conform to M-1.

1.6. Formwork materials shall be steel, plywood or other approved materials capable of producing the required line, level and surface finish.

1.7. Materials used for groove formation, joint treatment and finishing shall be of approved quality and as directed by the Engineer-in-Charge.

2.0. Workmanship

2.1. The work shall consist of providing and laying controlled cement concrete of grade M-200 for road works, pavements or other specified locations complete with formwork, vibration, Trimix process, vacuum dewatering, finishing and curing as directed by the Engineer-in-Charge.

2.2. The sub-grade or prepared base shall be brought to the required line, level, camber and compaction before placement of concrete.

2.3. Formwork shall be rigid, true to line and level and adequately supported to prevent movement during concreting operations.

2.4. Concrete shall be machine mixed, transported and placed as rapidly as practicable to avoid segregation and loss of workability.

2.5. Concrete shall be spread uniformly and compacted using approved surface vibrators, screed vibrators or other suitable equipment.

2.6. The Trimix vacuum dewatering process shall be carried out immediately after placement and vibration of concrete using approved vacuum dewatering equipment.

2.7. Vacuum mats and vacuum pumps shall be used to remove excess water from the concrete surface and improve density, strength, abrasion resistance and durability.

2.8. Surface finishing shall be carried out using power floater, screed board and other approved equipment to achieve the specified level and finish.

2.9. Grooves, contraction joints, expansion joints and surface texturing shall be formed as shown in the drawings or directed by the Engineer-in-Charge.

2.10. The finished concrete surface shall be provided with rough, broomed or textured finish as specified to ensure adequate skid resistance.

2.11. All edges, corners and joints shall be neatly finished and protected against damage.

2.12. Concrete shall be protected against rapid drying, rain, vibration and traffic during setting and hardening.

2.13. Curing shall commence immediately after final finishing and shall continue for a minimum period of fourteen days or as specified.

2.14. The completed surface shall be true to line, level, thickness, grade and camber and shall be free from cracks, honeycombing, depressions and surface defects.

2.15. Any defective work shall be removed and reconstructed by the contractor at his own cost.

3.0. Mode of Measurements and Payment

3.1. Controlled cement concrete shall be measured in cubic metres of finished concrete work actually laid and approved by the Engineer-in-Charge.

3.2. Measurement shall be based on the compacted dimensions of the completed concrete work.

3.3. The rate shall include supply of all materials, batching, mixing, transportation, placing, vibration, Trimix process, vacuum dewatering, power floating, surface vibration, groove making, rough surface finishing, curing, labour, tools, plants, machinery and all incidental operations required for completion of the work.

3.4. The rate shall also include providing, erecting and removing formwork, testing, protection of concrete and rectification of minor defects.

3.5. No separate payment shall be made for vacuum dewatering equipment, power float finishing, groove cutting, curing, formwork, machinery deployment, testing, surface texturing, protection or incidental works required for satisfactory completion.

3.6. The rate shall be for one cubic metre of completed M-200 controlled cement concrete executed using Trimix vacuum dewatering technology including formwork, groove formation, rough finish and curing complete as approved by the Engineer-in-Charge.

Item No: 114 Providing and fixing pre-cast Rubber Dye / steel Dye inter locking concrete block 60mm thick with grade of concrete M300 pneumatic compressed / vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35 mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. Complete

1.0 MATERIAL

(1) Water shall conform to M-1.

(2) Cement shall conform to M-3

(3) Sand shall conform to M-6

2.0 CEMENT CONCRETE INTERLOCKING TILES

2.1 pre-cast inter locking Rubber Dye concrete block of gray cement based concrete block shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the interlocking tiles shall generally be uniform cement colour. Broken tiles or damaged tiles with cracks shall not be allowed for use. They shall be without any soft veins cracks of flaws

2.2. The size of the pre-cast inter locking Rubber Dye concrete block shall be 60 mm Thick , of M200 grade concrete as per approved design However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified.

2.3. Tolerance of minus 30 mm. on accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be +3 mm.

2.4. The edges of pre-cast inter locking Rubber Dye concrete block shall in true shape of casting. All angles and edges of the Interlocking cement concrete tiles shall be true, square and free chipping and surface shall be true and plain.

2.5. The pre-cast inter locking Rubber Dye concrete block shall have flat plain surface. When brought on site, the pre-cast inter locking Rubber Dye concrete block shall be in good condition. The pre-cast inter locking Rubber Dye concrete block for paving shall generally be used in good condition

3.0 WORKMANSHIP

3.1 pre-cast inter locking Rubber Dye concrete block of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of sand average 75mm thick.

3.2. During hot weather, all finished or partly finished work shall be covered or wetted in such manner as will prevent rapid drying of the flooring work.

3.3. Joints of flooring shall be through and continuous throughout the building as directed by Engineer in charge

3.4. joints shall be filled with sand in proper line and level.

3.5. The rate of pre-cast inter locking Rubber Dye concrete block is inclusive of providing and laying in true line and level including filling the joints with sand in line and level.

4.0 MODE OF MEASUREMENT & PAYMENT :

4.1. The unit rate of pre-cast inter locking Rubber Dye concrete block shall include the cost of all materials, tools and plant required for mixing, placing stones in position in true line and level , as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work. The rate of pre-cast inter locking Rubber Dye concrete block shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

4.2. The pre-cast inter locking Rubber Dye concrete block work shall be measured for its length and, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

4.3. The payment will be made on square Meter basis of the finished work.

Item No: 115 Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15cm thick of M250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1 cement: 3 fine sand) etc complete.

The work shall consist of scarifying the existing road surface to required depth, preparing pre cast C.C. M 20 blocks of required shape and size and fixing them in two rows as per drawing and joining them in C.M. 1:3 and filling the central portion with selected soil and compacting etc. complete.

2.0 MATERIAL:

2.1 M-200 Precast C.C. Blocks:

- (1) Water shall conform to M-1.
- (2) Cement shall conform to M-3
- (3) Sand shall conform to M-6
- (4) Mortar shall conform to M-11.
- (5) Aggregates shall conform to M-12
- (6) Shuttering shall conform to M-26. Construction of Pre cast C.C.

Block:

MATERIALS:

Pre cast C.C. Block:-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6.

Mortar shall conform to M-11. Aggregates shall conform M-12. Shuttering shall conform to M-26. Construction of Pre cast C.C. Block:- It shall be of cement concrete M-250.

GENERAL:

The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 (1 cement: 2 coarse sand: 4 graded fine aggregate 100 mm. nominal size) by volume. Concrete work shall have exposed concrete surface or as specified in the item.

The designation ordinary M-100, M-150, M-200 & M-250 specified tests. The proportion of the concrete mix shall be 1:2:4, 1:1 ½: 3:1:2 nominal mix of ordinary concrete by volume respectively.

The ingredients required for ordinary concrete containing one bag of cement of 50 kg. by weight (0.0342 Cum) for different proportions of mix shall be as under: Grade of concrete Total quantity of dry aggregate by volume per 50 kg. of cement to be taken of fine and coarse aggregates, maximum Proportion of fine aggregate to coarse aggregate Quantity of water per 50 kgs. of cement maximum.

The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.

Workability of the concrete shall be controlled by maintaining a water cement ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with that means available.

The maximum size of coarse aggregates shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

For reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bars, or 5 mm less than the minimum cover to the reinforcement whichever is smaller.

Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregates may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

Admixture may be used in concrete only with approval of Engineer in charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

WORKMANSHIP:

Proportioning:

Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg. weight. The Volume of one such bag being taken as 0.0342 cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregates. The size of the boxes (internal) shall be 35 cms x 25 cms and 40 cms deep while measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering.

the proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulk age shall be made.

MIXING:

For all work, concrete shall be mixed in mechanical mixer high along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running.

After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire

mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

When hand mixing is permitted by the Engineer in charge for small jobs or for certain other reasons, it shall be done on the smoothest watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by running over to get a mixture to uniform color. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

Mixers which have been out of use of more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed by the Engineer in charge the first batch of concrete from texture shall contain only two thirds of normal quantity of coarse aggregate.

Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

Consistency:

The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete shall be determined by regular slump tests in accordance with I.S. 11199-1959. The slump of 10mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.

Inspection:

Contractor shall give the Engineer in charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and rooms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained.

Immediately before concreting, all forms shall be thoroughly cleaned.

Centering design and its erection shall be got approved from the Engineer in charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed.

For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi and metal pieces shall not be used for this purpose.

Transporting and laying:

The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place.

All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer in charge has been obtained.

Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless

a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise aggregates by the Engineer in charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibratory are used and not exceeding 0.30 meter in all other cases.

Unless otherwise agreed by the Engineer in charge, concrete shall not be dropped into place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened.

all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness and shall well rammed against old work, particular attention being given to corners and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless, otherwise permitted by the Engineer in charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream in to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

Curing:

Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, Hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement.

Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for minimum period of 14 days.

Sampling and Testing of Concrete:

Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following:

NOTE:

At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall

be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer in charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/Cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade, does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in the higher grade on the ground that the test strength are higher than the minimum specified.

Stripping:

The Engineer in charge shall be informed i.e. advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather another condition that influence the setting of concrete and of the materials used into the mix. In normal circumstances (generally where temperatures are above 20 C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in it. No.9.1(A) for respective item form work.

All formwork shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and studs are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm cover to the finished concrete surface. Where it is intended to reuse the form work, it shall be cleaned and made good to the satisfaction of the Engineer in charge.

After removal of form work and shuttering, the in charge shall inspect the work and satisfy by random checks that concrete produced is of good quality.

Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honey comb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregates mixed into the proportions used in the grade of concrete that is being finished and of as dry consistency as is possible are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer in charge are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

Mode of measurement and payment:

The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dis-similar materials, labours, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excluded the cost of form work.

(b) Opening upto 0.1 Sq.m. The rate shall be for a unit of one cubic meter The strength of C.C. Block shall have compressive strength of 25 N/mm² after 28 days. It shall fixed on road surface with necessary excavation and shall be jointed in C.M.1:3 to required line and fixed level.

Excavation of pre cast Block shall be carried out as per the size shall be as specified in drawing and the surface shall have fair finish.

The strength of the C.C. Block shall have compressive strength of 15N/mm² after 28 days.

2.2 : Soil :

The soil to be filled in the central portion shall be brought from approved borrow area and shall be free from stone or hard stuff.

3.0 Construction:

The road surface shall be excavated to required depth on approved alignment. The vertical precast C.C. stones shall be fixed as shown in drawing to line and level and joined in C.M. 1:3. The selected soil shall be filled in the gap between the vertical kerb stones and shall be compacted and shall be covered with 75 mm thick precast C.C. stone laid horizontally and joined to each other and the vertical kerb stones in C.M. 1:3 in a manner that the alternate vertical joints match with the joints of the horizontal top slab.

4.0 Mode of Measurement and Payment:

The measurement shall be on running meter basis and shall include all the work including necessary excavation, pre cast C.C. Blocks and soil filling and joining C.C. Blocks in C.M. 1:3, curing, including all labour, material tools & plants etc. complete.

Item No: 117 Providing, assembling, transporting & placing/fixing of Magazine Rack of size: 900W x 300D x 1800mmH. Top and body structure made of 18mm thick BWR plywood (IS303:1989) with 1mm thick laminate (IS 2046:1995) on all exposed surfaces. Four inclined display shelves made of 18mm thick BWR plywood (IS303:1989) with 1mm thick laminate (IS 2046:1995) finish. Bottom fitted with adjustable nylon bushes for floor leveling. All exposed edges to be finished with 2mm thick PVC edge banding. Complete with all necessary hardware and accessories As per design and drawing provided and finishing as per approval of architect and material as approved by engineer in charge.

1.0. Materials

1.1. The magazine rack shall be fabricated from **18 mm thick BWR (Boiling Water Resistant) plywood** conforming to IS 303:1989.

1.2. All exposed surfaces shall be finished with **1.0 mm thick decorative laminate** conforming to IS 2046:1995 of approved colour, shade and texture as approved by the Architect and Engineer-in-Charge.

1.3. The top, side panels, bottom panel, partitions and body structure shall be made from 18 mm thick BWR plywood.

1.4. The magazine rack shall be provided with **four inclined display shelves** fabricated from 18 mm thick BWR plywood finished with 1.0 mm thick laminate on exposed surfaces.

1.5. All exposed edges shall be finished with **2 mm thick PVC edge banding** fixed with approved hot-melt adhesive and machine pressed to provide a smooth and durable finish.

1.6. Adjustable nylon bushes shall be provided at the bottom for proper floor leveling and stability.

1.7. Adhesives used for bonding laminates and edge banding shall be of approved quality and suitable for furniture applications.

1.8. Screws, fasteners, brackets, connectors and other hardware shall be of approved make and corrosion-resistant quality.

1.9. All materials shall be new, free from defects, warping, delamination, cracks and other imperfections.

2.0. Workmanship

2.1. The work shall consist of providing, assembling, transporting and fixing a magazine rack of size **900 mm (W) × 300 mm (D) × 1800 mm (H)** as per approved drawings and directions of the Engineer-in-Charge.

2.2. The magazine rack shall be fabricated in a professional workshop using precision cutting, machining and assembly techniques to ensure dimensional accuracy and quality workmanship.

2.3. All plywood components shall be cut accurately to required dimensions and assembled true to line, level and plumb.

2.4. The body structure including top, sides, bottom and internal members shall be rigidly fixed to form a stable and durable unit.

2.5. Four inclined display shelves shall be securely fixed at the specified angles and locations as shown in the approved drawings.

2.6. Laminates shall be bonded uniformly without bubbles, wrinkles, blisters, gaps or surface defects.

2.7. PVC edge banding shall be machine applied and trimmed neatly to provide smooth, uniform and damage-resistant edges.

2.8. All joints shall be tight, properly aligned and finished to provide a seamless appearance.

2.9. Adjustable nylon bushes shall be installed at the bottom to facilitate leveling on uneven floor surfaces.

2.10. The completed unit shall be transported carefully to the site and fixed in position without causing damage to the furniture or surrounding finishes.

2.11. All exposed surfaces shall be cleaned and finished free from scratches, stains, adhesive marks and manufacturing defects.

2.12. The contractor shall rectify or replace any damaged, defective or unsatisfactory components at no extra cost.

2.13. The completed magazine rack shall conform to the approved design, dimensions, finish and workmanship requirements of the Architect and Engineer-in-Charge.

3.0. Mode of Measurements and Payment

- 3.1. Magazine rack shall be measured in **Numbers (Nos.)** of completed units supplied, assembled and fixed in position.
- 3.2. The rate shall include supply of BWR plywood, laminates, PVC edge banding, adjustable nylon bushes, adhesives, screws, hardware, accessories, fabrication, assembly, transportation, handling, installation, labour, tools, equipment and all incidental items required for complete execution of the work.
- 3.3. The rate shall also include precision cutting, edge finishing, laminate application, leveling arrangements, cleaning and protection until handing over.
- 3.4. No separate payment shall be made for hardware, edge banding, adhesives, transportation, wastage, shop drawings, mock-ups, protection, adjustments or any incidental operations necessary for satisfactory completion.
- 3.5. The rate shall be for **one complete magazine rack of size 900 mm × 300 mm × 1800 mm**, fully fabricated, assembled, transported and fixed in position complete in all respects and approved by the Engineer-in-Charge.

Item No: 118 Providing and Placing News paper Stand 600 W X 900 D X 900 H mm. To be made from prime-quality CRCA steel tubes and sheets for durability & longevity, and the reading top is made from high-quality pre-laminated MDF for a seamless finish and contemporary look. H-type cross bracings, paired with levelling bolts at the base, provide extraordinary strength and stability, ensuring steady performance even on uneven floors.



1. Material:

- News paper stand shall be used as per approved make and sample by EIC/Architect.
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

2. Workmanship:

- Work complete as per standard Manufacturers specification.
- Work complete including all types of tools, tackles, labour etc complete at any level and height.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.

The work done shall be measured in Numbers for area of work done.

The rate shall be for a unit of one Numbers

Item No: 119 Table : Providing & fixing office table / staff table having ht of 750 mm Top, with 19mm thk plywood as per Architect/ Engineer Design or Selection and Back and side Ply of table is also made up of 19mm Thick. Top of Table is 19mm thk ply with laminate Finish Per Requirement and All internal & external Joints finished with teakwood beading Patti. Item includes fixing of drawers and keyboard tray and storage with shutters under table as per drawing. With grooves shown as per drawing. All exposed and internal surfaces covered with Laminate Finish of approved shade & Complete as per detail drawings & as instructed by Architect/consultant/ Engineer In charge. Complete with all necessary hardware like nails, ss screws, table chain, TDS channel, adhesives etc. Contractor has to provide all necessary cut outs for Electrical works & no extra payment shall be made for it. All ply should follow IS 710

1. Material:

- IS 710 ply shall be used as per approved make and sample by Employer's representative/employer
- Laminate shall be used as per approved make and sample by Employer's representative/employer
- Hardware's shall be used as per approved make list and confirming to relevant IS codes and approved by Employer's representative/employer
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by Employer's representative/employer.

2. Workmanship:

- Work complete as per above specification.
- Work complete including all types of tools, tackles, labour etc complete at any level and height.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of Employer's representative/employer

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of Employer's representative/employer
- ☐ No extra payment will be given for any of the reasons.

- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.
- The work done shall be measured in Numbers for area of work done.

The rate shall be for a unit of Square Meter.

Item No: 120 Reading Table/Work Station : Providing & fixing work station / table having ht of 750 mm Top, with MS Pipe Structure of Frame as per Architect/ Engineer Design or Selection and Back and side Ply of table is also made up of 19mm Thick. Top of Table is 19mm thk ply with laminate Finish Per Requirement and All internal & external Joints finished with teakwood beading Patti. Common or front Part of Table is Sectionalized with MS Perforated Sheet. All exposed and internal surfaces covered with Laminate Finish of approved shade & Complete as per detail drawings & as instructed by Architect/consultant/ Engineer In charge. Complete with all necessary hardware like nails, ss screws, table chain, Key board tray, TDS channel, adhesives etc. Contractor has to provide all necessary cut outs for Electrical works & no extra payment shall be made for it. All ply should follow IS 710

1. Material:

- IS 710 ply shall be used as per approved make and sample by Employer's representative/employer
- Laminate shall be used as per approved make and sample by Employer's representative/employer
- Hardware's shall be used as per approved make list and confirming to relevant IS codes and approved by Employer's representative/employer
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by Employer's representative/employer.

2. Workmanship:

- Work complete as per above specification.
- Work complete including all types of tools, tackles, labour etc complete at any level and height.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of Employer's representative/employer

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of Employer's representative/employer
- ☐ No extra payment will be given for any of the reasons.
- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.
- The work done shall be measured in Numbers for area of work done.

The rate shall be for a unit of Square Meter.

Item No: 121 Chair Type - 01 (Cabin Main Chair) :- Supplying and providing High Back Mesh office Chair As per specification below:

- Metal frame seat made of Mesh fabric upholstery (foam base)
- Adjustable Head rest
- Fixed Arm rest
- Knee tilt mechanism
- 360 swivel motion/ 100mm stroke gas
- Nylon Star base
- Pushback mechanism & Comfy seating.
- Complete as per architectural design and concept and approved by Architect & Client.

1. Material:

- Chair Type - 01 (Cabin Main Chair) High Back Mesh office Chair shall be used as per approved make and sample by EIC/Architect.

All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

2. Workmanship:

- Metal frame seat made of Mesh fabric upholstery (foam base)
- Adjustable Head rest
- Fixed Arm rest
- Knee tilt mechanism
- 360 swivel motion/ 100mm stroke gas
- Nylon Star base
- Pushback mechanism & Comfy seating.
- Work complete including all types of tools, tackles, labour etc complete at any level and height.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- Rate shall be inclusive of all materials, loading, unloading, all taxes, transportation, placing at all floors and for all leads, polishing and all accessories as described in item description.
- The work done shall be measured in Numbers for area of work done.

The rate shall be for a unit of one Numbers.

Item No: 122 Providing, assembling, transporting & placing/fixing of high-back mesh office chair with metal frame seat and mesh fabric upholstery with foam base. Features include:

- Adjustable headrest
- Fixed armrests
- Knee tilt mechanism
- 360° swivel motion with 100mm stroke gas lift
- Nylon star base
- Pushback mechanism

Complete with all necessary hardware and accessories As per design and drawing provided and finishing as per approval of architect and material as approved by engineer in charge.



1. Material:

- Chair Type - 02 (Cabin Visitor Chair) Mid Back Mesh office Chair shall be used as per approved make and sample by EIC/Architect.
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

2. Workmanship:

Metal frame seat made of Mesh fabric upholstery (foam base)

Center tilt mechanism

100mm class 4 gas lift

- PP Fixed Arm rest
- Nylon Star base/Twin wheel nylons casters
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- Rate shall be inclusive of all materials, loading, unloading, all taxes, transportation, placing at all floors and for all leads, polishing and all accessories as described in item description.
- The work done shall be measured in Numbers for area of work done.

The rate shall be for a unit of one Numbers.

Item No: 123 Providing, assembling, transporting & placing/fixing of bookshelf of size: 900W x 410D x 1800mmH. Upper section and Lower section with 5mm thick glass and with 18mm thick BWR plywood (IS303:1989) doors with 1mm thick laminate (IS 2046:1995) finish. Main structure made of 18mm thick BWR plywood (IS303:1989) with 1mm thick laminate (IS 2046:1995) finish. All exposed edges to be finished with 2mm thick PVC edge banding. Complete with handles, locks, and all necessary hardware As per design and drawing provided and finishing as per approval of architect and material as approved by engineer in charge.



MATERIALS

Bookshelf shall be fabricated from 18 mm thick BWR grade plywood finished with decorative laminate on exposed surfaces. Glass shutters shall be made from 5 mm thick clear glass. Exposed edges shall be finished with 2 mm PVC edge banding. Hardware shall be of approved make.

WORKMANSHIP

The bookshelf shall be accurately fabricated to approved dimensions. Shelves shall be properly supported and aligned. Glass shall be securely fixed. All laminate surfaces shall be smooth and free from defects.

FIXTURES & ACCESSORIES

Locks, handles, hinges, shelf supports, screws, brackets and all hardware required for complete installation shall be included.

INSTALLATION

The bookshelf shall be assembled, positioned and installed at designated locations. All fittings shall be adjusted for smooth operation. The completed unit shall be cleaned and handed over.

MEASUREMENTS

Measurement shall be made in Numbers (Nos.). Rate shall include materials, fabrication, transportation, installation and finishing.

Item No: 124 Gang Chair (3 Seater) : Providing and Fixing 3 Seater (moulded foam seat and back In PU upholstery) Pero Cross Beam made of powder coated regular MS ERW tube having 8.0 ± 0.03 cm x 4.0 ± 0.03 cm x 0.2 ± 0.014 cm size. Legs to be chrom plated made of rolled steel with 0.12 ± 0.013 cm thickness. Seat and Back Shell to be peforated made from cold rolled M.S. Sheet (DIN 1623 Part 1 ST -12 Grade), 0.14 ± 0.013 cm thickness. The side Bar is made of chrome Plate solid steel 3.0 cm x 1.2 cm x 0.03 cm with fluting and plastic inserts. The Shell to be assembled on the cross beam with help of M8 Bolts.



1. Material:

- Waiting Area Chair shall be used as per approved make and sample by EIC/Architect.
- Black powder coated regular MS ERW (Electric Resistance Welded) tube
- Legs: Chrome plated rolled steel, Thickness: 0.12 cm with a tolerance of ± 0.013 cm
- Seat and Back Shell: Material: Perforated cold rolled M.S. (Mild Steel) sheet, conforming to DIN 1623 Part 1 ST "-12" Grade or IS 513 and moulded foam seat and back In PU upholstery
- Thickness: 0.14 cm with a tolerance of ± 0.013 cm.
- All type of material shall be used as per approved make list and confirming to relevant IS codes and approved by EIC/Architect.

2. Workmanship:

- Work complete as per standard Manufacturers specification.
- Finish (MS Components): All MS components shall be epoxy polyester powder coated using a multi-chamber pre-treatment process (e.g., 7 or 8 tank process). The dry film thickness (DFT) of the powder coating must be a minimum of 50 microns (range 50-60 microns).
- Fasteners : The shell is to be assembled on the cross beam using M8 bolts. (A specific quantity per seat.)
- MS ERW tube having 8.0 ± 0.03 cm x 4.0 ± 0.03 cm x 0.2 ± 0.014 cm size.

- Legs to be chrom plated made of rolled steel with 0.12 +/- 0.013 cm thickness. Seat and Back Shell to be perforated made from cold rolled M.S. Sheet (DIN 1623 Part 1 ST -12 Grade), 0.14 +/- 0.013 cm thickness.
- The side Bar is made of chrome Plate solid steel 3.0 cm +/- 0.03cm x 1.2 cm +/- 0.03 cm with fluting and plastic inserts.
- The Shell to be assembled on the cross beam with help of M8 Bolts.
- Model Similar to the picture attached
- Work complete including all types of tools, tackles, labour etc complete at any level and height.
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction of EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all above items.
- The rate shall include the cost of all materials, labour, scaffolding etc. to complete the whole work satisfactorily as per instruction of EIC/Architect.
- No extra payment will be given for any of the reasons.
- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.

The work done shall be measured in Numbers for area of work done. The rate shall be for a unit of one Numbers

Item No: 125 Supplying and Placing Folding Wheel Chair with Overall dimension: (L) 790 x (W) 600 x (H)870mm Frame structure Foldable frame structure is made of section 22x1.2mm A3 carbon steel with chrome finish. Cross bar are made of A3 carbon steel with section 25.4 x 1.2mm. Rear wheel 24 inch Solid mag wheels with alloy in the rim Hand rim Integrated hand rim provide to drive the wheel chair of section 16x1.2mm A3 carbon steel with chrome finish Front wheel 8 inch HUB made of PA polymer and outer with solid rubber Arm rest PU molded arm rest & base is made of ABS for better arm support Calf rest & seat Leatherette strap for calf rest & leatherette cushion for seat Footrest Adjustable alluminium die cast foot rest with updown & swivel type mechanism Push handle Handles are made of moulded rubber grip to push the wheelchair Brakes Hand brakes are provided to lock the wheelchair at desired location. Foot press Extended base with molded plastic for better grip Finish Anti rust chrome finish safe working load 100kg.etc.complete as per drawings and design supplied by architect and instruction given by authority and E.I.C.



1. Material

- The folding wheelchair shall be manufactured from high-quality A3 carbon steel unless otherwise specified, suitable for long-term institutional use.
- **Frame:**
- Foldable frame made of A3 carbon steel section 22×1.2 mm.
- Cross bars made of A3 carbon steel section 25.4×1.2 mm.
- All steel components shall be treated with anti-rust chrome finish.
- **Rear Wheels:**
- 24-inch solid mag wheels with alloy rim.
- Integrated hand rim made of A3 carbon steel section 16×1.2 mm, chrome finished.
- **Front Wheels:**
- 8-inch hub made of PA polymer with solid rubber outer.
- **Arm Rest:**
- PU molded arm rest with base made of ABS plastic for durability and comfort.
- **Seat & Calf Rest:**
- Seat cushion made of leatherette material.
- Calf rest provided with leatherette strap.
- **Foot Rest:**
- Adjustable aluminum die-cast footrest, up-down and swivel type mechanism.
- **Push Handles:**
- Handles fitted with molded rubber grips for ease of handling.

Brakes:

Hand-operated brakes to lock the wheelchair securely at the desired position.

- **Load Capacity:**
- Safe working load shall be minimum 100 kg

2. Workmanship:

- All components shall be manufactured with sound engineering practice, accurate dimensions, and smooth operation.
- Welded joints shall be neat, strong, uniform, and free from cracks, sharp edges, or burrs.
- Folding mechanism, wheels, brakes, and footrests shall operate smoothly without excessive play, noise, or obstruction.
- Chrome finish shall be uniform, corrosion-resistant, and free from peeling, blistering, or surface defects.
- The wheelchair shall be assembled, adjusted, and tested before delivery to ensure stability, safety, and comfort.
- The complete unit shall conform to the drawings, design details, and instructions issued by the Architect, Authority, and Engineer-in-Charge (E.I.C.).

3. Measurements:

- The rate shall be consolidated for all above items.

- Rate to be inclusive of all material, wastage, necessary tools tackles etc for fixing at all heights and for all floors.
- The rate shall be for a unit of one Number.

Item No: 126 Supplying and providing dust bin made of 100% virgin plastic with paddle. Capacity-10 to 15 Ltr.

MATERIALS

Dust bin shall be manufactured from virgin plastic of approved quality. Material shall be impact resistant, washable and suitable for indoor institutional use. Lid and pedal mechanism shall be durable and corrosion resistant.

WORKMANSHIP

The dust bin shall be free from cracks, sharp edges and manufacturing defects. Surface finish shall be smooth and easy to clean. Pedal operation shall be smooth and reliable.

FIXTURES & ACCESSORIES

Foot-operated pedal mechanism, hinged lid and all integral accessories shall form part of the item.

INSTALLATION

Dust bin shall be supplied and placed at designated locations complete and ready for use.

MEASUREMENTS

Measurement shall be made in Numbers (Nos.). Rate shall include supply, transportation and placement

Item No: 127 Providing, assembling, transporting & placing/fixing of decorative wood panelling (1200mm x 3000mm) with melamine polish for reception area vertical wall with Photo frame 10 nos size of A4 (210 X 297 MM), 03 nos A3 (420 X 297 MM), 2 nos A2 (594 X 420 MM) with 50mm wooden frame with plastic glazing. MDF back with metal hangers. In Dark brown, Solid colour. As per design and drawing provided and finishing as per approval of architect and material as approved by engineer in charge. Complete with all necessary hardware and accessories.

MATERIALS

Panelling shall comprise MDF boards, wooden framework, decorative mouldings, approved laminate or melamine finish, plastic glazing where specified and MS brackets for fixing. All materials shall be of approved quality and finish.

WORKMANSHIP

Panelling shall be installed true to line, level and plumb. Joints shall be neatly aligned and finished. Decorative mouldings and profiles shall be fixed accurately. Finished surfaces shall be smooth, uniform and free from visible defects.

FIXTURES & ACCESSORIES

Wooden framework, decorative mouldings, glazing panels, MS brackets, screws, anchors and all fixing accessories required for complete installation shall be included.

INSTALLATION

Panelling shall be securely fixed to wall surfaces with approved support systems. Finished surfaces shall be protected until completion of the project.

MEASUREMENTS

Measurement shall be made in Square Metres (Sq.m.) unless otherwise specified in the BOQ. Rate shall include materials, fabrication, finishing and installation

Item No: 128 Providing and Placing Goddess Saraswati idol, seated gracefully on a swan having Copper detailing and with dimensions of Height: 24 inches (61 cm), Width: 22 inches (55.88 cm), Depth: 11.5 inches (29.21 cm). As per design and drawing provided and finishing as per approval of architect and material as approved by engineer in charge.

MATERIALS

The idol shall be manufactured from approved material with decorative copper detailing and superior finish. The material shall be durable, stable and suitable for indoor installation.

WORKMANSHIP

The idol shall be artistically crafted with fine detailing and proportion. Surface finish shall be smooth and free from cracks, chips or defects.

FIXTURES & ACCESSORIES

Base supports and accessories necessary for safe placement shall form part of the item.

INSTALLATION

The idol shall be transported and carefully placed at the designated location. Necessary precautions shall be taken during handling and installation.

MEASUREMENTS

Measurement shall be made in Numbers (Nos.). Rate shall include supply, transportation and placement.

Item No: 129 Providing and fixing of approved quality roller blinds using phifer or equivalent fabric of premium grade, with roller tube, bottom bar leveller made of extruded aluminium alloy an Idler, Insert Type- Brackets, PVC chain etc. all complete at all floor and heights as per approved specification. Roller Tube Control, Clutch, Idler Side by side or single Roller Tube of extruded Aluminium 38mm inner dia - 41mm outer dia minimum wall thickness of 1.6mm. Roller blind - roller blind fabric should be made up of 35% FibreGlass, 65% PVC, it should have specific low emissivity treatment and lead free with Greenguard gold certification. It should have 3% to 5% openness, fabric thickness should be 0.43 mm, mesh weight approx 400 gms/ sqmtr. It should cut UV rays, with antimicrobial properties preferably with Microban. The fabric should be Flame retardant and Lead Free. It should be GreenGuard certified with Gold Standard for low chemical emissions for indoor use. including all accessories, material, labour, installation etc..and complete the work satisfactorily as per instruction of architect or Engineer-in charge.

1. Material:

- Phifer fabric of premium grade as per selection o EIC/Architect.
- Roller tube, bottom bar leveller made of extruded aluminium alloy an Idler, Insert Type- Brackets, PVC chain etc.
- Roller Tube Control, Clutch, Idler Side by side or single Roller Tube of extruded Aluminium 38mm inner dia - 41mm outer dia minimum wall thickness of 1.6mm. Roller blind

2. Workmanship:

- Entire work to be carried out as per drawings, instructions and supervision of the architect
- Work complete including all type of tools, tackles, scaffolding etc complete at any level and height
- The whole work is to be completed as per design; sample material & any other requirement shall be as per instruction EIC/Architect.

- The relevant specification for this item shall be followed as per Item Description and instruction given by Engineer in charge.

3. Measurements:

The rate shall be for a unit of One Square Meter.

Item No: 134 Providing and fixing R.C.C. Manhole cover 600 MM x 600 MM size with R.C.C. cover frame having 5 MT load carrying capacity etc comp

1.0. Materials

SFRC plain cover with Frame 600mm X 600 mm shall be of best ISI approved quality. The SFRC cover and frame shall be having Minimum 5 M.T. load carrying capacity. The SFRC manhole cover shall be of light duty and conform relevant I.S. & as approved by Engineer in charge.

2.0. Testing:

2.0.1. After completion of work, manhole cover shall be sealed by means of thick grease.

3.0. Mode of measurements and payment

3.1. The rate includes cost of all labour and materials, transportation required for satisfactory completion of this item.

3.2. The rate shall be for a unit of One number.

Item No: 346 Drilling of 315 mm dia bore in overburden strata & lowering of 200 mm dia PVC Casting Pipe up to Required Length and Further Drilling of 200 mm dia Bore in all Types of Rocky Strata, Soft Rock & Hard Rock by DTH Rig and Fixing the Bore Plug in all talukas of all districts of zone - III upto 350 mtr (Up to 350 Mtr Depth)

1. The drilling should be done by mud flush direct circulate rotary rig with hydraulic movement fitted with heavy duty reciprocating mud pump.
2. The tools and equipment required for drilling operation should be brought to site of work by contractor at his own cost. Arrangement of fresh potable water for drilling operation should be done by contractor at his own cost. When unavoidable for specification of particulars type well with permission of Engineer in charge of work.
3. The drilling agency has to collect the furnish following information.
4. Samples of drilled cuttings from different strata shall be collected at suitable intervals preferably at over 2 meters depth drilled or at cross intervals, if a change in the strata is met with. The opinion of the Geohydrologist of Public Health Mech. Circle shall be binding to the contractor.
5. The samples should be stored preferably in sufficient quantity and should be washed properly. As per drilling is in progress, an accurate drilling time log shall be kept indicating the time taken for drilling every two meters. This log will enable interpretation regarding the nature of formation (hard, soft, unconsolidated etc.) which has bearing on the water yielding capacity of the formation.
6. The unit rate shall be on Meter basis and payment shall be done on Meter basis.

Item No: 347 S.I.T.C. submersible pump set suitable for bore of 150 mm dia or more having 3 phase motor capacity not less than 10 HP with following capacity. Lifting and Lowering taken extra. [C] 25 stage 160 to 100 LPM discharge at 185 to 220 mtr head for 50 mm dia delivery pipe Cat.III

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 348 Supplying & erecting approved make 3 phase motor control cubical panel (Star - Delta) made from 16 G. CRCA sheet duly painted with epoxy powder painted inside and outside with hinged doors and locking arrangement, consisting of suitable size of ON-OFF isolator (AC - 3/23 duty) main fuses, single phasing preventer cum water level. Guard (Complete unit), Toggle switch to by pass Single phase preventer cum WLG, indicating lamps for R- Y- B phases, over load relay, Automatic water level controller, Ammeter & Voltmeter each with two way selector switch incoming wires duly socket Crimped, Panel to be erected on angle iron frame grouted on wall as directed. Star Delta & main contactor, overload relay, thermal / Electronic Star delta cutoff timer, start - stop push buttons. The isolator overload relay & contactors of L& T, Siemens or Cuttler Hamer make only. Panel to be erected on angle iron frame ground on wall. (B) S/D up to 10 H.P.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 349 Lowering of submersible motor pump set at the depth of following ,complete with required. Nos. and size of casing pipes erected by means of proper chain pulley block & pipe wrenches after checking of threads of each pipe with coupling to take the load of the pump set and pipe assembly filled up with water (C)Above 120 mtr.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 350 Providing and erecting ISI marked PVC insulated PVC Sheathed Flat flexible Submersible copper cable approved make of following Size. (D) 3 Core x 6 Sq. mm.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 351 Supplying of following size of STANDARD UPVC column pipe with coupler and wire lock [D] 50 mm dia

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 352 Supply of following size of TOP & BOTTOM accessories i.e. Adaptor set (CI) long, pump guard set, starter pipe Rubber ring for submersible pump & UPVC column pipe as directed by Engineer - in - charge with necessary plumbing as desired. [D] 50 mm dia

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 353 Providing and fixing of planter/pots of frp or plastic with Natural indoor plants as per selection and complete the work satisfactorily, etc. complete as per drawings and design supplied by architect and instruction given by authority and E.I.C.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 354 Supplying heavy duty hand car Dustbins having standard different colour of size litters 250 of any brand or its equivalent brand as directed by engineer-in-charge etc. complete.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 355 Supplying & Fixing of Photo frame of up to Size 12" x 18" with Slogen Sticker or Any Photo (up to Size 225 Sqinch)

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 356 Supplying of Wall Clock (Size Up to 15") or Table Clock (Size Upto 12" Digital Clock)

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 357 Supplying of Office Table Top Artificial or Indoor Pot (Ht Up to 12")

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 358 Supplying Small Size Door matt (Size Up to 15" x 24")

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 359 Supplying Big Size Door matt (Size : 60" X 24")

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 360 Providing and Supplying of Tripoi (Size : 30" x 18")

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 361 Notice Board / Pin Board

Supplying of Notice Board of 3'x 3' (or as specified) with all Fixing Arrangement complete as per drawing and Directed by Engineer In Charge etc complete.

“As Per Detailed item description and directed by Engineer in Charge.”

Item No: 362 Providing and Fixing Library Name in Gujarati Letter SS304 1mm thick letter 1.5" depth 10" Height with Duco color & fitting as per direction of Architect & EIC.

“As Per Detailed item description and directed by Engineer in Charge.”

A. Part-1 General Specification

1. Scope of Work

Work under this contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely furnish all the plumbing and other specialized services as described hereinafter and as specified in the schedule of quantities and/or shown on the plumbing drawings.

Scope of Work generally shall include the area shown in the drawings attached.

Over & above Clause 1.1, the plumbing installation may include but not limited to the following:

- Sanitary & CP Fixtures with all accessories. ☐ Water Treatment Plant.
- Internal & External Water supply & Distribution.
- Internal & External Sewage Collection & Disposal system.
- Electro-mechanical equipment/accessories required for Plumbing Installation.
- All hardware, supports, hangers required for complete installation.
- Civil work related to Plumbing Installation.
- Instruments, meters, gauges, required for the installation.
- External sewerage network.
- Sewage Treatment Plant
- The scope of work also includes all minor details of construction which are obviously and fairly intended and which may not have been referred to in these documents but are essential for the entire completion in accordance with standard Engineering practice.

2. Technical Information

The detailed specifications given hereinafter are for the items of works described in the schedule of quantities attached herein, and shall be guidance for proper execution of work to the required standards. It may also be noted that the specifications are of generalized nature and these shall be read in conjunction with the description of item in schedule of quantities and drawings.

Work under this contract shall be carried out strictly in accordance with specifications attached with the tender.

Item not covered under these specifications due to any ambiguity or misprints, or additional works, the work shall be carried out as per specifications of the latest applicable standards with latest amendments as applicable in the contract or as directed by Engineer in Charge.

Works not covered under Para 2 and 3 above shall be carried out as per relevant Indian standards specifications or codes of practice.

Unless specifically otherwise mentioned, all the applicable codes and standards published by the Indian Standard Institution and all other standards which may be published by them before the date of receipt of tenders, shall govern in all respects of design, workmanship, quality and properties of materials and methods of testing, method of measurements etc.

Wherever any reference to any Indian Standard Specification occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued there to or revisions thereof, if any, up to the date of receipt of tenders. In case there is no IS specification for the particular work; such work shall be carried out in accordance with the instructions in all respects and requirements of the Engineer-in-Charge.

For the items not covered under any of the specifications stated above, the work shall be executed as per manufacturers specifications / General good engineering practice/ or as per direction of Engineer in charge and shall be carried out in a manner complying in all respects with the requirement of relevant byelaws of municipal corporation/ Development Authority etc. under the jurisdiction of which the work is to be carried out.

In case of any difference or discrepancy between specifications & the description of Schedule of Quantities, the Schedule of Quantities shall take precedence. In case of any difference or discrepancy between specification and drawings, the drawings shall take precedence. In case any difference or discrepancy between the specifications for civil works and specification for Public Health Engineering works, specifications for civil works shall take precedence.

All electrical installation shall comply with the requirements of relevant Indian Standards, Indian Electricity rules & Indian Electricity Act amended up to date & local bye laws.

3. Contractor's Rates

Rates quoted are for all heights and depths required for this work.

All rates quoted must be for complete items inclusive of all such accessories, fixtures and fixing arrangements, nuts, bolts, hangers as are a standard part of the particular item except where specially mentioned otherwise.

All rates quoted are inclusive of cutting holes and chases in walls and floors and making good the same with cement mortar/ concrete of appropriate mix and strength as directed by consultant/client/ Engineer in Charge.

Rates quoted shall be inclusive of cost incurred in testing, commissioning of works and materials.

Rates quoted shall be inclusive of any rework to be carried in the system installation due to the instructions given by Statutory / Approval authority.

For all the items/ equipment supplied free of cost by the Client, the contractor's rate shall take care of transportation to the site, lifting and shifting at required height for installation, storage at site, installation, testing & commissioning of those items/equipment's.

All rates quoted by the contractor under this contract shall including bailing or pumping out of all the water and drainage at approved location by engineer in-charge, which may accumulate during the progress of work either through seepage, springs, rain or any other cause without any additional cost.

All rates quoted by the contractor shall include all miscellaneous civil work related to Plumbing work like excavation, refilling, timbering, bedding, encasing, etc. required as per actual site condition.

The contractor must get acquainted with the proposed site for the works and study specifications and site conditions carefully before bidding.

All water and electricity charges for testing and commissioning of the system shall be borne by the contractor.

In case of discrepancy / calculation error between rate & amount quoted by the contractor, the quoted rate shall be considered as final to derive the amount.

4. Drawings

Plumbing drawings are diagrammatic but shall be followed as closely as actual construction permits.

Any deviations made shall be in conformity with the Client / consultant and other services drawings.

Contractor shall verify all dimensions/service coordination at site and bring to the notice of the PMC / Engineer in Charge all discrepancies or deviations noticed. PMC / Engineer in Charge decision shall be final. In case of commencing the work with discrepancies, contractor will have to rectify the same without additional cost.

Civil related details like tanks, basement channel, and plant room, sump, etc. to be read in conjunction with structure drawings. In case of any discrepancies, Contractor shall co-ordinate with other agencies & execute as per the best practices.

Large size details and manufacturers dimensions for materials to be incorporated shall take precedence over small-scale drawings.

Any drawings supplied with the tender shall be returned in good conditions along with the tender.

Any drawings issued by the Client / consultant / Engineer in Charge for the works are the property of the Client / consultant / Engineer in Charge and shall not be lent, reproduced or used on any works other than intended without the written permission of the Client /consultant / Engineer in Charge.

5. Execution of Work

The contractor must get acquainted with the proposed site for the works and study specifications and conditions carefully before execution.

The work shall be carried out in conformity with the plumbing drawings and within the requirements of Client / consultant, HVAC, Electrical, Structural and other specialized services drawings.

The work shall be executed as per program approved by the Client / consultant / Engineer in Charge. If part of site is not available for any reason or there is some unavoidable delay in supply of materials stipulated by the Client / or due to any other issue not pertaining to the contractor, the contractor shall draw attention to the Client & as per the mutual agreement, the program of construction shall be modified accordingly and the contractor shall have no claim for any extras or compensation on this account. Here Client means the authorized person / agency representing Client / Client.

The contractor shall cooperate with all trades and agencies working on the site. The contractor shall ensure that all inserts, pipe lines embedded in structural members, sleeves, cutouts, etc. are placed in position in coordination with civil work as and when required. All holes, sleeves, cutouts shall be filled with best quality sealant to make leak proof joint.

The contractor shall take instructions from the Engineer In charge regarding collection and stacking of material in any place with lockable arrangement. For damage / theft of any material, Contractor shall be held responsible. No Excavated earth or Building material shall be stacked on areas where other buildings, roads, services, compound walls, etc. are to be constructed.

The contractor shall maintain in perfect condition all works executed till the completion of the entire work allotted to him. Where Phased delivery is contemplated, this provision shall apply to each phase. While carrying out pipeline work, in case the contractor encounters any Interference with other services, such as cable, conduits, etc. he shall take sufficient precautions in order to prevent any damage to them. If any damage occurs it shall be rectified to its original condition at his own cost to the satisfaction of Engineer-In-Charge.

The contractor carrying out the construction work shall take effective measures to carefully open out all existing channels, culverts, bridges, pipelines, conduits, water courses, sewer, drains, electrical cables, transmission lines and their supports and all works buried or otherwise where such services have to be interfered with the purpose of the construction of the works. He shall provide and arrange all necessary temporary supports and diversions, if necessary, across / under / even through along sides

of the trenches and all other parts of construction work for all such channels, culverts, bridges, pipe lines, and conduit.

The contractor shall arrange to carry out all works with least interference practicable with public footpath and vehicular traffic and with existing waste water or storm water drainage arrangements and provide all necessary road barriers, fences, notices, lights, gangways, access crossings, diversions for traffic, temporary drains, dewatering channels, chutes pumping or water lifting arrangements and all other facilities for the proper execution of the works to the approval and satisfaction in all respects of the Engineer-in-Charge. Any work carried out by the contractor in this connection shall be deemed as temporary works incidental to the construction work.

For any free issue items by Client, the contractor shall maintain the same properly & install as per good engineering practice.

No structural member shall be chased or cut without the written permission of the Client/consultant/ Engineer in Charge/ Engineer in charge.

The work shall be executed in a manner complying in all respects with requirements of relevant byelaws of the municipal corporation / Development Authority / NBC 2016 / Applicable Statutory Authority, the jurisdiction of which the work is to be executed or as directed by the Engineer-InCharge. All plumbing services shall be handed over to Engineer-In-Charge complete in all respects. Incomplete work will not be taken over. Any loss or damage to these services due to any reasons by anybody whatsoever before handing over will be at contractor's risk and cost. Any damage to any structural, finishing work done during the testing or rectification shall be made good by the contractor at his own cost and risk.

6. Material and Workmanship

All materials used in the works shall conform to the list of approved vendors provided in the tender. The approved samples shall be maintained at site till the completion of work.

As far as possible, materials bearing IS certification marks shall be used with the approval of the Client / consultant / Engineer in Charge.

Unless otherwise specified and explicitly approved in writing by the Client / consultant / Engineer in Charge, materials of makes and specifications mentioned with tender shall be used. In case of any items, list of approved vendors is not given; the contractor shall submit his recommendation to Engineer in charge with proper technical back up justifying the selection.

Workmanship and general finish shall be of first-class quality and in accordance with best workshop practice. All similar items of the Plant and their component parts shall be completely interchangeable. Spare parts shall be manufactured from the same materials as the originals and shall fit all similar items.

Machining fits on renewable parts shall be accurate and to specified tolerances so that replacements made to may be readily installed.

All equipment shall operate without excessive vibration and with minimum noise.

All revolving parts shall be truly balanced both statically and dynamically so that when running at normal speeds at any load up to the maximum there shall be no vibration due to lack of balance.

All parts which can be worn or damaged by dust shall be totally enclosed in dust proof housings.

All materials selected in the work shall be most suitable for duty concerned, free from imperfections, selected for long life and minimum maintenance.

All necessary accessories required for satisfactory and safe operation of the Plant shall be supplied by the Contractor unless it is specifically excluded from his scope.

All valves shall be closing on clockwise rotation of the hand wheel. The effort required to close / open under all operating conditions shall be limited to 7 kg. The direction of opening/ closing shall be cast on the hand wheel.

All flanges shall be drilled in accordance with requirements of IS: 1538. All flanges shall be full or spot faces on the back side. The flange thickness shall be uniform throughout. Flange outside periphery shall be concentric with the bore. Flanges shall be finished smooth on periphery also Castings and fabricated materials shall be finished smooth all over.

7. Inspection and Testing of Materials

Contractor shall be required, if requested, to produce manufacturers test certificate for the particular batch of materials supplied to him. The tests carried out shall be as per the relevant Indian standards. Testing charges including incidental charge and cost of sample for testing shall be borne by the contractors for all mandatory tests.

Testing charges for optional tests shall be paid by the Dept. However, the incidental charges and cost of sample for testing shall be borne by the contractor.

In case of non-IS materials, it shall be the responsibility of the contractor to establish the conformity of material with relevant IS specification by carrying out necessary tests. Testing charges including incidental charge and cost of sample for testing shall be borne by the contractors for such tests.

The materials should pass all tests and tolerance in dimensional, chemical, physical properties should be within the limit as stipulated in relevant I.S. for acceptance. Such materials will be accepted as standard.

Payments shall be restricted to standard unit mass, or as specified in the schedule, without making any cost adjustment towards mass or any other properties provided the material pass all the tests and tolerance are within the specified limit.

For examination and testing of materials and works at the site, contractor shall provide all testing and gauging equipment necessary but not limited to the followings:

- Theodolite
- Dumpy level
- Steel tapes
- Weighing machine
- Plumb bobs, spirit levels, Hammers
- Micrometers
- Thermometers, Stoves
- Hydraulic test machine □ Smoke test machine.

All such equipment shall be tested for calibration at any approved laboratory, if required by the Client / consultant / Engineer in Charge.

All testing equipment shall be preferably located in special room meant for the purpose.

8. Mock Up

The contractor shall install all pipes, fixtures, clamps and accessories and fixing devices in mock-up shaft and room so constructed as directed by Client / consultant / Engineer in Charge without any cost. The materials used in the mock-up may be reused in the works if found undamaged.

Any tiles or finished surfaces or floors damaged by the contractor while doing his work shall be made good with new tiles or other finishing material. No payment shall be admissible for such repairs. The Client/consultant / Engineer in Charge may, at his discretion get the damaged work repairs to the contractor.

9. Materials Supplying by Client

The contractor shall verify that all materials supplied by the Client conform to the specifications of the relevant item in the tender. Any discrepancy found shall be brought to the notice of the Client / consultant / Engineer in charge.

If any materials issued to the contractor, free of cost, are damaged or pilfered, the cost of the same shall be recovered from the contractor on the basis of actual cost to Client which shall include all freight and transportation, excise duty, sales tax, octroi, import duty etc.

10. Reference Points

Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of the work.

All such reference points shall be in relation to the levels and locations given as per the Client / consultant / Engineer in Charge and in plumbing drawings.

11. Reference Drawings

The contractor shall maintain one set of all construction drawings issued to him as reference drawings. These shall not be used on site.

All corrections, deviations and changes made on the site shall be shown on these reference drawings for final incorporation in the completion (as built) drawings. All changes to be made shall be initialed by the Engineer in charge.

One complete set of construction drawings shall be made available to the execution engineer & shall be maintained in good condition throughout the execution activities.

12. Shop Drawings

The contractor shall submit to the Client / consultant / Engineer in Charge four copies of the shop drawings.

Shop drawings shall be submitted under following conditions:

- Showing any changes in layout in the plumbing drawings.
- Foundation details, Nozzle Orientation, Equipment layout and piping, electrical, wiring diagram.
- Manufacturer's or contractor's fabrication drawings for any materials or equipment supplied by him.

The contractor shall submit four copies catalogues, manufacturers drawings, technical data sheet, equipment characteristic data or performance charts as required by the Client / consultant / Engineer in Charge.

13. Site Clearance and Cleanup

The contractor shall, from time to time clear away all debris and excess materials accumulated at the site.

After the fixtures, equipment and appliances have been installed and commissioned, contractor shall clean-up the same and remove all plaster, paints stains, stickers and other foreign matter of discoloration leaving the same in a ready to use condition.

On completion of all works, contractor shall demolish all stores, remove all surplus materials and leave the site in a broom clean condition, failing which the same shall be done at contractor's risk and cost.

14. Testing

Piping and drainage works shall be tested as specified under the relevant clauses of the specifications. Tests shall be performed in the presence of the Engineer in Charge. The engineer in charge shall issue a certificate for approved testing of all systems duly signed & stamped.

All materials and equipment found defective shall be replaced and whole work tested to meet the requirements of the specifications.

Contractor shall perform all such tests as may be necessary and required by the local authorities to meet Municipal or other bye-laws in force.

Contractor shall provide all labour, equipment and materials for the performance of the test.

After completion of work and during the maintenance liability period of contract, the work shall be subjected to "Post construction and testing". In case, if the materials incorporated in the work are found to be inferior, though the sample collected from the materials might have been passed at the time of execution, it shall be the responsibility of the contractor to replace the same without any cost to the Client failing which the Client may rectify the same at the risk and cost of the contractor or the Client may accept the same as substandard, and cost be adjusted from the outstanding security deposit as per the terms and condition of the contract for the work.

15. License and Permits

Contractor must hold a valid plumbing license issued by the Municipal authority (if applicable) or other competent authority under whose jurisdiction the work falls.

Contractor must keep constant liaison with the Municipal authority and obtain approval of all drainage and water supply works carried out by him.

Contractor shall obtain, from the municipal authority, completion certificate with respect to his work as required for occupation of the building.

All inspection fees or submission fees paid by the contractor shall be reimbursed by the Client on production of valid official receipts.

16. Handing Over Documents

On completion of work, contractor shall submit one complete set of as built drawings in editable soft copy and two hard prints of 'as built' drawings to the Engineer in Charge. These drawings shall have the following information:

- Run of all piping & diameters on all floors, terrace and vertical stacks.
- Ground and invert levels of all drainage pipes together with location of all manhole and connections up to outfall.
- Run of all water supply lines with diameters, locations, of control valves, access panels inside the utilities.
- Location of all mechanical equipment with layout and piping connections & location of electrical panel for the same.
- Location & capacity of Underground / Overhead tanks.
- Equipment general arrangement drawings, as built drawings, P&ID diagram.

- Warranty/ guarantee certificate from OEM.
- Inventory datasheet.
- Sanitary item guarantee bond.

Contractor shall provide four sets of catalogues, performance data and list of spare parts together with the name and address of the manufacturer for all electrical and mechanical equipment provided by him.

All 'warranty cards' given by the manufacturers shall be handed over to the Client / consultant / Engineer in Charge.

Contractor shall provide Operation and Maintenance manual of all major Electro-mechanical equipment's.

All test certificates of materials & testing at manufacturer works shall be submitted in one set of hard copy.

All site performance test certificates approved by Engineer in charge shall be submitted in one set of hard copy.

17. Applicable Codes and Standards

Plumbing system design shall conform to plumbing design codes like National Building code – 2016, Part 9, Section 1, CPHEEO Manual, Handbook on Water supply & Drainage – SP 35, Public Health Engineering Handbook, Uniform Plumbing Code for India.

All equipment, supply, erection, testing and commissioning shall comply with the requirements of Indian Standards and code of practice given below as amended up to the date of submission of Tender. All equipment and material being supplied shall meet the requirements of BIS and other relevant standard and codes.

LIST OF INDIAN STANDARDS FOR PLUMBING

The following IS codes shall be referred in execution of Public Health Engineering works.

IS CODE	SUBJECT
456- 2000	Code of practice for Plain & Reinforced concrete.
458- 2003	Specifications for Concrete Pipes.
554- 1999	Dimensions for pipe thread where pressure tight joints are required.
651- 1992	Specifications for Salt glazed stoneware pipes & fittings.
778- 1984	Specifications for copper alloy gate & Globe check valves for water works

779- 1994	Water meters (domestic type)
782- 1978	Specification for Caulking lead.
783- 1985	Code of practice for laying concrete pipes.
784- 2001	Pre-stressed concrete pipes.
1172- 1993	Code of basic requirements for water supply, drainage and sanitation
1200-1979 (Pt. 16)	Method of measurements for Laying of water and sewer lines including appurtenant items.
1200-1981 (Pt. 19)	Method of measurements for Water supply, plumbing and drains.
1230	Specifications for CI Rain Water pipes
1703- 2000	Ball valve (horizontal plunger type) including floats for water supply.
1726- 1991	Cast iron manhole covers and Frames.
1729- 2002	Cast /ductile iron drainage pipes & fittings for over ground NP pipeline S/S series.
1742- 1983	Code of practice for building drainage
2065- 1983	Code of practice for water supply in buildings.
2097 - 1983	Specification for foam making branch pipe.
2104- 1981	Water meter boxes (domestic type)
2267- 1995	Polystyrene molding and extension materials – specification
2373	Specification for Water Meter (Bulk type)
2379- 1990	Color code for identification of pipe lines.
2401- 1973	Code of practice for selection, installation & maintenance of domestic water meters
2527- 1984	Code of practice for fixing rain water gutters and down pipes for roof drainage.
2692- 1989	Specification for Ferrules for water services.
2800- 1991 (Pt. I)	Construction of tube well

2800- 1979 (Pt. II)	Testing of tube well
2951- 1965 (Pt. I)	Head loss in straight pipes due to frictional resistance

2951- 1965 (Pt. II)	Head loss in valves & fittings.
3076- 1985	Low density polyethylene pipes for potable water supply
3597- 1998	Method of test for concrete pipes.
4038- 1986	Foot valves for water works purposes.
4111 (Pt. I to V)	Code of practice for ancillary structures in sewage system.
4111- 1986 (Pt. I)	Manholes
4111- 1985 (Pt. II)	Flushing tanks
4111- 1985 (Pt. III)	Inverted siphon
4111- 1968 (Pt. IV)	Pumping stations & pumping mains (rising mains)
4111- 1993 (Pt. V)	Tidal out-falls
4350- 1967	Specification for concrete porous pipes for under drainage.
4733- 1972	Methods of sampling & test for sewage effluents
4854 (Pt. I to III)	Glossary terms for valves and their parts
4854- 1969 (Pt. I)	Screw down stop, check & gate valves & their parts
4854- 1974 (Pt. III)	Butterfly valves
4985- 2000	Specifications for un plasticized PVC pipes for potable water supplies

5312 (Pt. I)	Swing check type reflux (non-return) valves
5312- 1984 (Pt. I)	Reflux (non-return) valves – single door pattern
5329- 1983	Code of Practice for sanitary pipe work above ground for building
5382- 1985	Specifications for rubber sealing rings for water, gas & sewer mains
5455- 1969	Cast iron steps for manholes
5600- 2002	Specifications for Sewage and drainage pumps
5961- 1970	Specifications for CI grating for drainage purposes
6279- 1971	Equipment for grit removal
6280- 1971	Sewage screens
6494- 1988	COP for water proofing of underground water tanks & swimming pools
7634 (Pt. I to III)	Code of Practice for Plastic pipe work for potable water supplies
7634- 2003 (Pt. III)	Laying & jointing un plasticized PVC pipes
7740- 1985	Code of Practice for road gullies
7834 (Pt. I to VIII)	Injection molded PVC socket fittings with solvent cement joints for water supplies
8329- 2000	Centrifugally cast (spun) ductile iron pressure pipes & fittings for water, gas & sewage
8835- 1978	Guideline for planning and design of surface drains.
9739- 1981	Specifications for Pressure reducing valves for Domestic water supply system.
9762- 1994	Specifications for polyethylene floats for float valves
10500- 1991	Specification of Drinking water
11189- 1985	Method of tube well development
11632 - 1986	Rehabilitation of Tube well
12183- 1987 (Pt. I)	Code of practice for Plumbing in multi-storied buildings (for water supply)

12231 - 1987	UPVC pipes for suction & delivery lines of agricultural pumps— Specification.
12235 - 1986	Method of test for UPVC pipe for potable water supply
12469 - 1988	Specifications for pumps
12592- 2002	Precast concrete frame & cover (SFRC frame & cover)
12701-1996	Specifications for rotational molded polyethylene water storage tanks
12818 - 1992	Specification for UPVC ribbed screen casing & plain casing pipes for bore / tube well
13095 - 1991	Butterfly valves for general purposes
13114 - 1991	Specification for forged brass gate, globe & check valves for water works purposes
14333-1996	Specification for HDPE pipes for sewerage system.

B. Technical Specification

1. General

Any damage caused to the building, or to electric, sanitary water supply or other installations etc. therein either due to negligence on the part of the contractor, or due to actual requirements of the work, shall be made good and the building or the installations shall be restored to its original condition by the contractor. Nothing extra shall be paid for it, except where otherwise specified.

All plumbing installation work shall be carried out through licensed plumbers.

It is most important to ensure that wholesome water supply provided for drinking and culinary purposes, is in no way liable to contamination from any less satisfactory water. There shall, therefore, be no cross connection whatsoever between a pipe or fitting for conveying or containing wholesome water and a pipe or fitting for conveying or containing impure water or water liable to contamination or of uncertain quality of water which has been used for any purpose. The provision of reflux or nonreturn valves or closed and sealed valves shall not be construed a permissible substitute for complete absence of cross-connection.

Where a supply of wholesome water is required as an alternative or standby to supply of less satisfactory water or is required to be mixed with the latter, it shall be delivered only into a cistern, and by a pipe or fitting discharging into the air gap at a height above the top edge of the cistern equal to twice its nominal bore, and in no case less than 15 cm.

No piping shall be laid or fixed so as to pass into, through or adjoining any sewer, scour outlet or drain or any manhole connected therewith nor through any ash pit or manure-pit or any material of such nature that can cause undue deterioration of the pipe.

Where the laying of any pipe through fouled soil or previous material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means. Any piping or fitting laid or fixed which does not comply with the above requirements, shall be removed and re-laid in conformity with the above requirements. No piping shall be laid or fixed so as to pass into, through or adjoining any sewer, scour outlet or drain or any manhole connected therewith nor through any ash pit or manure-pit or any material of such nature that can cause undue deterioration of the pipe.

Where the laying of any pipe through fouled soil or previous material is unavoidable, the piping shall be properly protected from contact with such soil or material by being carried through an exterior cast iron tube or by some other suitable means. Any piping or fitting laid or fixed which does not comply with the above requirements, shall be removed and re-laid in conformity with the above requirements. The design of the pipe work shall be such that there is no possibility of backflow towards the source of supply from any cistern or appliance whether by siphonage or otherwise, and reflux or non-return valves shall not be relied upon to prevent such back flow.

All pipe work shall be so designed, laid or fixed, and maintained so that it remains completely watertight, thereby avoiding wastage of water, damage to property and the risk of contamination of the water conveyed.

In designing and planning the layout of the pipe work, due attention shall be given to the maximum rate of discharge, required economy in labour and materials, protection against damage and corrosion, protection from frost, if required, and to avoidance of airlocks, noise transmission and unsightly arrangement.

To reduce frictional losses, piping shall be as smooth as possible inside. Methods of jointing shall be such as to avoid internal roughness and projection at the joints, whether of the jointing materials or otherwise.

Change in diameter and in direction shall preferably be gradual rather than abrupt to avoid undue loss of head. No bend or curve in piping shall be made so as to materially reduce or alter the crosssection. Underground piping shall be laid at such a depth that it is unlikely to be damaged by frost or traffic loads and vibrations. It shall not be laid in ground liable to subsidence, but where such ground cannot be avoided; special precautions shall be taken to avoid damage to the piping. Where piping has to be laid across recently disturbed ground, the ground shall be thoroughly consolidated so as to provide a continuous and even support.

Where the service pipe is of diameter less than 50 mm the stop valves shall be of the screw-down type and shall have loose washer plates to act as non-return valves. Other stop valves in the service line may be of the gate type.

Water for drinking or for culinary purposes as far as possible shall be on branch pipes connected directly to the service pipe.

Pumps shall not be allowed on the service pipe as they cause a drop of pressure on the suction side thereby affecting the supply to the adjoining properties. In cases where pumping is required, a properly protected storage tank of adequate capacity shall be provided to feed the pump.

Service pipes shall be so designed and constructed as to avoid air-locks, so that all piping and fittings above ground can be completely emptied of water to facilitate repairs. There shall be draining taps or draw-off taps (not underground) at the lowest points, from which the piping shall rise continuously to draw-off taps, ball valves, cisterns, or vents (where provided at the high points).

Service pipes shall be designed so as to reduce the production and transmission of noise as much as possible. Appliances which create noise shall be installed as far distant as possible from the living rooms of the house. High velocity of water in piping and fittings shall be avoided. Piping shall be confined, as far as possible, to rooms where appliances are fixed, it shall have easy bends, and where quietness is particularly desired, holder bats or clamps shall be insulated from the piping by suitable pads.

The rising pipe to the storage cistern, if any, or to any feed cistern shall be taken as directly as possible to the cistern and shall be fixed away from windows or ventilators.

All pipe work shall be planned so that the piping is accessible for inspection, replacement and repair. To avoid its being unsightly, it is usually possible to arrange it in or adjacent to cupboards, recesses, etc. provided there is sufficient space to work on the piping with the usual tools. Piping shall not be buried in walls or solid floors. Where unavoidable, piping may be buried for short distances provided that adequate protection is given against damage and that no joints are buried. If piping is laid in ducts or chases, these shall be roomy enough to facilitate repairs and shall be so constructed as to prevent the entry of vermin. To facilitate removal of pipe casing, floor boards covering piping shall be fixed with screws or bolts.

When it is necessary for a pipe to pass through a wall or floor, a sleeve shall be fixed therein for insertion of the pipe and to allow freedom for expansion, contraction and other movement. Piping laid in wood floors shall, where possible, be parallel with the joists.

Where storage tanks are provided to meet overall requirements of water connection of service pipe with any distributing pipe shall not be permitted except one direct connection for culinary or drinking requirements.

No service pipe shall be connected to any water closet or urinal. All such supplies shall be from flushing cisterns which shall have supply from storage tank.

No service or supply pipe shall be connected directly to any hot-water system or to any apparatus used for heating other than through a feed cistern thereof.

In designing a drainage system for building(s), the aim shall be to provide a self-cleansing conduit for the conveyance of soil, waste, surface or sub-surface waters and for the removal of such wastes speedily and efficiently to a sewer or other outlet, without risk of nuisance and hazard to health.

The discharge of water through a domestic drain is intermittent and limited in quantity and therefore, small accumulations of solid matter are liable to form in the drains between the building and the public sewer. There is usually a gradual shifting of these deposits as discharges take place. Gradients shall be sufficient to prevent these temporary accumulations building up and blocking the drains.

In cases, where it is practically not possible to conform to the minimum gradients, a flatter gradient may be used but the minimum velocity in such cases shall on no account be less than 0.62 meters per second.

On the other hand, it is undesirable to employ gradients giving velocity of flow greater than 2.40 meters per second.

All materials shall be new of the best quality confirming to specifications and subject to the approved make list and as approved by Design Consultant / Engineer in charge.

2. CPVC Pipes and Fittings

Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold-water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge.

a. Scope

This specification covers the requirements for manufacture, supplying, lowering, laying, jointing, testing and commissioning of CPVC solvent welded pipe with fittings for the conveyance & distribution system.

b. Material

The pipes and fittings chemically known as Chlorinated Poly Vinyl Chloride [CPVC] shall be produced in Copper Tube Size [CTS] from ½” to 2” with two different standard dimensional ratios – SDR 11 and 13.5 and from 2.5” to 10” as per SCH 40 and 80.

All the CPVC pipes and fittings shall be made from the identical CPVC compound having the same physical properties.

Pipes and fitting shall be produced as per SDR 11 & shall meet the requirement of ASTM D 2846 whereas the pipes produced with SDR 13.5 shall meet the requirement derived from ASTM F 442, specific to CPVC in Iron Pipe Size [IPS] dimension, which also shall be applied to CPVC pipes in Copper Tube Size [CTS] dimension.

Pipes and fitting shall be produced as per SCH 40 & 80 shall meet the requirement of ASTM F 441. Fittings shall be of the same make as that of pipes. It shall be injection molded type.

CPVC pipes and fittings shall be visually inspected before laying & shall be free from cracks, flaws and defects and shall be able to withstand a pressure as mentioned in the schedule of quantities. Cracked & damaged pipe shall be removed from the site by the contractor at his own cost. All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

The pipe shall be provided with bends, junctions, inspection doors, offsets, cowl, access pieces/ plugs etc. jointing with Solvent cement (lubricant) including cutting holes in walls and making good the same. The Access door shall be secured air and water tight with 3mm thick insertion

rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal.

Lubricant/ solvent cement: It is available in 100 Gms, 250 Gms & 500 Gms packing. It is specially formulated for compatibility with rubber seal as well as PVC. It does not support the growth of bacteria or fungi. Solvent joints shall be used as per manufacturer's recommendations.

c. Cutting, Jointing, & Fixing

In order to make a proper and neat joint, the pipe length shall be measured accurately and make a small mark. Ensure that the pipe and fittings are size compatible. It shall be easily cut with a wheel type plastic pipe cutter or hacksaw blade. Cutting tubing as squarely as possible shall provide optimal bonding area within a joint.

- Deburring/ Beveling

Burrs and filings shall prevent proper contact between tube and fitting during assembly and should be removed from the outside and inside of the pipe. A pocket knife or file shall be used for this purpose. A slight bevel on the end of the tubing shall ease the entry of the tubing into the fitting socket.

- Fitting Preparation

Using a clean, dry rag, wipe dirt and moisture from the fitting sockets and tubing end. The tubing should make contact with the socket wall 1/3 to 2/3 of the way into the fitting socket.

- Solvent Cements Application

Use only CPVC cement or an all – purpose cement conforming to ASTM -493 or joint failure may result. When making a joint, apply a heavy, even coat of cement to the pipe end. Use the same applicator without additional cement to apply a thin coat inside the fitting socket.

Too much cement can cause clogged water ways.

- Assembly

Immediately insert the tubing into the fitting socket, rotate the tube ¼ to ½ turn while inserting. This motion will ensure an even distribution of cement within the joint. Properly

align the fittings. Hold the assembly for approximately 10 seconds, allowing the joint to setup.

- Set and Cure Times

Solvent cement set and cure times are a function of pipe size, temperature and relative humidity. Curing time is shorter for drier environments, smaller sizes and higher temperatures. It requires 10 to 20 minutes for perfect joint.

- Cementing

Verify the cement is the same as the pipes and fittings being used. Check the temperature where the cementing will take place. Cement takes longer time to set up in cold weather. Be sure to allow extra time for curing. Do not try to speed up the cure by artificial means – this could cause porosity and blisters in the cement film.

Solvents evaporate faster in warm weather. Work quickly to avoid the cement setting up before the joint is assembled. Keep the cement as cool as possible. Try to stay out of direct sunlight. Keep the lid on cements, cleaner and primers when not in use. Evaporation of the solvent will affect the cement. Stir or shake cement before using.

Use ¾" dauber on small diameter pipes, 1 ½" dauber up through 3" pipe, and a natural bristle brush, swab or roller ½ the pipe diameter on pipes 4" and up.

Do not mix cleaner or primer with cement. Do not use thickened or lumpy cement. It should be like the consistency of syrup or honey. Do not handle joints immediately after assembly. Do not allow dauber to dry out.

Maximum temperature allowable for CPVC pipe is 180 °F. All colored cements, primers and cleaners will have a permanent stain. There is no known cleaning agent. Use according to the step outline in ASTM D – 2846, joining of pipe and fittings.

d. Testing

After laying and jointing, the pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost. Use of any compound or stop leak compound will not permit.

The pipes and fittings after they are laid shall be tested to hydraulic pressure of 1.5 times the working pressure or 7.5 Kg/Sq.cm whichever is more. The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw of taps and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure should be maintained without loss for at least two hours. The pipes and fittings shall be tested in sections as the work of laying proceeds, having the joints exposed for inspection during the testing.

- CPVC pipes and fittings of specified diameter & pressure class.
- Laying and cutting the pipe wherever necessary and wastage.
- Over ground installation with supports/ clamps, accessories required, Concealed installation with required civil work.
- Pipe & Fitting with insulation for hot water application if specified in schedule of quantities.
- Making the solution joint, painting the pipe line if mentioned in schedule of quantities.
- Making all damage good to original condition after completion of installation work.
- Testing the entire system and rectification of defects if any.
- All necessary materials, labor and use of tools.

f. Mode of Measurement

The measurement shall be for unit running meter length of pipe line laid or fixed. The measurement shall be taken along the center line of pipe. No measurement shall be recorded separately for fittings, making joint, supports, clamps, civil work, painting if mentioned in schedule of quantities. It shall also include insulation for hot water application if mentioned in schedule of quantities.

g. Mode of Payment

Mode of payment shall be Unit length of pipe line laid or fixed. No extra payment shall be made for fittings, making joint, supports, clamps, civil work, painting if mentioned in schedule of quantities. It shall also include insulation for hot water application if mentioned in schedule of quantities.

3. Ball Valve

a. Material

The ball valve shall be brass as specified conforming to IS: 9890 and of the size as specified. This shall be fixed in the pipe using suitable Teflon tape wrapping on the pitched pipe ends to remove any type of leakage.

b. Fixing

The valves shall be fixed in position in the pipeline as shown in the drawing or as directed with necessary socket or union, nuts, flanges, hardware, gaskets, tail piece, etc. During installation, flow direction on the valve shall be checked.

Valves shall be preferably installed in horizontal position.

Screwed valves after few turns shall be applied with Teflon tape over the threaded ends to obtain complete water tightness. Flanged joint shall be fixed with non-corrosive bolts & nuts with suitable thickness asbestos fiber gasket conforming to IS 638 for water tightness. c. Testing

The valves shall be body & seat tested at manufacturer's works as per the relevant standard & duly stamped. Test certificate shall be submitted for material & hydraulic testing.

After fixing in the pipelines, the system shall be hydraulically tested for 1.5 times working pressure or 10 kg/cm² whichever is higher for minimum 4 hrs. without any pressure drop. In case of leakage, contractor shall rectify / replace valves at his own cost

Valves shall also be tested for its hand wheel/ lever function by frequent on-off operation. d. Rates

- Fixing & jointing material.
- Painting.
- Making all damage good to original condition after completion of installation work.
- Testing.
- All necessary materials, labor and use of tools.

e. Mode of Measurement

The measurement shall be for each unit valve of specified diameter fixed.

f. Mode of Payment

The contract rate shall be for each unit of valve of specified diameter fixed. No extra payment shall be made for G.I. fittings used in fixing of the valve.

4. Non-Return Valve

Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required. a. General

Non return valve shall be either lift single/ multi door type or spring-operated check valves. For sizing more than 50 mm, generally NRV shall be of Cast Iron body, CI / CS door.

Single door Non return valve shall conform to IS 5312 up to 600 mm. Size above 600 mm shall have multi door design. Spring operated shall conform to API 594/598 standard having spring for non-slam action.

Material of Valves for hot water application shall withstand the temperature up to 80 deg. C. Generally, all internal valves (within the building) shall be of Gun Metal unless otherwise specified. All external installation on pipe line, plant rooms, etc. shall be of cast iron unless otherwise specified.

All valves up to 50 mm shall have screwed ends while all valves beyond 50 mm size shall have flanged ends. Flange dimensions shall conform to IS: 1538 Table IV & VI or IS: 6392 PN 1.6. b. Fixing

The valves shall be fixed in position in the pipeline as shown in the drawing or as directed with necessary socket or union, nuts, flanges, hardware, gaskets, tail piece, etc. During installation, flow direction on the valve shall be checked.

Valves shall be preferably installed in horizontal position, except butterfly valves which can be fixed in the vertical position.

Screwed valves after few turns shall be applied with Teflon tape over the threaded ends to obtain complete water tightness. Flanged joint shall be fixed with non-corrosive bolts & nuts with suitable thickness asbestos fiber gasket conforming to IS 638 for water tightness.

c. Testing

The valves shall be body & seat tested at manufacturer's works as per the relevant standard & duly stamped. Test certificate shall be submitted for material & hydraulic testing.

After fixing in the pipelines, the system shall be hydraulically tested for 1.5 times working pressure or 10 kg/cm² whichever is higher for minimum 4 hrs. without any pressure drop. In case of leakage, contractor shall rectify/replace valves at his own cost.

Valves shall also be tested for its hand wheel/ lever function by frequent on-off operation. d. Rates Included

- Valve of required type, size & pressure rating.
- Fixing & jointing material.
- Painting.
- Making all damage good to original condition after completion of installation work.
- Testing.
- All necessary materials, labor and use of tools.

e. Mode of Measurement

The measurement shall be for each unit valve of specified diameter fixed.

f. Mode of Payment

The contract rate shall be for each unit of valve of specified diameter fixed. No extra payment shall be made for G.I. fittings used in fixing of the valve.

5. Pressure Gauge

SITC of glycerine filled Pressure gauge of following ranges with isolation valve and tap off pipe complete in all respect as per technical specification and as per direction of Engineer. a. Scope

The item includes provision of Pressure Gauge of specified range as mentioned in the schedule with siphon tubing & SS isolation cock.

b. Material

The pressure gauge shall be constructed of die cast aluminum and stove enameled.

It shall be weather proof with an IP 55 enclosure.

It shall be a stainless-steel Bourdon tube type pressure gauge with a scale range from 0 to 16 Kg/cm² and shall be constructed as per IS: 3524.

Each pressure gauge shall have a siphon tube connection. The shut off arrangement shall be by SS Ball Valve.

c. Fixing

It shall be fixed vertically in position on pipe line by means of screwed nipple, spool piece or as required or as directed by the Engineer-in-charge.

d. Test

Calibration certificate shall be obtained and submitted for each pressure gauge. e. Rates

- Pressure Gauge with isolation valve & siphon tubing.
- Making connection with piping with all accessories.
- Making all damage good to original condition after completion of installation work.
- Testing the entire system and rectification of defects if any.
- All necessary materials, labor and use of tools.

f. Mode Of Measurement

The measurement shall be for each unit of Pressure Gauge of specified range fixed.

g. Mode Of Payment

The contract rate shall be for each unit Pressure Gauge of specified range fixed.

6. Strainer

Providing, installation, testing and commissioning of stainless-steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm Dia holes with stainless steel flange. a. Scope

The item includes the 'Y' type or POT type strainers of size as specified in schedule of quantities including fixing, testing & commissioning.

b. Material & Fixing

Body material shall be cast iron, Gun metal or Stainless steel.

Screen material shall be either bronze or stainless steel. Screen shall be removable type. Size of the perforations shall be 1/8" if not specified.

Strainers shall have either screwed or flanged ends.

Strainers shall be provided with equal size of butterfly valve for ease of cleaning.

It shall be such designed that, removal/ replacement of screen can be possible without disconnection of main pipe.

c. Testing

It shall be hydraulically tested at least for 1.5 times working pressure. d. Rates

- Strainer.
- Fixing material, specials & hardware.
- Fixing, testing & commissioning.
- Painting.
- Making all damage good to original condition after completion of installation work.
- All necessary labor, material and use of tools.

e. Mode Of Measurement

The measurement shall be for one strainer.

f. Mode Of Payment

The contract rate shall be for one strainer.

7. Float valve

Supply, installation, testing and commissioning of Horizontal plunger type Forged Brass / Bronze Float Valve, Screwed End, HDPE Ball / Float, PN 10 rating.

a. Scope

The valve shall be of copper or as specified in schedule of quantities. Size of float valve shall be as specified in schedule of quantities. Connecting rod to ball float shall be of brass & shall withstand high pressure encountered on it. It shall be brazed or soldered to render it leak proof.

b. Rates

- Ball float valve.
- Making all damage good to original condition after completion of installation work.
- Testing the entire system and rectification of defects if any.
- All necessary materials, labor and use of tools.

c. Mode Of Measurement

The measurement shall be for each unit of Ball float valve fixed.

d. Mode Of Payment

The contract rate shall be for each unit of Ball float valve fixed.

8. Water Meter

Providing and fixing enclosed type water meter (bulk type) conforming to IS: 2373 and tested by Municipal Board complete with bolts, nuts, rubber insertions etc. (The tail pieces if required will be paid separately)

e. Scope

The item includes the bulk type water meter of size as specified in schedule of quantities including fixing, testing & commissioning.

Water meters shall be selected according to flow to be measured and not necessarily to suit a certain size of main. The following points shall govern the selection of meters:

- The maximum flow shall not exceed the nominal capacity of the meter.
- The continuous flow shall be not greater than the continuous running capacity rating.
- The minimum flow to be measured shall be within minimum starting flows.

f. Material & Fixing

Water meters and their parts, especially parts coming in continuous contact with water shall be made of materials resistant to corrosion and shall be non-toxic and non-training. Use of dissimilar metals in contact under water shall be avoided as far as possible in order to minimize electrolytic corrosion.

The body of water meters shall be made from bronze, brass or any other corrosion resistant material e.g. grey iron castings, blackheart malleable iron, spheroidal graphite iron casting.

Registration box of water meters shall be made from bronze, brass, aluminum alloy or suitable plastics.

The registration box of dry dial water meters shall be provided with one or two escape holes for minimizing the accumulation of condensed water.

Cap of water meters shall be made from brass, bronze, aluminum alloy or suitable plastics. The cap shall be so designed and fixed to the registration box as to avoid entry of water and dirt. The transparent window which covers the dial shall be inserted from the inside into the cap. The protective lid shall be secured by a robust hinge or other suitable method of robust construction.

Provision shall also be made to lock the lid. The provision shall be such that the lock is conveniently operated from the top. Where the provision is designed for use in conjunction with padlocks, the hole provided for padlocks shall be of a diameter not less than 4 mm.

Where so required for dry-type water meters the transparent window covering the dial shall be provided with a wiper on the inner side for wiping off condensed water.

Water meters shall be provided with strainers. Strainers shall be of a material which is not susceptible to electrolytic corrosion. They shall be of plastics or other corrosion-resistant materials for both Type A and Type B meters. They shall be rigid, easy to remove and clean, and shall be fitted on the inlet side of the water meter. It shall be possible to remove and clean the strainer in such a way as not to permit disturbing the registration box or tampering with it. The strainer shall have a total area of holes not less than twice the area of the nominal inlet bore of the pipe to which the meter is connected however, in the case of meters provided with internal strainer involving opening of the registration box

for cleaning, an additional external strainer shall be fitted on the inlet side satisfying the above requirements.

9. Air release valve

a. Scope

The item includes supplying of single, double action or kinetic air Valve of specified diameter as mentioned in the schedule including fixing.

b. Material

Single air valve shall have single small or large orifice for releasing air during pipe filling and ventilating the pipe during emptying. Air valves up to 50 mm diameter directly shall be screwed on the main.

Double air valve shall have two ball chambers, on outlet of large capacity shall be provided for admission and release of bulk volume of air during emptying and filling of the main, another of small outlet type for the escape of smaller quantities of air accumulating under pressure. They shall be of flanged type.

Air valve body, bonnet , glands, caps, joints support rings shall be best gray iron of selected grade, 200 of IS-210-1978 specification for gray iron castings.

Ball guides of small orifice units and outlet bushes of large orifice valves shall be of gunmetal.

Nipples, spindles shall be machined from rolled, extruded or forged high tensile brass or aluminum bronze.

The balls shall be of rubber covered and vulcanite covered. The rubber shall have a smooth and hard surface. It shall be as per I.S. 638-1965 specification for rubber and insertion jointing.

Air valve shall be provided with isolation valve with IS certification mark and isolation valve. c. Fixing
The Air Valve shall be fixed in position as indicated in the drawing or as directed. They shall be fitted by means of flange joints or screwed joint to the pipe line.

d. Testing

The Air Valve and the joints shall be tested hydraulically to a minimum pressure of 10 kg/cm² or 1.5 times working pressure whichever is greater for minimum 4hrs without any leakage. e. Rates

- Supplying and fixing Air Valve of specified diameter and type with isolation valve.
- Fixing & Jointing material & specials.
- Painting.
- Making all damage good to original condition after completion of installation work.
- Testing & commissioning
- All necessary materials, labor and use of tools.

f. Mode Of Measurement

The measurement shall be for each unit of Air Valve fixed.

g. Mode Of Payment

The contract rate shall be for each unit of air valve fixed

10. SWR PVC Pipe

Providing & fixing of 6 Kg/ sq. cm SWR TYPE A / TYPE B PVC Pipe ISI marked brand as per IS 13592 selffit type complete. The work including solvent jointing hydraulic testing the joints & pipes as mentioned in the specification etc. making holes including fixing on the wall with clamps and fasteners at 1.00 meter distance or as mentioned in the specifications, making holes in brick or RCC wall as per requirement ,clearing the debris, grouting of concealed pipes, making good the chase as mentioned, making good the wall and floors, making connection with down take to satisfaction of Engr / arch with proper care, protecting fittings & pipes till the final handing over etc as directed by E-I-C complete as per specifications & drawing provided for all places, all heights & all levels (Exposed work on wall- Rain

Water)

a. Scope

The item includes supplying of UPVC soil, waste and rain water (SWR) and ventilation pipes with fittings of specified diameter including laying, fixing, cutting, joining, painting if required etc. b.

Material

The pipes shall conforming to IS 13592, UPVC - SWR (Type 'A' or 'B' as specified) and fittings conforming to IS 13591 shall be free from cracks, flaws and defects and shall be U.V. stabilized and able to withstand a pressure as mentioned in the schedule of work. Rubber sealing rings conforming to IS: 5382 with lubricant for sliding socket joints as mentioned in the schedule of work.

EXAMINING

Before laying the pipe line, it shall be first examined for damages and cracks, No cracked or damaged pipe and fittings shall be used in the work and they shall be removed from the site by the contractor at his own cost and charge.

CLEANING

All the pipes and fittings shall be thoroughly cleaned with brush and washed if necessary to remove any accumulated stone, soil or dirt inside and outside surfaces.

c. Laying, Fixing & Jointing

The pipes shall be carefully laid straight to the correct alignment in gradients as indicated in the drawing. The entire pipe shall be used in standard length as far as possible. Cut length may be used

only where it is necessary to make up exact length. The entire length of pipe shall be evenly supported on bed of the trench throughout. Care shall be taken to prevent any sand, earth or other materials from entering into the pipes during laying. At the end of day's work, the open end shall be suitably plugged. The pipe line shall be fixed in position as shown in the drawing or as directed by the Engineer-in-charge. The pipe shall be fixed with G.I. clamps not less than 2.0 mm thick or with suitable UPVC clamps/ clips, the clamps/ clips shall be fixed into the wall with G.I. nails not less than 40 mm long and wooden gutties keeping the pipe about 15 mm clear of the wall.

The jointing of pipes and fittings generally shall be done with approved cement solvent including making surface rough or rubber sealing rings with lubricant for sliding socket joints. The pipe shall be cut to desired length. Care shall be taken that that profile or cut surfaces shall not be changed and the fibrous material shall be removed with scraper or knife.

d. Detachable Joint

Detachable joints shall be made where pipes of different materials have to be jointed or as specified in the schedule. The flanges are first pushed over the pipe ends and jointing shall be made by cement solvent.

e. Painting

In case of underground piping, the pipe line shall be painted with two coats of approved oil paint of matching color over a coat of primer.

f. Dewatering & Civil Work

In case of underground pipes, the contract rate shall include bailing or pumping out all the water till completion or work if accumulated during the progress of work either from seepage, springs, rain or any other cause. The rate shall also include for excavation, refilling, etc. civil work required if specified in schedule of quantities. Pipe shall be laid with suitable bedding, encasing as per actual site condition. For concealed piping, chasing, drilling holes in wall, etc. shall be covered under the rate.

g. Testing

The joints shall be tested by either smoke test for vertical stacks or 2.5 m head of water at the highest point of the section under test for horizontal drainage pipes. Smoke shall be pumped into the pipes at the lowest end from a smoke machine which consists of a bowl and burner. The material usually burnt is greasy cotton waste which gives out a clear pungent smoke which is easily detectable by sight as well as by smell, if there is leak at any point of the drain. The water head test shall be carried out by suitably plugging the lower end of the drain and the ends of the connection if any and filling the system with water. A knuckle bend shall be temporarily jointed to it so as to provide required test head, or the top may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fixed suitable for observation. The leaky joints shall be remade and section re-tested at no extra cost.

h. Rates

- Supplying of UPVC-SWR pipes and fittings of specified diameter.
- Laying and cutting the pipe wherever necessary and wastage.
- Fixing the pipe line with G.I. clamps not less than 2mm thick and G.I. / M.S. nails length not less than 40mm or with UPVC clamps, screws, wooden gutties etc.
- Making the solution joint and painting if mentioned in schedule of work the pipe line.
- All civil work required for concealed piping.
- In case of underground pipes, dewatering, if necessary, till completion of work, excavation, refilling, etc. civil work if specified in schedule of quantities.
- Testing of pipes.
- Making all damage good to original condition after completion of installation work.
- All necessary materials, labor and use of tools.

i. Mode Of Measurement

The measurement shall be for unit running meter length of pipe line laid of fixed. The measurement shall be taken along the center line of pipe. No measurement shall be recorded separately for fittings, making joint, painting, civil work if mentioned in schedule of work and testing.

j. Mode Of Payment

The contract rate shall be for unit running meter length of pipe line laid or fixed.

11. uPVC Trap

Providing and fixing UPVC Trap confirming to IS 14735, including cost of cutting and making good of wall and floors to the satisfaction of Engineer-In-Charge.

a. Material & Fixing

The trap shall be of cast iron or PVC or SS as specified in schedule of quantities.

The trap shall be provided with SS/ CP brass/ PVC grating of size 100/ 150 mm size as specified in schedule of quantities.

The trap shall have generally water seal not less than 50 mm.

The trap shall have 150/ 100 mm inlet & 40/ 50/ 75/ 100 mm multiple outlets.

The trap & waste pipe shall be fixed in PCC 1:2:4, 100 mm around up to finished floor with water tight finishing & shall be firmly supported on structural floor.

b. Rates

- Multi floor trap with grating cover.
- Jointing & fixing material.
- Making all damage good to original condition after completion of installation work.

- Testing the entire system and rectification of defects if any.
- All necessary materials, labor and use of tools.

c. Mode Of Measurement

The measurement shall be for each unit of Multi floor trap with grating fixed.

d. Mode Of Payment

The contract rate shall be for each unit of Multi floor trap with grating fixed.

12. Constructing Brick Masonry Manhole

Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40mm nominal size) inside plastering 12mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) finished with a floating coat of neat cement complete as per standard design :

Inside size 90x80 cm and 60 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) with common burnt clay of class designation 5

Inside size 120x90 cm and 90 cm deep including C.I. cover with frame (Medium duty) 500 mm Dia internal dimensions total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) with common burnt clay of class designation 5 a. Material

Concreting, Brick work, plastering etc., shall be as per specification as given in general specification under section II.

b. Construction

Internal dimensions and initial depth shall be as specified in the schedule or as shown in the drawing.

If not specified, size of manholes shall be constructed as follows.

Foundation of 1:2:4 concrete shall be 150 mm thick and shall have 150 mm offset.

The concrete 1:2:4 shall be laid to necessary shapes to form the channel for the pipe being received in the channel. It shall be of appropriate diameter and shall be half round. The sides shall be kept sloping towards the channel.

Brick masonry shall be 230 mm thick in cement mortar 1:5 or as specified in the schedule of work, making brick tapering for longitudinal wall 450 mm from top of cover of the chamber.

Brick masonry shall be rendered with 20 mm thick plaster in cement mortar 1:1 or as specified in the schedule of work inside and outside surfaces in two courses and inside surface finished smooth with neat cement punning.

Il manholes with depths greater than 1 meter shall be provided with 20 mm square or 25 mm round rods the steps shall be fixed in brick masonry wall with 1:2:4 cement concrete with 75mm cement concrete cover at all around the step. Cast iron step shall be painted with two coats of approved black bitumastic anti corrosive paint over a coat of primer. Or foot rests shall be PVC coated.

All manholes shall be provided with Cast Iron/ pre cast RCC cover & frames & embedded in reinforced cement concrete slab. Weight of cover & frame & thickness of the slab shall be as specified in schedule of quantities.

c. Dewatering

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work either from rain, seepage, springs or any other cause.

d. Rates Included

- Concreting in foundation, forming the channels, constructing brick masonry and plastering over the brick work, and finishing smooth in side surfaces.
- Cover & Frame (if called in schedule of quantities).
- Foot rests (if called in schedule of quantities).
- Dewatering the pit if found necessary till completion of work.
- Making all damage good to original condition after completion of construction work.
- All necessary labor, materials and use of tools.

e. Mode Of Measurement

The measurement shall be for an Inspection chamber of specified finished internal size and initial depth measured vertically from top of the frame and cover to the invert of chamber. Extra for additional depth or rebate for lesser depth shall be measured in RMT.

f. Mode Of Payment

The contract rate shall be for unit Inspection chamber of specified internal size and initial depth Extra/Rebate for additional/lesser depth respectively shall be paid in RM.

Rate shall be for per number of CI cover installed.

Extra depth beyond mentioned depth for above items

Inside size 90x80 cm

Inside size 120x90 cm

a. Scope

The item includes provision for extra depth of Inspection Chamber and manholes of brick masonry.

b. Material

Concreting, Brick work, plastering etc. Shall be as per specification given above c. Construction
Extra depth for inspection chamber and manhole shall be constructed as per Inspection Chamber & Circular Manhole.

d. Dewatering

The contract rate shall include bailing or pumping out all the water if accumulated during the progress of the work either from rain, seepage, springs or any other cause.

e. Rates

- Constructing brick masonry and plastering over the brick work.
- Dewatering the pit if found necessary till completion of work.
- All necessary labor, materials and use of tools.

f. Mode Of Measurement

The measurement shall be for unit meter depth or part thereof for inspection/ manhole chamber manhole constructed. Depth of manhole or chamber shall be measured from top of the frame and cover to the invert level of manhole deducting the initial depth of at manhole/ chamber. Extra for additional depth or rebate for lesser depth shall be measured in R.M.

g. Mode Of Payment

The contract rate shall be for unit meter depth of inspection chamber/ circular manhole constructed.

13. Gully Trap

Constructing brick masonry road gully chamber 30x30x60 cm with bricks in cement mortar 1:4 (1 cement: 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design: with common burnt clay FPS (non modular) bricks of class designation 7.5
Relevant specifications shall be followed as per serial no. 3.06 except inside and outside dimension.

14. RCC PIPE

Providing and laying non-pressure NP3 class R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement: 2 fine sand) including testing of joints etc. complete: (For Rain Water & Sewer underground network)

a. General

The item includes supplying of RCC piping of specified diameter including laying, fixing, joining, painting etc. for external sewage disposal

b. Material

The pipe shall be new & of first class quality RCC & free from rough texture, inside & outside straight with uniform bore throughout.

All pipes shall be centrifugally spun NP3 class unless otherwise specified.

Pipe shall be tested at manufacturer's works prior to dispatch at site. A certificate shall be produce for the same.

Pipe shall be with or without reinforcement as required & of the class as specified. It shall conform to IS: 458.

c. Laying

RCC spun pipes shall be laid on cement concrete bed or cradles as specified. Cradles shall be pre cast & sufficiently cured to prevent cracks & breakage in handling.

The invert of cradle shall be left 12 mm below the invert level of the pipe & properly placed on the soil to prevent any disturbance.

The pipe shall then be placed on cradles & set for the line & gradient by means of sight rails, bonding rods, etc. Cradles or concrete bed may be omitted if directed by engineer in charge.

d. Jointing
After setting out the pipes, the collars shall be centered over the joint & filled in with tarred gaskin, so that sufficient space is left on either side of the collar to receive mortar.

The space then shall be filled with cement mortar 1:2 & caulked by means of proper tools.

All joints shall be finished at an angle of 45 degree to the longitudinal axis of the pipe on both sides of the collars neatly.

e. Testing

All pipes shall be tested to a hydraulic test of 2.5 m head for at least 50 minutes at the highest point in the section under test.

Smoke test is too carried out by the contractor, if directed by engineer in charge.

- f. Rate included
- RCC pipes of specified diameter.
 - Laying the pipe wherever necessary and wastage.
 - Underground installation with trenching, bedding, and encasing, dewatering, etc. civil work as specified in schedule of quantities.
 - Making joint, painting the pipe line if mentioned in schedule of quantities.
 - Making all damage good to original condition after completion of installation work.
 - Testing the entire system and rectification of defects if any.
 - All necessary materials, labor and use of tools.

g. Mode of Measurement

The measurement shall be for unit running meter length of pipe line laid or fixed. The measurement shall be taken along the center line of pipe. No measurement shall be recorded separately for fittings, making joint, painting, it shall also include required civil work for underground installation if mentioned in schedule of quantities.

h. Mode of Payment

Mode of payment shall be Unit length of pipe line laid or fixed. No extra payment shall be made for fittings, making joint, painting. It shall also include required civil work for underground installation if mentioned in schedule of quantities.

15. Septic Tank & Soak Pit

a. SCOPE

The item includes the Septic tank & soak pit with all connections & civil work including construction, testing & commissioning.

b. Construction

Septic tank shall consist of tank with inlet & outlets with all earthwork & backfilling. The details of the septic tank shall be as shown in the drawing. The item shall also include ventilating pipe of at least 100 mm diameter whose top shall be provided with a suitable mosquito proof wire mesh & a cowl. Ventilating pipe shall be extended to a height of about 2 meters from ground when septic tank is at least 15 meters from the nearest building and shall be 2meter above the building when it is located closer than 15 meter.

Effluent from the septic tank shall be disposed to drain/ water body if approved by concerned authority or to be discharged into a soak pit for absorption in soil or shall be allowed to be absorbed by soil through open jointed SW pipes laid in a trench filled with broken bricks.

Soak pit shall be as per drawing. Diameter & depth of soak pit shall be as indicated in schedule of quantities. The pit shall be lined with stone, brick or concrete blocks set in cement mortar (1:6) & filled with brick bats.

In case of open jointed SW pipe/dispersion trenches, minimum diameter of pipe shall be 150 mm. The trench for laying the pipes shall be minimum 600x600 mm. The joints of the pipe shall be left unsealed. The entire length of the pipe within the trench shall be buried in a 250 mm layer gravel or crushed stone of uniform size. On the top of gravel/crushed stone layer 150 mm bed of well graded coarse aggregate shall be laid. Ordinary soil will be used for filling the top trench.

c. Commissioning Of Septic Tank

After the septic tank has been proved water tight & the sewage system is checked the tank shall be filled with water to its outlet level before sewage is let into the tank. It shall be seeded with well-designed sludge obtained from septic tank or sludge digestion tank. In the absence of digested sludge, a small quantity of decaying organic matter such as digested cow-dung may be introduced.

d. Testing Of Septic Tank

The septic tank shall be tested for water tightness. It shall be filled up with water & allowed to soak for 24 hrs. Then it shall be topped up & allowed to stand again for 24 hrs. & loss of level is to be recorded. The fall shall not be more than 15 mm.

e. RATES

Septic tank

- All material & civil work for septic tank like excavation, backfilling, dewatering, & required brick work/ lining work/ RCC work/Plaster work, etc. complete.
- All pipe connections, jointing, vent, etc.
- Manhole cover & frame, rungs.
- Testing & commissioning.
- Making all damage good to original condition after completion of work.
- All necessary labor, material and use of tools.

Soak well

- All material & civil work for soak pit like excavation, backfilling, dewatering, & required brick work/ lining work/ RCC work/Plaster work, etc. complete.
- All pipe connections, jointing, vent, etc.
- Manhole cover & frame.
- Testing & commissioning.
- Making all damage good to original condition after completion of work.
- All necessary labor, material and use of tools.

16. Connection To RCC Tanks/ Reservoirs

Inlets, outlets, interconnection sleeves & drain outlets for the reservoir shall be made through mild steel bath galvanized puddle sleeves obtained from reputed manufacturers & to be inserted at suitable levels as indicated on the drawings. The contractor shall be responsible for placing the inserts at required level well in advance & before making the final shuttering layout for casting the walls. All puddle sleeves must be fixed in true alignment & level to ensure further connection in proper order all the overhead water tank terraces shall be provided with efficient rain water disposal system. The necessary sleeve in the tank wall shall be provided for running the level controller wires/ probes.

The plate used for fabricating the shall MS 6 mm thick with fillet welding. The length of the puddle sleeve shall be 600 mm minimum unless otherwise specified. Puddle sleeve shall have flanged ends for all sizes. Puddle sleeves shall be hot dip galvanized after fabrication.

The tanks shall be provided with vent pipes of minimum 100 mm diameter with mosquito proof mesh.

The overflow pipe shall be so placed to allow the discharge of water being readily seen. A stop valve shall be provided in the inlet water connection to tank. The outlet pipes shall be fixed approximately 75 mm above the bottom of tank towards which the floor of tank is slopping to enable tank to be emptied for cleaning.

Full way gate valves shall be provided as near the tank as practicable on every outlet pipe from storage tank except overflow pipe.

The floor & walls of the tank shall be tiled with glazed tiles (by other agency) up to overflow level. Alternatively, food grade epoxy paint to be applied.

a. Manhole Covers

Manhole cover shall be medium/ light duty type (cast iron) with double seal, locking arrangement & lifting hooks manufactures as per IS: 1726. The shape of the cover shall be as shown in the drawing.

b. Aluminum Ladder

For effective maintenance of the tank, portable aluminum step ladder to suit the depth of the tank shall be provided with necessary hooks & fixing accessories.

17. Pump and Motors

This specification covers the supply, installation; testing & commissioning of Centrifugal type (Monoset)/ Open well monoset submersible pumps. The scope also includes motor, delivery piping up to Discharge Header with necessary pipe, fittings, electric panel, pressure gauges, etc. Each pump shall have isolation gate/ ball valve & NRV at delivery side & on header.

c. Codes And Standards

The design and manufacture of the pump shall comply with all currently applicable statutes, regulations and safety codes in the locality where the equipment will be installed.

d. Design Features:

- The pump shall be capable of developing required total head at rated capacity.
- Impeller shall be enclosed type and shall be dynamically balanced.
- The pump shall have non overloading characteristics.
- The pump shall be submerged in tank/ reservoir.

e. Constructional Features

- The casing shall be of rigid construction and shall have central delivery pipe.
- The casing shall be of Cast Iron.
- The pump shall have very small length suction and delivery pipe connections which will result in minimum friction loss in case of moonset pumps.
- Impeller shall be of one piece and shall be of SS CF 8 M.
- The shaft shall be of S.S. and its surface shall be properly finished.
- Shaft sleeves shall be provided to protect shaft from any damage.
- Bearing shall be ball or roller type.
- Mechanical seal shall be provided to avoid any leakage.
- Each pump shall be driven by directly coupled squirrel cage induction motor having 1500/ 2900 RPM, TEFC enclosure & IP 55 protection.

f. Inspection And Testing

- The pump shall be offered for visual inspection before dispatch.
- Material test certificates for the various pump components shall be furnished for purchaser's approval.
- Hydrostatic test shall be carried out at 1.5 times the maximum discharge pressure.

- For electrical accessories, necessary tests shall be performed or factory test certificate shall be furnished.

g. Rates:

- Pump-Motor sets.
- Base plate, foundation bolts, anti-vibration pads.
- Pump delivery pipe & delivery manifolds.
- Foot valves in case of negative suction.
- Pump delivery & delivery manifold isolation valve & NRV & delivery flexible bellows.
- Pressure gauges & level indicator to be interlocked with pump operation.
- Starter panel with all electrical components, protections, interlocks, cable from starter to pump.
- All material like flanges, hardware, gaskets, etc. required for installation.
- Installation, testing & commissioning.
- Making all damage good to original condition after completion of work.
- All necessary labor, material and use of tools.

h. Mode Of Measurement

The measurement shall be for one set including working & stand by units

i. Mode Of Payment

The contract rate shall be for one set including working & stand by units.

PART – A – TECHNICAL SPECIFICATION FOR FIRE FIGHTING

1. GENERAL

1.1 SCOPE OF WORK

Work under this sub head is time-bound and has to be completed within the time limit set in tender. Work shall be executed in accordance with an agreed schedule which shall be submitted by the bidder along with offer and agreed to by Consultant / Engineering in charge by CLIENT.

The scope of work in this sub head shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely do all work relating to the supply, installation, testing & commissioning of Fire Fighting System as described herein after and shown on the drawings. The scope of work in general shall include the following.

- a) Providing firefighting and fire alarm system as per NBC2016 / IS code and as per requirement of local CFO (Authority Having jurisdiction).
- b) External / Internal Fire Hydrant System (3.5 kg/cm² pressure at most remote location)
- c) Sprinkler system.
- d) All type of civil work including excavation, cutting, drilling, back filling etc.
- e) Clean agent-based gas suppression system for HT and LT panel (MCC)
- f) Preparation of Shop drawing.
- g) To getting Fire NOC from Authority.
- h) Preparation as built Drawing

1.2 TECHNICAL INFORMATION

I. Contractor shall submit along with the tender copies of detailed specifications, cuts, leaflets and other technical literature of equipment and accessories for approval from Consultant / Engineering in charge by CLIENT.

II. Contractor's attention is specially invited to the special conditions and other clauses in the agreement which required the contractor to:

-

- a) Submit detailed shop drawings.
- b) Use material of specific makes and brands
- c) Obtain all approvals from Fire Fighting authorities.
- d) Execute the entire work on a turn-key basis so as to provide a totally operating plant.

1.3 SITE ACCESSIBILITY

I. The equipment must be carried from the goods receiving station to the site in an extremely careful manner to prevent damage to the equipment building or existing services.

II. Contractor must visit the site and familiarize himself with above problems to ensure that the equipment offered by him are of dimensions that they can be carried and planed in position without any difficulty.

1.4 APPROVALS

The contractor shall prepare all submission drawings, documents, Video recording etc. as required and obtain all approvals of firefighting works from firefighting authorizes/local CFO.

1.5 QUALITY CONTROL AND SURVEILLANCE

After erection at site the complete fire protection system shall be subjected to hydro test at 1.5 times of Design pressure for 24 hours to show satisfactory performance inline & as per applicable standards & to be approved by local fire authorities.

1.6 PAINTING AND COATING

I. Above Ground piping

- a) Piping to be laid above ground shall be supported on pipe rack /supports. Rack/ support details shall have to be approved by Consultant / Engineering in charge by client.
- b) Surface of over ground pipes except galvanized pipes shall be thoroughly cleaned of mill scale, rust etc. by wire brushing.
- c) Above ground piping for all the system shall be painted with onecoat of rich zinc primer & two coat of Synthetic Enamel paint of approved shade.

II. Buried Pipe Line

Pipe lines to be laid in trenches /underground shall be protected against corrosion by means of 4mm thick anti-corrosive tape.

Application:

- The various layers of materials shall be applied as follows:
- Cleaning of exterior steel pipe surface with wire brush such that all rust, mill scale is removed.
- Application of a continuous and uniform primer film with a dry thickness not less than 25 – 30 microns.
- Application of a helicoidally wrapping of a 4 mm thick tape pulled into contact with the primer with proper tension in order to avoid an excessive penetration 15 mm overlap shall be provided. The application shall be in accordance with IS: 10221.
- Painting & coating shall be as per specifications

1.7 GENERAL SPECIFICATIONS FOR FIRE FIGHTING SYSTEM.

1. General requirements

All materials shall be of the best quality conforming to the specifications and subject to the approval of the Consultant / client.

Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc. Pipes shall be securely fixed to walls and ceilings by suitable clamps and supports (galvanized after fabrication) at intervals specified. Only approved type of anchor fasteners shall be used for RCC slabs and walls / floors etc.

Valves and other accessories shall be so located that they are easily accessible for operations, Repairs and maintenance. Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

Pipe accessories such as gauges, meters, control devices, etc. shall have the same working pressure rating as the associated pipe work. All pipe work shall be free from burrs, rust and scale and shall be cleaned before installation. All personnel engaged on welding operations must possess a certificate of competence issued by an acceptable / recognized authority.

2. Piping and accessories

a) Pipe

G.I Pipe

Galvanized Iron (GI) pipes as per IS: 1239 heavy grade (Class C) suitably lagged on the outside to prevent soil corrosion. G.I. pipes buried below ground shall also be suitably be lagged with 2 layers of 400-micron polythene sheet over 2 coats of bitumen.

shall be as per IS: 1239, Part-II (heavy grade) while pipelines above 10 mm dia. shall be as per I.S.:3589 (6mm thick). All pipe clamps and supports shall be fabricated from MS steel sections and shall be factory galvanized before use at site. Welding of galvanized clamps and supports shall not be permitted.

Pipes shall be hung by means of expandable anchor fastener of approved make and design. The hangers and clamps shall be fastened by means of galvanized nuts and bolts. The size/diameter of the anchor fastener and the clamps shall be suitable to carry the weight of water filled pipe and dead load normally encountered.

Hangers and supports shall be thoroughly galvanized after fabrication. The selection and design of the hanger & support shall be capable of carrying the sum of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipeline movements as necessary. All guides, anchor braces, dampener, expansion joint and structural steel to be attached to the building/structure trenches etc. Shall be provided. Hangers and components for all piping shall be approved by the Consultant / Client.

The piping system shall be tested for leakages at 2 times the operating pressure or 1.5-time shutoff pressure, whichever is highest including testing for water hammer effects. Flanged joints shall be used for connections for vessels, equipment, flanged valves and also on two straight lengths of pipelines of strategic points to facilitate erection and subsequent maintenance work.

For pipes underground installation the pipes shall be buried at least one meter below ground level and shall have 230 mm x 230 mm masonry or concrete supports at least 300 mm high at 3m intervals. Masonry work to have plain cement concrete foundation (1 cement: 4 coarse sand: 8 stone aggregate) of size 380 x 380 x 75 thick resting on firm soil. Mains below ground level shall be supported at regular intervals not exceeding

3.0 metres and shall be laid at least 2.0 metre away from the building.

b) Pipe fittings

Pipe fittings mean tees, elbows, couplings, unions, flanges, reducers etc. and all such connecting devices that are needed to complete the piping work in its totality. Ductile Iron / Cast Iron / Forged steel screwed type fitting shall be used for all pipes size.

c) Procedure for pipe coating

- Surface Preparation - The pipe surface shall be cleaned by a wire brush.
- Application of Primer - Pypkote / Coatek or approved primer is to be applied on pipes immediately after cleaning. This is to prevent any further accumulation of rust on the pipe. This is a cold applied primer and is applied by brush.
- Application of Pypkote / Coatek 4 mm Tape - After the primer is applied on the pipe, it is allowed to dry for about 30 min. till it becomes touch dry. Before adhering the tape to the pipe, it is advisable to gently heat the primer coated pipe by a run of LPG torch. Remove the bottom polyethylene from the tape & then heat bottom surface of the tape by LPG torch or any heat source & start wrapping the tape to the pipe by heating the primer coated pipe & by removing the bottom polyethylene from the tape before wrapping better adhesion between the tape & pipe is obtained. Overlaps are maintained with a minimum of 12.5 mm.
- Tape coating of weld joints - The tape is applied over the weld joints after the necessary welding & testing methods of the joints is completed. The procedure for application of tape shall be the same as bare pipe procedure. Overlaps on each side of the weld joints shall be 50 mm.
- A final coat of White wash with water based cement paint is done immediately over the entire coated pipe.

d) Pipe joining

- Welding joints

All welded joints shall be full-penetration butt welds, properly aligned and free from cracks, porosity, or other defects. an approved manner.

After completion of welding, all welded portions shall be thoroughly cleaned and made good by applying zinc-rich cold galvanizing paint or approved corrosion-protective coating to restore the galvanizing layer. Welded joints shall be visually inspected and, if required by the Consultant / Client, shall be subjected to non-destructive testing prior to pressure testing of the system.

All welded joints shall successfully withstand the hydrostatic pressure test specified for the piping system without leakage.

- Flanged joints

Flanged joints with flanges conforming to IS: 6392 shall be provided on Straight runs at intervals not exceeding 25-30 m on pipe lines of 50 mm dia and above and as directed by the Project Manager.

For jointing all types of valves, appurtenances, pumps, connections with other type of pipes, to water tanks and other places necessary and as required for good engineering practice and as shown/noted on the drawings.

Flanges shall be with GI bolts and nuts and 3mm insertion gasket of natural rubber conforming to IS: 11149.

- Rigid type

“Installation Ready” rigid joints shall be designed for direct “stab” installation onto grooved pipe without prior disassembly of the coupling. Housings shall be cast with offsetting, angle-pattern bolt pads.

Housings shall be cast with offsetting, angle pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13.

Rigid couplings shall require visual pad-to-pad verification of complete installation. Tongue and recess type couplings which require the use of a torque wrench to achieve the exact required gap between housings are not permitted.

Grooved Fittings: Various fitting i.e. Tee, reduced, elbow, reducing tee, etc. shall be of forged steel and suitable for grooved fitting. The grooved fitting shall be of the same make as of mechanical coupling.

3. Fire brigade connection:

A fire brigade connection with inbuilt non-return valve shall be provided to facilitate the fire brigade to pump water into the installation by using their own equipment's (Four-way 100 mm dia. connection to the system) shall comprise of four instantaneous pattern 63 mm dia. male inlets with caps and chains.

4. Air valves:

The contractor shall provide 20 mm dia. Screwed inlet G.M. single acting air valve on all high points in the system or as shown on drawings.

5. Y-strainer:

Y-type strainers of cast carbon steel/fabricated steel with SS-316 baskets shall be provided. The screen diameter of perforations shall be 2.0 mm. The strainer should be so designed that pressure drop under 50% clogged condition shall not exceed 5 mwc. The ends of the strainer shall be flanged drilled to ANSI B16.5, 150#. Strainer shall be with pressure rating of PN25.

6. Relief valve:

Relief valve shall be provided on the delivery header. The relief valve shall have adjustable setting in range suitable for operating range of the pump. The relief valve outlet shall be led back to the tank. The valve shall be 150# rated. Relief valve body shall be cast steel confirming to ASTM A216 Gr. WCB. Relief valve sizing shall be done considering pump characteristics. Relief valve shall be with pressure rating of PN25.

7. Ball and Butterfly Valves:

Ball and butterfly valves conforming to the following specifications shall be provided as shown on Drawings: • Ball valve: Size – 15 to 40 mm

- Construction – Bronze ASTM B62
- Ends – Screwed
- Butterfly valve: Size – 50 mm and above
- Construction – Body cast iron
- Ends - Flanged
- Pressure rating: PN 25/PN16

Type and requirements shall be as indicated in Schedule of Quantities. Valves shall have non-rising spindles unless specified otherwise and shall be suitable for PN 16 rating. Butterfly valve should be of wafer type long neck construction single stem design with center lugs to ensure proper alignment of pipe flanges. Mount valve onto flanges only after flanges have been welded to pipes using a tool piece and cooled down to room temperature to prevent damage to resilient seat. The rubber liner should be fully supported by the valve flanges. Appropriate dimensions and thickness of Flanges and Bolts, as per the Flange Tables ANSI B16.5 (#150 class), should be used. The flanges should be properly aligned with each other so that bolts are exactly perpendicular to the flanges. Evenly tighten the flange bolts to secure the valves. Counter flanges with nut-bolts and gaskets shall be provided by valve manufacturer.

Butterfly valves shall be of cast iron conforming to BS 5155 with nylon coated disc black nitrile seat and shaft material SS. Up to 150 mm diameter shall be lever operated 200 mm diameter and above shall be gear operated.

8. Fire Hose Reels:

Contractor shall provide standard fire hose reels with 25 mm dia. high pressure PVC nylon braided hose of 40 meters length with S.S. shut-off nozzle with 8 mm bore & with circular hose reel wall mounted type of heavy-duty mild steel construction & M.S. brackets. Hose reel shall conform to IS-884-1969. The hose reel shall be connected directly to the G.I. Pipe riser through an independent connection with a S.S. Ball valve for isolating purpose.

9. Hydrants:

Hydrants inside the building shall be located on every landing of the floor furnished with required accessories such as hosepipes with instantaneous gunmetal couplings and short pattern branch pipes located in hose cabinets. The hose cabinets shall be of wall/column mounting type, constructed out of 16-gauge MS sheets.

The internal hydrants (Landing Valves) shall be of single headed type taken out from 150/100 mm dia. riser through suitable tapping. The outlets shall be of gunmetal and confirm to IS-5290. The Hose reels shall be firmly held against the wall by suitable heavy brackets and supports. The hose reel shall be swinging type (180 degrees) and the entire Drum reel etc. shall be as per IS: 3876. The hose tubing shall be of best quality (shut off) and the shut off nozzle shall be 8 mm dia. The equipment shall be out of one of the approved makes only.

The hydrant main shall be laid in the form of ring main. The hydrant risers shall be terminated with air release valves at the highest points to release the trapped air in the pipe work.

10. Non-Return Valves:

Non-return valves are to be IS: 778-1984 manufactured from gun-metal or dezincification resistant brass. NRV Shall be Dual Plate type PN. 25 with ISI marked complete with nuts, bolts, washers, gaskets etc.

11. Pressure Switches:

Pressure switches shall be differential type for operation of all pump sand for the various duties and settings required. Pressure switches shall before heavy-duty operation and of approved make. All pressure switches shall be factory calibrated.

Pressure switches shall be provided for switching on and off the pressurization pump at present pressures and also for switching off the fire pump at present pressure. Being the main component for initiating the signal for the operation of the pumps, the pressure settings shall be totally reliable, sturdy in construction and of long life. The pressure settings shall be adjustable.

12. Pressure Gauges:

Pressure gauge shall be constructed of die cast aluminium and shall be stove enameled. They shall be weather proof with an IP-55 enclosure. They shall be stainless steel bourdon type pressure gauges with a scale range from 0 to 16 Kg/cm² and shall be constructed as per IS-3624. Pressure gauges shall be 100 mm dia. size. Gauge to be made of SS 304. Glycerin to be filled in for needle.

13. ABC Type Fire Extinguisher:

ABC Type fire extinguisher shall be squeeze grip type, minimum MAP 50%, Fire rating capacity - 4A, 55B. Fire extinguisher shall be working at 15 KG/cm² and Hydro tested at min 35 Kg/cm².

14. CO₂ Type Fire Extinguisher

CO₂ Type fire extinguisher shall 4.5 Kg Fire rating capacity – 21B. Fire extinguisher shall be working at 60 KG/cm² and Hydro tested at min 250 Kg/cm². Extinguisher shall IS 15683 approved.

Item No 363. Reading Chair-02 : Providing and Placing Reding Chair - The seat and back are made up of 1.2cm.thick hot pressed plywood upholstered with leather and moulded Polyurethane foam.MID BACK SIZE: 53.0cm. (W) X 73cm. (H)SEAT SIZE: 54.6cm. (W) X 49.0cm. (D)The HR Polyurethane foam is moulded with density=45+/-2 kg/m cube and hardness load 16+/-2 kgf as per IS:7888 for 25% compression. The fixed type mechanism is made with a 0.8 cm thk HR Steel spine-welded to it and black powder coated(D- FT 40-60 microns-).The Understructure is made up of M.S.E.R.W. Elliptical tube of size 4.5 x 1.9 cm x 0.25 cm welded to M.S.E.R.W Tube of dia 1.6 cm x 0.2 cm thick.The understructure is powder coated (DFT 40-60 microns) in Silver metallic gray.

1. Material:

- An MS pipe 12 mm rod frame shall be used as per the approved make and sample by the EIC/Architect.
- All types of materials shall be used as per the approved make list, conforming to relevant IS codes, and approved by the EIC/Architect.

2. Workmanship:

- Work shall be completed as per the above manufacturer's specification.
- Work shall be completed including all types of tools, tackles, labour, etc., complete at any level and height.
- The entire work is to be completed as per the design; sample materials and any other requirements shall be as per the instructions of the EIC/Architect.

3. Measurements:

- The rate shall be consolidated for all the above items.
- The rate shall include the cost of all materials, labour, scaffolding, etc., to complete the entire work satisfactorily as per the instructions of the EIC/Architect.

- No extra payment will be given for any reason.
- The rate shall be inclusive of all materials, loading, unloading, all taxes, transportation, placing at all floors and for all leads, polishing, and all accessories as described in the item description.
- The work done shall be measured in numbers for the area of work completed. The rate shall be for a unit of one number.