

SPECIFICATION OF ITEM

Item 21:

Providing TMT Bar FE 500D reinforcement for R.C.C. work including bending, binding and placing in position complete upto floor two level

1.0. GENERAL

This work shall consist of furnishing and placing TMT Fe-500D Conforming to IS 1786 2008 reinforcement, bars (intentioned) of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

2.0. MATERIAL

2.1. TMT Bars Reinforcements shall be TMT Fe-500D steel bars. They may be uncoated or coated 'with epoxy or with approved protective coatings. 2.2. TMT bars reinforcement for RCC work shall conform to IS 1786 FE-500 and shall be of tested quality. It shall also comply with relevant part of IS 456-1966 2.3. All reinforcement shall be clean and free from dirt, paint, grease or oil, oil scale or loose or thick rust at the time of placing 2.4. All steel shall be procured from original producers no re-rolled steel shall be incorporated in the work 2.5. Only new steel shall be delivered to the site every bar shall be inspected before placing to its position and defective brittle or burnt bar shall be discarded cracked ends of bars shall be discarded

3.0. Pitch 3.1.

Distance between bars shall be as specified in drawings and as directed by the Engineer in Charge. all bars shall be placed at an accurate distance from each other and shall be bind tightly to maintain the desired pitch Suitable means shall be provided for holding bars securely in position

4.0. Binding wire

4.1. Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge diameter and shall conform IS 280-1972 4.2. The use of black wire will be permitted for binding reinforcement bars. It shall be free from dirt, paint, grease or oil, oil scale or loose or thick rust and any other undesirable coating which may prevent adhesion of cement mortar at the time of binding 4.3. Only new binding wire shall be delivered to the site all binding wire shall be inspected before binding to its position and defective brittle, rusted, used wire, shall be discarded

5.0. PROTECTION OF REINFORCEMENT

5.1. Uncoated reinforcing steel shall be protected from rusting or chloride contamination. Reinforcements shall be free from rust, mortar, loose mill scale, grease, oil or paints. This may be ensured either by using reinforcement fresh from the factory or thoroughly cleaning all reinforcement to remove rust using any suitable method such as sand blasting, mechanical wire brushing, etc. as directed by the Engineer. Reinforcements shall be stored on bricks, racks

or platforms and above the ground in a clean and dry condition and shall be suitably marked to facilitate inspection and identification. 5.2. Portions of uncoated reinforcing steel and dowels projecting from concrete shall be protected within one week after initial placing of concrete with a brush coat of neat cement mixed with water to a consistency, of thick paint. This coating shall be removed by lightly tapping with a hammer or other tool not more than one week before placing of the adjacent pour of concrete. Coated reinforcing steel shall be protected against damage to the coating. If the coating on the bars is damaged during transportation or handling and cannot be repaired, the same shall be rejected.

6.0. Workmanship

6.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed by The Engineer in charge. 6.2. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawing

7.0. BENDING OF REINFORCEMENT

7.1. Bar bend g schedule shall be furnished by the Contractor and got approved by the Engineer before start of work. 7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved Bar bending Schedules. 7.3. Bars shall be bent cold to the specified shape and dimensions or directed by the Engineer using a proper bar bender operated by hand power to obtain the correct radius of bends and shape. Bars, shall not be bent or straightened in a manner that will damage parent material or the coating bars bent during transport or handling shall, be straightened before being used on work and shall not be heated to facilitate straightening.

8.0. PLACING OF REINFORCEMENT

8.1. The reinforcement cage should generally be fabricated in the yard at ground level, and then shifted and placed in position. The reinforcement shall be placed strictly, in accordance with the drawings and shall be assembled in position, only when structure is otherwise ready for placing of concrete. Prolonged time gap, between assembling of reinforcements and casting of concrete, which may result in rust formation on the surface, shall not be permitted. 8.2. Reinforcement bars shall be placed accurately in position as shown on the drawings. The bars, crossing one another shall be tied together at every intersection with binding wire (annealed), conforming to IS:280 to make the skeleton of the reinforcement rigid such that the reinforcement does not get displaced during placing of concrete, or any other operation. The diameter of binding wire shall not be less than 1 mm. 8.3. Bars shall be kept in. position usually by the following methods: In case of beam an slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member. 8.4. In case of dowels for Columns and walls the vertical reinforcement shall be kept in position by means of timber templates with slots in them accurately, or with cover blocks tied to the Reinforcement

Timber templates shall be removed after the concreting has progressed up to a level just below their location.

8.5. Layers of reinforcements shall be separated by spacer bars at approximately One meter intervals. The minimum diameter of spacer bars shall be 12 mm or: equal to maximum size of main reinforcement or maximum size of coarse aggregate, whichever is greater. Horizontal reinforcement shall not be, allowed to sag between supports. 8.6. Necessary stays, blocks, metal chairs, spacers, metal hangers. supporting wires etc, or other subsidiary, reinforcement shall be provided to fix the reinforcements firmly in its correct position. 8.7. Use of pebbles, broken stone, metal pipe, brick, mortar or wooden blocks etc as devices for positioning reinforcement shall not be permitted. 8.8. Bars coated with epoxy or any other approved protective coating shall be placed on supports that do not damage the coating. Supports shall be installed in a manner such that planes of weakness are not created in hardened concrete. The coated reinforcing steel shall be held in place by use of plastic or plastic coated binding wires especially manufactured for the purpose. 8.9. Placing and fixing of reinforcement shall be inspected and approved by the Engineer before concrete is deposited.

9.0. Lapping

9.1. All reinforcement shall be furnished in full lengths as indicated on the drawing. No splicing of bars, except where shown on the drawing; will be permitted without approval of the Engineer. The lengths of the splice shall be as indicated on drawing or as approved by the Engineer. Where practicable, overlapping bars shall not touch each other, and shall be kept apart by 25 mm or 1 1/4 times the maximum size of coarse aggregate, whichever is greater. If this is not feasible, overlapping bars shall be bound with annealed steel binding wire, not less than 1 mm diameter and twisted tight in such a manner as to maintain minimum clear cover to the reinforcement from the concrete surface. Lapped splices shall be staggered or located at points, along the span where stresses are low.

10.0 Welding

10.1 Splicing by welding of reinforcement will be permitted only if detailed on the drawing or approved by the Engineer. Weld shall develop an ultimate strength equal to or greater than that of the bars connected. 10.2. While welding may be permitted for TMT .reinforcing bars conforming to IS: 432, welding of deformed bars conforming to IS: 1786 shall in general be prohibited. Welding may be permitted in case of bars of other than S 240 grade including special. Welding grade of S 500 grade bars conforming to IS: 1786, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula: $CE = C + Mn + Cr + Mg + V + Ni + Cu$ 6 5 15 is 0.4 or less. 10.3. The method of welding shall conform to IS: 2751 and IS: 9417 and to any supplemental specifications to the satisfaction of the Engineer 10.4. Bars shall be bent cold to the specified shape and dimensions or as directed by Engineer in charge using the proper bender tool, operated by hand or power to attain proper radius of bends. Bars shall not be bend or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used in the work. Bars shall not be heated to facilitate

bending. 10.5. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bane shall not be less then twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times of the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area the hooks shall be suitably encased to prevent any spiting of the concrete. 10.6. All reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and by using say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of not corrodible material wooden and metal supports shall not extended to the surface of the concrete, except where shown in drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocs shall not be used Layers of bars shall be separated by spacer bars pre-cast mortar blocks or other approved devices. Reinforcement after bending placed in position shall be maintained in a clean condition until completely embedded in concrete, Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout 10.7. Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm in such a manner that they do not slip over at the time of fixing and concreting. 10.7. As far possible bars of full length shall be used In case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge When practicable overlapping bars shall not touch each other, but be kept apart by 25 mm Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither sheer not bending moments is maximum. 10.8. Whenever indicated on drawing or desired the Engineer in charge bars shall be jointed by coupling which shall have a cross section sufficient to transmit the full stresses of bars The end of the bars that are jointed by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standards threads Steel for coupling shall conform to IS 226. 10.8. When permitted or specified on the drawings joints of reinforcement bars shall butt-welded so as to transmit their full stresses Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded Only electric are welding using a process which excludes air form the molten metal and conforms to any or other special provisions for the work shall be accepted Suitable means shall be provided for holding bars securely in position during welding It shall be ensured that no voids are left in welding and when welding is done in two or three stages previous surface shall be cleaned properly Ends of bars shall be cleaned of all

loose scale rust stages paint and other foreign matter before welding Only competent welders shall be employed on the work. The M S electrodes used for welding shall conform IS 814 Welded pieces of reinforcement shall be tested. Specimen shall be taken form the actual site and their number shall frequency to test shall be as directed by the Engineer in charge

11.0 MODE OF MEASUREMENTS & PAYMENT

. 11.1. Excess consumption over 5% will be charged at penal rate. 11.2. Reinforcement shall be measured in length including overlaps, no steel shall be given for lap but work may be carried out as per detailed drawings. Where welding or coupling is resorted to, in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per table given above even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement. 11.3. The rate for reinforcement includes cost of steel binding wires including lap, it's carting with all lead lifts, cutting, bending, placing in position, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars. No Payment shall be given for Lap.

11.4. The rate shall be for a unit of One Kg

Item No-24

Providing and fixing FOUR track sliding window (3 Shutter + 1 Mosquito Net Shutter) : Using standard extruded color anodized aluminum section equivalent to eries E (30mm) section numbers: frame bottom track with weep holes 21198, frame top & sides 21176, shutter top & bottom rail 20993, interlock rails 20550, shutter side Handle - 20549 with one mosquito net shutter and remaining with 5mm thick transparent tinted float glass, with rubber gasket, air lock strip and finishing joints with transparent silicon sealant, with alluminium powder

coated fittings and fixtures.

Providing and Fixing Four-Track Sliding Window System

1. Scope of Work

Providing, fabricating, supplying, and fixing of **four-track sliding aluminum window system** consisting of **three glazed shutters and one mosquito mesh shutter**, complete in all respects as per specifications, drawings, and directions of the Engineer-in-Charge.

2. Material Specifications

2.1 Aluminum Sections

- All sections shall be made from **standard extruded aluminum**, color anodized.
- Sections shall be equivalent to **E-Series (30 mm)** or approved equivalent.

- The aluminum shall be free from defects such as cracks, distortions, or surface imperfections.

2.2 Section Details (Indicative Section Numbers)

- Frame Bottom Track (with weep holes): **21198**
- Frame Top & Side Sections: **21176**
- Shutter Top & Bottom Rails: **20993**
- Interlock Rails: **20550**
- Shutter Side Handle Section: **20549**

3. Glazing and Mesh

- Three shutters shall be fitted with **5 mm thick transparent tinted float glass** of approved quality.
- One shutter shall be provided with **mosquito mesh (net shutter)** using durable and corrosion-resistant mesh material (e.g., fiberglass or stainless steel, as approved).

4. Accessories and Fittings

- Rubber gaskets of approved quality for glass fixing.
- Air lock strips to ensure proper sealing.
- Smooth functioning sliding rollers.
- Aluminum powder-coated fittings and fixtures including:
 - Handles
 - Locks
 - Stoppers
 - Guides

All hardware shall be of approved make and quality.

5. Fabrication and Assembly

- All sections shall be accurately cut, machined, and assembled to ensure proper alignment.
- Corners shall be mechanically jointed or cleated to maintain rigidity.
- Interlocks shall be properly aligned to ensure airtight and dust-resistant performance.

6. Installation

- The window frame shall be fixed in position using suitable fasteners, screws, and anchor bolts.

- Proper leveling, alignment, and plumbing shall be ensured during installation.
- Necessary packing and sealing shall be done to avoid gaps.

7. Sealing and Finishing

- All joints between frame and wall shall be sealed with **transparent silicone sealant**.
- Finishing shall be neat, smooth, and aesthetically acceptable.
- Weep holes shall be properly provided to ensure drainage of water.

8. Performance Requirements

- Smooth and noiseless sliding operation.
- Proper locking arrangement.
- Weather resistance against dust, air, and water leakage.
- Durability and corrosion resistance.

9. Measurement

- Measurement shall be taken in **square meters (sqm)** for completed work.
- Rate shall include cost of all materials, labor, fittings, transportation, fabrication, installation, and finishing.

10. Rate Includes

- Aluminum sections and fabrication
- Glass and mosquito mesh
- All fittings and accessories
- Installation and sealing
- All taxes, transportation, and labor

Item No-25

Providing and fixing THREE track sliding window (2 Shutter + 1 Mosquito Net Shutter) : Using standard extruded color anodized aluminum section equivalent to eries E (30mm) section numbers: frame bottom track with weep holes 20928, frame top & sides 20837, shutter top & bottom rail 20993, interlock rails 20550, shutter side Handle - 20549 with one mosquito net shutter and remaining with 5mm thick transparent tinted float glass, with rubber gasket, air lock strip and finishing joints with transparent silicon sealant, with alluminium powder coated fittings and fixtures.

1. Scope of Work

Providing, fabricating, supplying, and fixing of three-track sliding aluminum window system consisting of two glazed shutters and one mosquito mesh shutter, complete in all respects, including all materials, labor, fittings, and accessories as per specification and direction of the Engineer-in-Charge.

2. Material Specifications

2.1 Aluminum Sections

- Aluminum sections shall be standard extruded, color anodized, of approved make.
- Sections shall be equivalent to E-Series (30 mm) or approved equivalent.
- Sections shall be straight, smooth, and free from visible defects.

2.2 Section Details (Indicative Section Numbers)

- Frame Bottom Track (with weep holes): 20928
- Frame Top & Side Sections: 20837
- Shutter Top & Bottom Rails: 20993
- Interlock Rails: 20550
- Shutter Side Handle Section: 20549

3. Glazing and Mosquito Mesh

- Two shutters shall be provided with 5 mm thick transparent tinted float glass, free from bubbles, distortions, and defects.
- One shutter shall be fitted with mosquito mesh shutter, using high-quality fiberglass or stainless steel mesh of approved make.

4. Hardware and Accessories

All fittings shall be aluminum powder-coated or suitable corrosion-resistant material, including:

- Sliding rollers (nylon/metal, heavy-duty)
- Handles
- Locks and latches
- Stoppers and guides
- Rubber gaskets for glass fixing
- Air lock strips for proper sealing

All hardware shall ensure smooth, silent, and durable operation.

5. Fabrication

- Aluminum sections shall be cut to size and fabricated with precision.
- Corners shall be joined using mechanical cleats or screws to ensure rigidity.
- Interlocking system shall be properly aligned to provide tight sealing.
- Shutters shall be fabricated to ensure proper sliding clearance.

6. Installation

- Frames shall be fixed to the wall using appropriate fasteners, screws, and anchor bolts.
- Proper alignment (vertical and horizontal) shall be maintained.
- Packing materials shall be used where required to maintain level and support.
- Installation shall ensure smooth sliding of shutters without obstruction.

7. Sealing and Finishing

- All joints between frame and wall shall be sealed using transparent silicone sealant.
- Rubber gaskets shall be used for fixing glass panels securely.
- Air gaps shall be sealed using air lock strips.
- Exposed surfaces shall be clean, smooth, and aesthetically finished.

8. Drainage Provision

- Bottom track shall include weep holes to allow drainage of rainwater.
- Proper slope and alignment shall be maintained to avoid water accumulation.

9. Performance Requirements

- Smooth and noiseless sliding operation
- Proper locking and security
- Resistance to air, dust, and water leakage
- Long-term durability and corrosion resistance

10. Measurement

- Measurement shall be carried out in square meters (sqm) for completed work.
- Dimensions shall be taken as per actual site measurements.

11. Rate Includes

The quoted rate shall include:

- Cost of aluminum sections

- Glass and mosquito mesh
- All fittings and accessories
- Fabrication, transportation, and installation
- Sealing, finishing, and testing
- All labor, tools, and incidental charges
- Taxes, duties, and overheads

Item 26:

Providing and fixing Standard extruded of aluminium section of size 63 x 38.1 x 1.2mm (of Jindal Section No. 465, @ Wt. 0.643 Kg. per Rmt. with colour anodized aluminium frame with 5mm thick transparent glass as details for ventilation

1. Scope of Work

Providing, fabricating, supplying, and fixing of aluminum ventilator made from standard extruded sections, glazed with glass, complete in all respects including all materials, labor, fittings, and finishing, as per specifications and direction of the Engineer-in-Charge.

2. Material Specifications

2.1 Aluminum Sections

- Aluminum sections shall be standard extruded sections of size 63 mm × 38.1 mm × 1.2 mm thickness.
- Section shall be equivalent to Jindal Aluminium Section No. 465 or approved equivalent.
- Weight of section: 0.643 kg per running meter (Rmt.) (approx.).
- Finish: Color anodized (shade as approved by Engineer-in-Charge).
- Sections shall be straight, true, and free from defects.

3. Glazing

- Glass shall be 5 mm thick transparent float glass of approved make.
- Glass shall be free from air bubbles, waviness, scratches, or other defects.
- Glass shall be fixed using approved quality rubber gaskets.

4. Hardware and Accessories

- Necessary fittings shall be provided, including:
 - Aluminum/SS screws
 - Fasteners and anchors
 - Rubber gaskets

- Glazing clips (if required)
- All fittings shall be corrosion-resistant and compatible with aluminum sections.

5. Fabrication

- Sections shall be cut to required sizes and assembled accurately.
- Corners shall be joined using screws or cleats to ensure rigidity.
- Fabrication shall ensure proper squareness and dimensional accuracy.

6. Installation

- The ventilator frame shall be fixed in position using suitable screws, fasteners, and anchor bolts.
- Proper alignment, level, and plumb shall be maintained during fixing.
- Adequate packing shall be provided wherever necessary.

7. Sealing and Finishing

- All joints between frame and wall shall be sealed using transparent silicone sealant.
- Gaps, if any, shall be properly filled and finished.
- The completed installation shall be neat and aesthetically acceptable.

8. Performance Requirements

- Rigid and durable structure
- Proper ventilation opening
- Weather resistance against dust and minor water ingress
- Corrosion resistance due to anodized finish

9. Measurement

- Measurement shall be taken in square meters (sqm) for completed ventilator work.

10. Rate Includes

The rate shall include:

- Cost of aluminum sections
- Glass and glazing materials
- All fittings and accessories
- Fabrication and installation
- Sealing and finishing

- Labor, tools, and transportation
- All taxes, duties, and incidental charges

Item 28:

Providing and fixing FRP frame size 100x50 mm and 28mm thick FRP depress panel shutter having extra reinforcement on sides & edges in Gel coat finish. The core of the shutter & frame is to be filed up with injected fire retardant grade polyurethane foam done in situ alongwith embedded wooden pieces for stiffening & also taking hinges & fintures. 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 & alluminium fixtures & fastenings & fastener sleeve.

General

This work shall consist of FRP frame size 100 x 50 mm and 28 mm thick FRP shutter with depressed panel SHUTTER of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge MATERIAL

F R P molded frame FRP Molded frame shall be of approved made as approved by Engineer in charge FRP molded frame shall be of water proof weather proof termite proof mild acid and alkali proof, sound proof and fire resistance F R P molded frame chemphered type size 125 mm x 65 mm with F R P skin 1.5 mm to 2 mm thickness with extra reinforcement on side and edges and gel coat finished Remaining hollow portion is to be filled by polyurethane foam P U F with wooden block for taking hinges

F R P molded shutters

FRP Molded shutters shall be of approved made as approved by Engineer in charge FRP molded shutters shall be of water proof weather proof termite proof mild acid and alkali proof, sound proof and fire resistance FRP Shutters of 27 mm thick in standard design of FRP and 3.12 mm hide and dandified molded wood primer coated skin on both side of shutter skin is to be confirmed to ASTMD - 1037 pressed under hot process over wood style 65 x 35 mm top and bottom rail and lock rail 125 mm x 235 mm including stainless steel hinges with necessary aluminum fixture and fastening remaining hole of portion is to be filled up with PUF and shutters is to be finished in gel coat Whole section shall be of water proof weather proof termite proof mild acid and alkali proof, sound proof and fire resistance

FIXTURES AND FASTNINGS Stainless steel Fixtures and fastening shall confirm Specification no M-43 except all fixtures and fastening shall be made of stainless steel

WORKMANSHIP

The Work of aluminum door 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 door properly and shall be given trial of opening and closing properly.

Mode of Measurement & Payment:

The rate for window shutter with frame shall include the cost of materials & labour involved to finish the work. The dimension of the window shall be measured clear size of the frame in closed position of shutter between the two outer edges of the frame. The payment shall be made on completion of work. The unit rate for the item shall be for a unit of one square meter.

Item 30:

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 with C.C 1:2:4 flooring with 40 mm etc.(waterproofing 3 years bond for leakage) as directed.

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 j\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 specified 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 30 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 or 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 slag cement as per IS 1624 -1974 or Portland slag cement as per IS 455-1976 2.2 Cement shall be stored above the ground level in perfectly dry and water tight sheds. Wherever bulk storage containers are used, their 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 intermixing the materials.

3.0 SAND

3.1 Sand shall be natural sand, clean well graded, hard 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 3.2 FINE SAND: The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under: 3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deteriorated 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. brick bats Brick bat aggregates shall be broken form well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and fee from dirt or any other foreign material brick bats shall be of 40 to 50 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used

1.6. china mosaic tile pieces china mosaic tiles pieces shall be of 50 mm to 90 mm nominal size. tile pieces shall be made form 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

WORKMAN SHIP

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 for the entire surface of the terrace All joints and cracks shall be racked off and cut in v 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 throughout 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. cement concrete 1:5:10 (using 50% of cement mortar 1:5 1part of cement and 5part of coarse sand by volume admixed with water proofing compound of approved make in specified proportion) of specified thickness shall be laid (specification of cc1:5:10 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 slab 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 1:4 and china mosaic tilling in true level and slope as directed by Engineer in charge & finally finishing the surface with trowel with white cement slurry (specification of white glaze tiles flooring shall be followed for the execution of this item.) E. finishing the surface with 20 mm thick C M 1:4 and china mosaic tilling & 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 & PAYMENT :

7.1. The unit rate 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 & placing stones in position, compacting, finishing, curing mirror polishing, 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 or its components 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 plastering shall include the cost of all labour, materials tools and plant 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. 7.3. The payment will be made on square Meter basis of the finished work.

Item 31 :

Providing and fixing 25 mm thick shutters for cupboards etc. including black enamelled M.S. butt hinges with necessary screws. (A) Indian teak wood. (i) Fully Panelled. laminated Pro. required drawer, Partitation & direction of cup-board, lock, handle, cloth rail, stopper with inner site touch wood ,polishing etc. Comp.as per direction by Engineer-in-charge etc.comp.

1. Scope of Work

Providing, fabricating, supplying, and fixing of 25 mm thick wooden shutters for cupboards, including all necessary fittings, fixtures, internal arrangements, and finishing, complete in all respects as per specifications and direction of the Engineer-in-Charge.

2. Material Specifications

2.1 Timber (Shutters)

- Shutters shall be made from first-class Indian Teak Wood, well-seasoned and free from defects such as warping, cracks, knots, or insect attack.
- Thickness of shutters: 25 mm (finished thickness).
- Moisture content shall conform to relevant standards for interior joinery.

2.2 Type of Shutter

- Shutters shall be fully panelled type, with frame and panel construction.
- Panels shall be properly fitted into grooves and finished smooth.

2.3 Laminate Finish

- External face shall be finished with decorative laminate of approved shade, texture, and thickness (typically 1.0 mm or as approved).
- Laminate shall be bonded using approved adhesive with proper pressing.

2.4 Internal Finish

- Inner surfaces shall be finished with touchwood polish / melamine polish or equivalent approved finish.

3. Hardware and Fittings

- M.S. Butt Hinges:
 - Black enamelled mild steel butt hinges of approved size and quality.
 - Fixed with suitable screws.
- Other Fittings:
 - Lock (Godrej or approved equivalent)
 - Handles
 - Magnetic catch / stopper
 - Tower bolts (if required)

All fittings shall be of approved make and quality.

4. Cupboard Internal Arrangement

The cupboard shall include the following internal provisions as per drawings or instructions:

- Shelves / Partitions (fixed or adjustable)
- Drawers (where specified), including proper sliding arrangement
- Cloth hanging rail (chrome-plated or powder-coated M.S./SS rod)
- Division of compartments as directed by Engineer-in-Charge

5. Fabrication

- Timber shall be properly cut, planed, and assembled to required dimensions.
- Joints shall be mortise and tenon or equivalent strong joints.
- Workmanship shall ensure rigidity, durability, and dimensional accuracy.

6. Installation

- Shutters shall be fixed to cupboard frames using approved hinges and screws.
- Proper alignment, leveling, and smooth operation shall be ensured.
- All fittings shall be securely installed.

7. Polishing and Finishing

- External laminated surfaces shall be cleaned and finished neatly.
- Internal wooden surfaces shall be polished (touchwood/melamine) to a smooth finish.
- All edges shall be properly finished and free from sharpness.

8. Performance Requirements

- Smooth opening and closing of shutters
- Proper alignment and gap uniformity
- Durable and termite-resistant (if treated)
- Good aesthetic finish

9. Measurement

- Measurement shall be taken in square meters (sqm) for shutters.
- Internal fittings (drawers, partitions, etc.) may be included in rate unless specified separately.

10. Rate Includes

The quoted rate shall include:

- Cost of teak wood and laminate
- All hardware and fittings
- Fabrication and carpentry work
- Internal fittings (drawers, partitions, cloth rail, etc.)
- Polishing and finishing
- Labor, tools, transportation
- Taxes, duties, and all incidental charges

Item 32:

Providing and fixing 25 mm thick shutters for cupboards etc. including black enamelled M.S. butt hinges with necessary screws. (A) Indian teak wood. (i) Fully Panelled. Kitchen Drawer Required S.S. tandem box drawer 45 kg Capacity , Partitation / Self of cup-board, handle, s.s roller channel, hing etc. with inner site touch wood ,polishing etc. Comp.as per direction by Engineer-in-charge etc.comp.

1. Scope of Work

Providing, fabricating, supplying, and fixing of 25 mm thick wooden shutters for kitchen cupboards, along with drawer units, internal partitions/shelves, and all necessary fittings and

fixtures, complete in all respects as per specifications, drawings, and direction of the Engineer-in-Charge.

2. Material Specifications

2.1 Timber (Shutters)

- Shutters shall be made from first-class Indian Teak Wood, well-seasoned and free from defects.
- Finished thickness: 25 mm.
- Timber shall be properly treated against termites and moisture.

2.2 Type of Shutters

- Shutters shall be fully panelled type, with strong frame and panel construction.
- Panels shall be properly grooved and finished smooth.

3. Kitchen Drawer System

- Drawers shall be provided using S.S. tandem box drawer system.
- Load capacity: minimum 45 kg.
- Features:
 - Smooth sliding mechanism
 - Soft closing (if approved)
 - Corrosion-resistant stainless steel construction
- Drawer sizes and locations shall be as per drawings or instructions.

4. Shelves / Partitions

- Cupboards shall include internal partitions and shelves as required.
- Shelves shall be properly supported and aligned.
- Layout (number and position) shall be as directed by the Engineer-in-Charge.

5. Hardware and Fittings

All fittings shall be of approved make and quality:

- Black enamelled M.S. butt hinges with necessary screws
- Stainless steel roller channels (where tandem system is not used)
- Handles (SS / aluminum / approved type)
- Cabinet hinges (for shutters)
- Stoppers / magnetic catches (if required)

All hardware shall be corrosion-resistant and suitable for kitchen use.

6. Internal Finish

- Inner surfaces shall be finished with touchwood polish / melamine polish or equivalent approved finish.
- Finish shall be smooth, even, and protective against moisture.

7. Fabrication

- Timber shall be machine cut, planed, and assembled accurately.
- Joints shall be strong (mortise & tenon or equivalent).
- Work shall ensure proper alignment, rigidity, and durability.

8. Installation

- Shutters shall be fixed using approved hinges and screws.
- Drawers shall be installed with proper alignment for smooth operation.
- All fittings shall be securely fixed and tested.

9. Polishing and Finishing

- All wooden surfaces shall be properly sanded and polished.
- Internal surfaces: touchwood/melamine finish.
- External surfaces: finished as per approved sample (polish/laminate if specified).
- Edges shall be smooth and neatly finished.

10. Performance Requirements

- Smooth opening and closing of shutters and drawers
- Proper alignment and gap uniformity
- Adequate load-bearing capacity of drawers (45 kg)
- Resistance to moisture and corrosion (kitchen conditions)
- Durable and aesthetically acceptable finish

11. Measurement

- Measurement shall be taken in square meters (sqm) for shutters.
- Drawer units, partitions, and fittings shall be included in the item rate unless specified separately.

12. Rate Includes

The quoted rate shall include:

- Cost of teak wood
- Drawer system (S.S. tandem box – 45 kg capacity)
- All hardware and fittings
- Internal shelves and partitions
- Fabrication and installation
- Polishing and finishing
- Labor, tools, and transportation
- Taxes, duties, and all incidental charges

Item 33:

Providing and Fixing Machine cut, free edges, machine polished Granite Telephonice Black stone sandwich type slab 18 mm thick for Doors/Windows Cill and Jambs cladding as per design including full molded round front edge and 1 cm nosing and laid on 10 mm thick cement mortar 1:3 (1 cement:3 coarse sand) jointed with grey cement slurry including rubbing and polishing finishing etc complete.

1. Scope of Work

Providing, cutting, supplying, and fixing of machine-cut, machine-polished granite stone slabs for door/window cills and jamb cladding, including edge molding, fixing in mortar, finishing, and polishing, complete in all respects as per design, drawings, and direction of the Engineer-in-Charge.

2. Material Specifications

2.1 Granite Stone

- Granite shall be “Telephone Black” (or approved equivalent shade), dense, hard, and free from cracks, veins, or defects.
- Type: Sandwich type slab (uniform quality and finish on exposed surface).
- Thickness: 18 mm (finished thickness).
- The stone shall have uniform texture and color.

2.2 Surface Finish

- Exposed surfaces shall be machine polished to a high gloss finish.
- Edges shall be machine cut and polished, ensuring straightness and smoothness.

3. Edge Profile and Molding

- Front exposed edge shall have:

- Full molded round edge
- 1 cm nosing
- All edges shall be uniformly shaped and polished.

4. Base Preparation and Laying

- Granite slabs shall be laid on 10 mm thick cement mortar bed in proportion 1:3 (1 cement : 3 coarse sand).
- Surface shall be properly prepared, cleaned, and wetted before laying.
- Slabs shall be properly aligned, leveled, and pressed into position.

5. Jointing

- Joints shall be kept as thin as possible.
- Joints shall be filled with grey cement slurry matching the shade of granite.
- Excess slurry shall be cleaned immediately.

6. Finishing

- After laying, the surface shall be:
 - Rubbed and polished to achieve a smooth and even finish
 - Cleaned thoroughly to remove stains, marks, or mortar residues
- Final finish shall be uniform, glossy, and aesthetically acceptable.

7. Workmanship

- Cutting shall be precise to suit site dimensions.
- Proper slope (if required for cills) shall be maintained for drainage.
- Jamb cladding shall be vertically aligned and securely fixed.
- No visible cracks, uneven joints, or lippage shall be accepted.

8. Performance Requirements

- High durability and strength
- Resistance to weathering and wear
- Smooth, polished, and defect-free surface
- Proper bonding with base mortar

9. Measurement

- Measurement shall be taken in square meters (sqm) for finished work.

- Dimensions shall be measured as per actual installed size.

10. Rate Includes

The quoted rate shall include:

- Cost of granite stone
- Cutting, molding, and polishing
- Cement mortar bed (1:3)
- Jointing with cement slurry
- Labor, tools, and equipment
- Transportation and handling
- Finishing, cleaning, and protection
- All taxes, duties, and incidental charges

Item 34:

Constructing sandwich platform of 18 mm thick polished black granite at top and 25 mm thick Kota stone slab with 75cm height with necessary support using cement mortar 1:3 for sandwich and fitting at bottom & edges with waterproof rigid adhesives including making necessary grooves in walls with vertical kota stone 30 mm x 2 No. sandwich thick every 60 cm centre to centre including all labour material of approved quality including full molded round front edge fixed in wall for partition and jointed with grey cement slurry including rubbing and polishing etc. complete.

1. Description of Item

Providing and constructing **sandwich type platform** consisting of **18 mm thick polished black granite on top** and **25 mm thick Kota stone slab at bottom**, supported and fixed at a height of **750 mm (75 cm)** from finished floor level, including vertical supports, edge finishing, fixing in walls, jointing, polishing, and all complete as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Granite (Top Layer)

- Thickness: **18 mm (finished)**
- Type: **Black granite (polished)**, uniform in color and texture
- Free from cracks, stains, and defects

2.2 Kota Stone (Bottom Layer & Supports)

- Thickness: **25 mm (for bottom slab)**
- Vertical supports: **30 mm thick Kota stone strips (2 layers sandwich type)**
- Size and finish as per design
- Stone shall be of approved quality, free from defects

2.3 Mortar

- Cement mortar **1:3 (1 cement : 3 coarse sand)** for bedding and fixing

2.4 Adhesive

- **Waterproof rigid adhesive** of approved make for fixing granite and Kota stone

2.5 Jointing Material

- **Grey cement slurry** for joints, matching the shade of stone

3. Construction Methodology

3.1 Preparation

- Necessary **grooves shall be made in walls** to receive stone slabs and supports.
- Surface shall be cleaned, wetted, and prepared before fixing.

3.2 Vertical Supports (Partitions)

- Vertical **Kota stone supports (30 mm thick, double/sandwich type)** shall be provided at **every 600 mm center-to-center**.
- Supports shall be firmly embedded into wall grooves and fixed using mortar/adhesive.

3.3 Bottom Layer (Kota Stone)

- 25 mm thick Kota stone slab shall be laid and fixed over supports using cement mortar (1:3).
- Proper level and alignment shall be maintained.

3.4 Top Layer (Granite)

- 18 mm thick polished granite slab shall be fixed over the Kota base using **cement mortar and waterproof adhesive**.
- Proper bonding shall be ensured to avoid hollowness.

4. Edge Finishing

- Front exposed edge shall be provided with:
 - **Full molded round edge**
- Edges shall be machine polished and smooth.

5. Jointing

- Joints between slabs shall be kept minimal.
- Filled with **grey cement slurry** and properly finished.

6. Finishing

- Entire surface shall be:
 - **Rubbed and polished** to achieve smooth and even finish
 - Cleaned thoroughly after completion
- No stains, cracks, or uneven surfaces shall be accepted.

7. Fixing in Walls

- Platform shall be securely fixed into **pre-made wall grooves**.
- Proper anchorage shall be ensured for stability and load bearing.

8. Workmanship

- Work shall be executed true to line, level, and plumb.
- All dimensions shall conform to drawings.
- Proper slope (if required) shall be maintained.
- Finished work shall be rigid, stable, and aesthetically acceptable.

9. Measurement

- Measurement shall be taken in **square meters (sqm)** for the finished platform area.

10. Rate Includes

- Cost of granite and Kota stone
- Vertical supports and partitions
- Cement mortar (1:3) and adhesives
- Cutting, molding, polishing, and finishing
- Making grooves in walls
- Fixing, jointing, and curing
- Labor, tools, scaffolding, and transportation
- All taxes, royalties, and incidental charges

11. Mode of Payment

- Payment shall be made based on **actual measured quantity** of completed work, as certified by the Engineer-in-Charge.

Item 34:

Providing 15mm thick Mala cement plaster in single coat on smooth finished (Similar)side of single or half masonry walls for interior plastering upto floor two level and finished even and smooth in (ii) Cement mortar 1:4 (1-cement :4-sand) incl. finishing Putty with a floating coat of neat cement slurry etc. G.F.

1. Description of Item

Providing and applying 15 mm thick cement plaster in single coat on the smooth finished side of single or half masonry walls for internal surfaces up to floor two level (Ground Floor), using cement mortar 1:4 (1 cement : 4 sand), including floating coat of neat cement slurry, finishing with putty, and making the surface even, smooth, and true to line and level, complete as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Cement

- Ordinary Portland Cement of approved make, conforming to relevant IS specifications.

2.2 Sand

- Clean, well-graded coarse sand, free from dust, organic matter, and impurities.

2.3 Putty

- White cement-based wall putty of approved make for smooth finish.

2.4 Water

- Clean and potable water for mixing and curing.

3. Mortar

- Cement mortar shall be prepared in proportion 1:4 (1 cement : 4 sand) by volume.
- Mortar shall be mixed on a watertight platform or in a mechanical mixer.
- Only required quantity shall be mixed to avoid setting before use.

4. Surface Preparation

- The masonry surface shall be cleaned of dust, loose particles, oil, grease, etc.
- Joints shall be raked to proper depth (if required).
- Surface shall be thoroughly wetted before application of plaster.
- Any unevenness shall be corrected before plastering.

5. Application of Plaster

- Plaster shall be applied in single coat of 15 mm thickness.
- Mortar shall be applied evenly and pressed firmly to ensure proper bonding.
- Surface shall be brought to true line, level, and plumb using screeds.

6. Floating Coat

- A floating coat of neat cement slurry shall be applied over the plastered surface.
- Surface shall be finished using wooden float to achieve uniform texture.

7. Putty Finish

- After proper curing and drying of plaster, wall putty shall be applied:
 - In one or more coats as required
 - Surface shall be made smooth and even
 - Final finish shall be suitable for painting

8. Finishing

- The finished surface shall be:
 - Smooth, even, and free from undulations
 - Without cracks, hollowness, or visible joints
- Edges, corners, and junctions shall be neat and sharp.

9. Curing

- Plastered surface shall be cured for a minimum of 7 days.
- Proper moisture shall be maintained throughout curing period.

10. Scaffolding

- Necessary scaffolding shall be provided for execution of work at all heights within Ground Floor level.

11. Workmanship

- Work shall be executed true to line, level, and plumb.
- Thickness shall be uniform throughout.
- Proper bonding with masonry shall be ensured.

12. Measurement

- Measurement shall be taken in square meters (sqm) of finished plastered surface.

- Deductions shall be made as per standard R And B rules.

Item 38:

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 colour cement slurry including finished with flush pointing & cleaning the surface etc. complete for DARK shade.

1. Description of Item

Providing and laying **24" × 24" (600 mm × 600 mm) vitrified tiles of 8 mm thickness in dark shade**, over a base of **20 mm average thickness cement mortar (1:6)** or by fixing on existing flooring using adhesive, including **dismantling of existing flooring (if required)**, jointing with coloured cement slurry, finishing with flush pointing, and cleaning the surface, complete in all respects as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Vitrified Tiles

- Size: **600 mm × 600 mm (24" × 24")**
- Thickness: **8 mm (minimum)**
- Type: **Vitrified tiles (dark shade)**
- Tiles shall be of uniform size, colour, and thickness, free from cracks, chips, or defects.
- Water absorption shall be low as per relevant IS standards.

2.2 Cement

- Ordinary Portland Cement of approved make conforming to IS standards.

2.3 Sand

- Clean, well-graded **coarse sand**, free from impurities.

2.4 Adhesive (if applicable)

- Approved **tile adhesive** suitable for vitrified tiles and existing flooring.

2.5 Jointing Material

- **Coloured cement slurry** matching the shade of tiles for joint filling.

3. Base Preparation

3.1 For New Flooring

- Surface shall be cleaned, leveled, and wetted.
- A base layer of **cement mortar 1:6 (1 cement : 6 coarse sand)** shall be laid to an **average thickness of 20 mm**.

3.2 For Existing Flooring

- Existing flooring shall be **carefully dismantled** and debris removed.
- Surface shall be cleaned and prepared.
- Tiles shall be fixed using approved **adhesive material**.

4. Laying of Tiles

- Tiles shall be soaked (if required) and laid over mortar bed/adhesive.
- Proper alignment, level, and slope (if required) shall be maintained.
- Tiles shall be tapped gently to ensure full bedding and proper adhesion.
- Spacers may be used to maintain uniform joints.

5. Jointing

- Joints shall be kept thin and uniform.
- Filled with **coloured cement slurry** matching tile shade.
- Excess slurry shall be cleaned immediately.

6. Finishing

- Surface shall be finished with **flush pointing**.
- Tiles shall be cleaned and polished after completion.
- No lippage, unevenness, or hollow sound shall be accepted.

7. Curing

- Flooring shall be cured for a minimum of **5–7 days** (for mortar base).
- Adhesive-fixed tiles shall be protected as per manufacturer's recommendations.

8. Workmanship

- Tiles shall be laid true to line, level, and pattern.
- Cutting of tiles shall be done neatly using tile cutting machine.
- Edges and corners shall be properly finished.

9. Measurement

- Measurement shall be taken in **square meters (sqm)** of finished flooring area.

- Deductions shall be made as per R and B rules.

Item 39:

Providing and laying Vitrified tiles 8 to 10 mm thick , in skirting risers of steps and dado on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) and jointed with white cement slurry.

1. Description of Item

Providing and laying vitrified tiles of 8–10 mm thickness in skirting, risers of steps, and dado, fixed over 10 mm thick cement plaster in cement mortar 1:3 (1 cement : 3 coarse sand), including jointing with white cement slurry, finishing, and cleaning, complete in all respects as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Vitrified Tiles

- Thickness: 8 to 10 mm
- Tiles shall be of approved make, uniform in size, shade, and thickness.
- Free from cracks, chips, stains, or other defects.
- Edges shall be straight and true.

2.2 Cement

- Ordinary Portland Cement of approved make conforming to relevant IS standards.

2.3 Sand

- Clean, well-graded coarse sand, free from dust, silt, and organic impurities.

2.4 Jointing Material

- White cement slurry, with or without pigment to match the tile shade.

3. Base Preparation

- Wall/step surfaces shall be cleaned thoroughly of dust, grease, loose particles, etc.
- Surface shall be roughened (if required) for proper bonding.
- Surface shall be wetted before application of plaster.

4. Cement Plaster Base

- A base layer of 10 mm thick cement plaster in CM 1:3 shall be applied.
- Plaster shall be finished rough to receive tiles.
- Proper line, level, and plumb shall be maintained.

5. Laying of Tiles

- Tiles shall be fixed over the prepared plaster base while it is still green or using slurry/adhesive as approved.
- Tiles shall be properly aligned and pressed to ensure full contact and adhesion.
- Uniform joints shall be maintained using spacers where required.

6. Jointing

- Joints shall be filled with white cement slurry, matching the tile colour.
- Excess slurry shall be wiped off immediately.

7. Finishing

- Tiles shall be cleaned after fixing.
- Surface shall be smooth, even, and true to line and level.
- Edges and corners shall be neatly finished.
- No hollow sound, lippage, or misalignment shall be accepted.

8. Curing

- Work shall be cured for a minimum of 3–5 days to ensure proper bonding.

9. Workmanship

- Tiles shall be laid in true vertical/horizontal alignment.
- Proper cutting shall be done using tile cutting machine for edges and corners.
- Pattern and layout shall be as per drawings or instructions.

10. Measurement

- Measurement shall be taken in square meters (sqm) of finished area of skirting, dado, and risers.
- Length × height shall be considered for calculation.

Item 40:

Providing and laying Ceramic tiles 6mm thick 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. Description of Item

Providing and laying **ceramic tiles of 6 mm thickness** in **flooring of treads of steps and landings**, laid over a bed of **12 mm thick cement mortar in proportion 1:3 (1 cement : 3 coarse**

sand), including **flush pointing with white cement slurry**, finishing, cleaning, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 Ceramic Tiles

- Thickness: **6 mm (minimum)**
- Type: **glazed ceramic tiles of approved make and shade**
- Tiles shall be uniform in size, colour, and thickness
- Free from cracks, chips, warping, or surface defects
- Abrasion and slip resistance suitable for stair usage

2.2 Cement

- Ordinary Portland Cement of approved make conforming to relevant IS standards

2.3 Sand

- Clean, well-graded **coarse sand**, free from silt, clay, and organic matter

2.4 Jointing Material

- **White cement slurry** for flush pointing of joints
- Shall match the tile finish and shade as directed

3. Surface Preparation

- Existing surface of steps and landings shall be **cleaned, roughened, and made free from dust, oil, and loose particles**
- Surface shall be **properly wetted** before laying mortar
- Any unevenness shall be corrected prior to laying tiles

4. Cement Mortar Bed

- Tiles shall be laid over **12 mm thick cement mortar bed in proportion 1:3 (1 cement : 3 coarse sand)**
- Mortar shall be of proper consistency and uniformly spread
- Bedding shall ensure proper slope for drainage where required

5. Laying of Tiles

- Tiles shall be laid on the fresh mortar bed and properly pressed to ensure full contact
- Alignment shall be maintained for uniform appearance and level
- Tiles shall be laid true to line, level, and slope of steps and landings

- Care shall be taken to maintain uniform nosing and riser alignment

6. Jointing

- Joints shall be kept uniform and minimum in width
- Joints shall be filled with **white cement slurry**
- Excess slurry shall be cleaned immediately to avoid stains

7. Finishing

- Work shall be finished with **flush pointing using white cement**
- Surface shall be cleaned thoroughly after completion
- Steps shall have proper nosing and anti-slip finish as directed

8. Curing

- Work shall be cured properly for a minimum of **7 days**
- Mortar bedding shall be kept moist to ensure proper strength development

9. Workmanship

- Tiles shall be cut accurately to fit steps, risers, and corners
- Proper alignment of treads and risers shall be ensured
- Finished surface shall be even, neat, and free from lippage or hollow sound

10. Measurement

- Measurement shall be taken in **square meters (sqm)** of finished area of treads and landings
- Risers (if included) shall be measured separately unless specified in item

Item 41 :

Granite slab (telephonice Black) (18mm thick) in risers of steps dedo and pillars laid 10mm thick cement mortar 1:3 cement 3 coarse sand) and jointed with grey cement slurry including rubbing and polishing etc. comp. in single piece for stair steps with full molding(single piece not more than 150cm)including, the edge& manage three groove for thread

1. Description of Item

Providing, cutting, supplying, and fixing 18 mm thick polished granite slabs (Telephone Black) in risers of steps, dado, pillars, and stair steps (treads and risers), laid over 10 mm thick cement mortar in proportion 1:3 (1 cement : 3 coarse sand), including jointing with grey cement slurry, rubbing, polishing, full edge molding, groove formation for treads, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 Granite Stone

- Type: Telephone Black Granite (or approved equivalent)
- Thickness: 18 mm (finished thickness)
- Stone shall be machine cut and machine polished, uniform in colour and texture
- Free from cracks, stains, pinholes, and other defects
- Each piece shall be in single length not exceeding 150 cm

2.2 Cement

- Ordinary Portland Cement of approved make conforming to IS specifications

2.3 Sand

- Clean, well-graded coarse sand, free from organic impurities and silt

2.4 Jointing Material

- Grey cement slurry matching granite shade for joint filling

3. Base Preparation

- Surfaces of steps, risers, dado, and pillars shall be cleaned, roughened, and made free from dust, oil, and loose particles
- Surface shall be properly wetted before laying mortar
- Proper alignment and level shall be checked before fixing stone

4. Cement Mortar Bedding

- Granite slabs shall be laid over 10 mm thick cement mortar in proportion 1:3 (1 cement : 3 coarse sand)
- Mortar shall be evenly spread to ensure full bedding support
- Proper slope shall be maintained for stair treads

5. Laying of Granite Slabs

- Granite slabs shall be fixed in single piece (maximum length 150 cm)
- Slabs shall be carefully placed and pressed to ensure full contact with mortar bed
- Proper alignment of treads, risers, and vertical surfaces shall be maintained
- Work shall be executed true to line, level, and plumb

6. Edge Treatment and Molding

- Exposed edges of steps shall be provided with full molded finish (rounded/approved profile)
- Nosing shall be properly shaped and machine polished
- Edges shall be smooth, even, and free from sharp corners

7. Groove Formation

- Three grooves shall be provided on tread surface for anti-skid purpose
- Grooves shall be uniform in depth, spacing, and alignment as per design or direction of Engineer-in-Charge

8. Jointing

- Joints between slabs shall be kept minimum and uniform
- Joints shall be filled with grey cement slurry
- Excess slurry shall be cleaned immediately to avoid staining

9. Finishing

- Entire surface shall be rubbed and machine/hand polished to achieve uniform glossy finish
- No unevenness, cracks, or hollow sound shall be accepted
- All surfaces shall be cleaned properly after completion

10. Workmanship

- Granite slabs shall be cut accurately to size and shape
- Proper care shall be taken during fixing to avoid damage to polished surface
- Alignment of risers and treads shall be strictly maintained
- Finished work shall be strong, durable, and aesthetically acceptable

11. Curing

- Mortar bedding shall be cured properly for a minimum of 7 days
- Surface shall be protected from damage during curing period

12. Measurement

- Measurement shall be taken in square meters (sqm) of finished surface area
- Separate measurements may be taken for risers, treads, and dado if required

Item 41:

Providing and laying coloured glazed tiles/Digital wall tiles of the size 300mm x 300mm x 8mm / 300mm x 405mm x 8mm in skirting, risers of steps and Dedo on 1mm thick cement plaster 1:3 (1-Cement : 3-Coarse sand) & jointed with white cement slurry.

1. Description of Item

Providing, supplying, and laying coloured glazed ceramic tiles / digital wall tiles of size 300 mm × 300 mm × 8 mm or 300 mm × 405 mm × 8 mm in skirting, risers of steps, and dado, fixed over 10 mm thick cement plaster in cement mortar 1:3 (1 cement : 3 coarse sand), including jointing with white cement slurry, finishing, cleaning, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials**2.1 Wall Tiles**

- Type: Coloured glazed / digital printed ceramic wall tiles
- Size: 300 × 300 × 8 mm or 300 × 405 × 8 mm
- Tiles shall be of approved make, shade, design, and finish
- Uniform in size, thickness, and colour
- Free from cracks, chips, warping, and other defects
- Edges shall be straight and true

2.2 Cement

- Ordinary Portland Cement of approved make conforming to relevant IS specifications

2.3 Sand

- Clean, well-graded coarse sand, free from dust, silt, clay, and organic matter

2.4 Jointing Material

- White cement slurry, with or without pigment matching tile shade as directed

3. Surface Preparation

- Wall surfaces shall be cleaned thoroughly of dust, grease, oil, paint, and loose particles
- Surface shall be roughened where necessary to ensure proper bonding
- Surface shall be properly wetted before plastering

4. Cement Plaster Base

- A base coat of 10 mm thick cement plaster in CM 1:3 (1 cement : 3 coarse sand) shall be provided
- Plaster surface shall be finished rough to receive tiles
- Proper line, level, and plumb shall be strictly maintained

5. Laying of Tiles

- Tiles shall be laid over the plaster base while it is green or using approved adhesive if specified
- Tiles shall be properly pressed to ensure full bedding and adhesion
- Proper alignment and verticality shall be maintained for skirting, dado, and risers
- Uniform joints shall be maintained using spacers where required

6. Jointing

- Joints shall be filled with white cement slurry of approved quality
- Joints shall be thin, uniform, and neatly finished
- Excess slurry shall be cleaned immediately to avoid staining

7. Finishing

- After laying, surface shall be thoroughly cleaned and finished
- Work shall be smooth, even, and aesthetically pleasing
- No hollow sound, cracks, unevenness, or misalignment shall be accepted

8. Workmanship

- Tiles shall be accurately cut for corners, edges, and junctions
- Proper alignment shall be maintained in all vertical and horizontal surfaces
- Work shall be executed true to line, level, and plumb

9. Curing

- Cement plaster base shall be cured properly for a minimum of 7 days
- Tiles shall be protected from damage during curing and setting period

10. Measurement

- Measurement shall be taken in square meters (sqm) of finished work
- Skirting, dado, and risers shall be measured separately or as per BOQ provisions

Item 44:

Providing GI Pipe railing made from 50mm dia hollow made of 6.17kg/Rmt one black pipe medium grade 1mt c/c vertically supported special type of bracket made from 50mm dia bla..ck medium grade pipe with two coats of oil painting with red oxide paints etc complete vertical support 50mm pipe.

1. Description of Item

Providing, fabricating, supplying, and fixing **GI pipe railing system** made of **50 mm dia hollow medium grade black steel pipe (weight 6.17 kg/Rmt)**, including **vertical supports at 1.0 m centre-to-centre**, special fabricated brackets, welding, fixing, and painting with **red oxide primer and two coats of oil paint**, complete in all respects as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 Steel Pipes

- Type: **Black medium grade steel pipe (GI/black pipe as specified)**
- Diameter: **50 mm nominal bore (approx. 6.17 kg per running meter)**
- Pipes shall be straight, uniform, and free from cracks, rust, or defects
- Conforming to relevant IS specifications

2.2 Vertical Supports

- Vertical posts shall be made of **50 mm dia medium grade steel pipe**
- Spacing: **1.0 meter centre-to-centre unless otherwise specified**
- Supports shall be firmly anchored to base structure

2.3 Brackets and Fittings

- Special type **fabricated steel brackets** made from **50 mm dia pipe sections**
- Brackets shall be welded or fixed securely to ensure rigidity and load stability
- All welds shall be smooth, continuous, and ground finished

3. Fabrication

- Pipes shall be cut to required lengths and properly aligned
- Welding shall be done using approved welding process ensuring strong joints
- All joints shall be ground smooth and free from burrs
- Railing shall be fabricated true to line, level, and alignment

4. Installation

- Vertical supports shall be fixed firmly to RCC/brickwork using anchor bolts or embedded base plates as directed
- Proper spacing of **1 m centre-to-centre** shall be maintained
- Railing shall be installed ensuring stability, rigidity, and proper alignment

5. Surface Preparation

- All steel surfaces shall be cleaned thoroughly to remove rust, scale, oil, grease, and dust before painting
- Surface shall be made dry and smooth before applying primer

6. Painting

- First coat: **Red oxide primer of approved quality**
- Subsequent coats: **Two coats of synthetic oil paint of approved shade (as directed by Engineer-in-Charge)**
- Each coat shall be applied after proper drying of the previous coat
- Finish shall be smooth, uniform, and free from brush marks

7. Workmanship

- Railing shall be straight, rigid, and properly aligned
- Welding joints shall be strong and neatly finished
- No sharp edges or projections shall be allowed
- Entire structure shall be stable and safe for use

8. Performance Requirements

- High structural strength and stability
- Resistance to corrosion due to proper painting
- Smooth and safe finish without sharp edges
- Long-lasting durability under normal usage conditions

9. Measurement

- Measurement shall be taken in **running meters (Rmt.)** of railing length
- Vertical supports and brackets shall be included in the item rate unless specified separately

Item 45:

Finishing Wall with Weather Proof Exterior Emulsion Paint on Wall Surface (Two Coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials etc. complete

1. Description of Item

Providing and applying weather proof exterior emulsion paint on wall surfaces in two coats, to achieve an even shade and smooth finish, including surface preparation, cleaning, and all preparatory works, complete in all respects as per specifications and direction of the Engineer-in-Charge.

2. Materials**2.1 Exterior Emulsion Paint**

- Type: Weather proof exterior emulsion paint of approved make and shade
- Paint shall be of high durability, water-resistant, and UV resistant quality
- Shall be suitable for exterior masonry surfaces
- Shall conform to manufacturer's specifications and IS standards where applicable

3. Surface Preparation

- The existing wall surface shall be thoroughly cleaned by brushing to remove:
 - Dirt and dust
 - Loose particles and powdered materials
 - Efflorescence, grease, oil, or foreign matter
- Surface shall be made dry, sound, and free from cracks or flaking paint
- Any cracks or surface defects shall be repaired before painting
- Necessary scaffolding shall be provided for work at all heights

4. Application of Paint

- Paint shall be applied in two coats of weather proof exterior emulsion
- First coat shall be applied uniformly after proper surface preparation
- Second coat shall be applied only after drying of first coat
- Paint shall be applied using brush, roller, or spray as approved
- Each coat shall be applied to achieve:
 - Uniform thickness

- Smooth finish
- Even shade without patches or brush marks

5. Finishing

- Final finish shall be:
 - Smooth and uniform
 - Free from streaks, patches, or uneven shade
 - Aesthetically pleasing and consistent across the surface

6. Workmanship

- Application shall be done by skilled painters only
- Proper care shall be taken to avoid splashing on adjacent surfaces
- Paint shall be stirred properly before application
- Manufacturer's instructions regarding dilution and application shall be strictly followed

7. Environmental Conditions

- Painting shall not be carried out during rain, fog, or extreme humidity conditions
- Surface shall be completely dry before application of paint

8. Scaffolding

- Necessary safe scaffolding, ladders, or staging shall be provided and included in the item rate

9. Measurement

- Measurement shall be taken in square meters (sqm) of painted surface area
- Deductions shall be made for openings as per R and B measurement rules

Item 46:

Applying two coats of putty & two coats of primer of approved brand and manufacture on new wall surface to give an even shade with Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.

1. Description of Item

Providing and applying **two coats of wall putty, two coats of primer**, and finishing with **two coats of plastic emulsion paint of approved brand and manufacture** on new wall surfaces, to achieve a smooth, even, and uniform shade finish, including surface preparation, cleaning, sanding, and all complete as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Wall Putty

- Type: **White cement-based wall putty of approved make**
- Shall be suitable for interior wall application
- Provides smooth base for painting

2.2 Primer

- Type: **Acrylic wall primer / water-based primer of approved brand**
- Suitable for new plastered masonry surfaces
- Enhances adhesion of paint and reduces absorption

2.3 Plastic Emulsion Paint

- Type: **Plastic emulsion paint of approved brand and manufacture**
- Shall be washable, durable, and suitable for interior surfaces
- Shall provide smooth, uniform, and aesthetic finish

3. Surface Preparation

- New wall surface shall be thoroughly cleaned to remove:
 - Mortar droppings
 - Dust and loose particles
 - Oil, grease, and foreign materials
- Surface shall be **sand papered smooth** before application
- Any cracks or imperfections shall be repaired and leveled
- Surface shall be dry and sound before starting work

4. Application of Putty

- **Two coats of wall putty** shall be applied uniformly
- First coat shall fill all pores and surface irregularities
- Second coat shall provide smooth and even finish
- Each coat shall be allowed to dry properly before applying next coat
- Surface shall be sanded after drying to achieve smoothness

5. Application of Primer

- **Two coats of primer** shall be applied after putty work
- First coat shall ensure proper sealing of surface

- Second coat shall ensure uniform base for emulsion paint
- Primer shall be applied evenly using brush/roller/spray

6. Application of Plastic Emulsion Paint

- **Two coats of plastic emulsion paint** shall be applied
- Each coat shall be applied after proper drying of previous coat
- Paint shall be applied using roller/brush/spray as approved
- Work shall ensure:
 - Uniform colour and shade
 - Smooth, streak-free finish
 - No patchiness or brush marks

7. Finishing

- Final surface shall be:
 - Smooth and even
 - Uniform in shade
 - Free from brush marks, stains, or defects
- Finished work shall be aesthetically pleasing and durable

8. Workmanship

- Work shall be executed by skilled painters only
- Manufacturer's instructions regarding mixing, dilution, and application shall be strictly followed
- Proper drying time shall be maintained between coats
- Adjacent surfaces shall be protected from splashes

9. Scaffolding

- Necessary scaffolding, ladders, and staging shall be provided and included in the item rate

10. Measurement

- Measurement shall be taken in **square meters (sqm)** of finished painted surface
- Deductions for openings shall be made as per R and B norms

Item 47:

Providing erecting fixing double coated Syntex or Equivalent PVC (ISI) Mark Water Tank of Required Capacity each with all necessary fittings & connection etc. complete on Terrace.

1.0 Materials:-

1.1 Polyethylene water storage tank shall be of as per ISI marked and IS 12701, this materials should be light weight, non toxic all fitting materials shall be H.D.P.E. / Brass 1.2 The P.V.C. tank shall be of ISI mark and approved quality and brand like infra or Sintex or equivalent. It shall be approved by Engineer in charge 1.3 The thickness of P.V.C. materials shall be as per Company's specification. The size of tank shall be decided by Engineer in charge

2.0 Workmanship :-

2.1 Water tank shall be installed on perfectly plained and smooth surface. 2.2 Outlet pipe shall be 7.5 cm high then bottom surface. 2.3 Diameter of overflow pipe shall be bigger then inlet pipe diameter. 2.4 Unions shall be used in inlet and outlet pipe. 2.5 For connection in water tank required vicer, and check-nuts shall be used. 2.6 Fitting shall be done by G.I. / P.V.C. pipes as per instruction of Engineer in charge in each tank. All joints shall be leak proof.

3.0 Mode of Measurement and Payment :-

3.1 This shall be measured in one liter basis and rates are as per liter basis for the volumetric capacity of the water tank.

3.2 Rate shall be inclusive of placing, lifting, storing and making connection for inlet, outlet, overflow pipe, out pipe with all necessary plumbing work and material. For complete work

Item – 65

Providing cement vata (1cm. x 1 cm. size) quarter round in cement mortar 1:1 including neat cement finishing, watering etc. complete.

1. Description of Item

Providing and forming cement vata (quarter round) of size 10 mm × 10 mm (1 cm × 1 cm) in cement mortar 1:1 (1 cement : 1 coarse sand) at junctions of wall-to-floor, wall-to-wall, or other internal corners, including neat cement finishing, curing, watering, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials**2.1 Cement**

- Ordinary Portland Cement of approved make conforming to relevant IS specifications

2.2 Sand

- Clean, fine, well-graded sand free from silt, dust, and organic impurities

3. Mortar

- Cement mortar shall be prepared in proportion 1:1 (1 cement : 1 coarse sand)
- Mortar shall be mixed thoroughly to uniform consistency
- Only fresh mortar shall be used within initial setting time

4. Surface Preparation

- Junction surfaces (wall-floor / wall-wall) shall be:
 - Cleaned thoroughly
 - Free from dust, oil, grease, loose particles, and laitance
- Surface shall be properly wetted before application of mortar

5. Formation of Vata (Quarter Round)

- Cement mortar shall be applied and shaped to form a uniform quarter round (10 mm × 10 mm)
- Proper template or tool shall be used to ensure smooth and regular curvature
- Vata shall be formed at all specified internal corners as directed

6. Finishing

- Surface of vata shall be finished with neat cement slurry to obtain smooth and even finish
- Corners shall be sharp, uniform, and free from irregularities
- No cracks, hollowness, or rough surfaces shall be permitted

7. Curing

- Completed work shall be properly cured with clean water for a minimum of 7 days
- Moist curing shall be maintained continuously to ensure strength and durability

8. Workmanship

- Work shall be executed by skilled masons only
- Proper care shall be taken to maintain uniform size and alignment throughout
- Vata shall be firmly bonded with base surface without separation or cracks

9. Measurement

- Measurement shall be taken in running meters (Rmt.) of completed vata
- Measurement shall be taken along the center line of the formed quarter round

Item No-68

Providing and fixing Kitchen SS Sink Glosy ASIS 304 Grade 1mm thick with overall size 610 X 460 mm & Bowl size 560X410X200 with C.I. or M.S. Brackets, painted white including cutting holes in walls and making good the same etc. complete.

SS Sink Glosy ASIS 304 Grade 1mm thick with overall size 610 X 460 mm & Bowl size 560X410X200

1.0. Materials 1.1. SS Sink Glosy ASIS 304 Grade 1mm thick with overall size 610 X 460 mm & Bowl size 560X410X200mm. size shall conform

2.0. Workmanship 2.1. The kitchen sink shall be supported on a pair of Hole of Kitchen Granite or other member with cutting holes and etc complete with finished with adhesive joints and with waste pipe and union include

. 3.0. Mode of measurements & payment 3.1. The rate includes cost of all labour, materials, tools and plant and other equipment required for satisfactory completion of this item as described in workmanship. 168 3.2. The rate shall be for a unit of One number.

Item No-69

Providing and fixing inter locking Paver concrete block 60mm thick with grade of concrete M200 pnumatic compressed / vibrated mechanically and as per approved design including 75 mm Sand layer for levelling and filling the joint with sand in proper line and level as per Directed Engineer in charge.

Materials

- Paver blocks: 60 mm thick, machine made
- Concrete grade: M200
- Manufactured by vibrated/pneumatic compression method

Sub-base Preparation

- Providing 75 mm thick sand layer for leveling
- Proper compaction and dressing to required slope

Laying

- Blocks laid in approved pattern and design
- Proper alignment, line and level maintained
- Edge restraints provided if required

Joint Filling

- Joints filled with fine sand
- Surface compacted using plate compactor

Finishing

- Even surface with proper slope for drainage
- No loose or uneven blocks

Measurement

- Measured in square meters (m²)

Item 70:

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 50Mt.lead.

1. Description of Item

Box cutting the existing road surface to the required depth, slope, and camber for preparation of base for road construction work, including excavation, dressing, disposal of excavated material to road side slopes up to 50 m lead, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Scope of Work

The work includes:

- Cutting and removing existing road surface
- Achieving required formation level, slope, and camber
- Dressing and leveling of subgrade
- Disposal of excavated material within 50 m lead
- Spreading of material on road side slopes as directed

3. Method of Execution

3.1 Box Cutting Operation

- The road surface shall be cut uniformly to the required depth as per design.
- Cutting shall be done using suitable mechanical equipment or manual means as directed.
- Proper camber and cross slope shall be maintained as per road specifications.

3.2 Dressing and Formation

- After excavation, the formation surface shall be properly dressed, leveled, and compacted as required.

- Loose soil and uneven portions shall be corrected to achieve a uniform base.

3.3 Disposal of Excavated Material

- Excavated material shall be transported and deposited on road side slopes or as directed by Engineer-in-Charge.
- Lead for disposal shall be considered up to 50 meters.
- Material shall be spread uniformly without obstruction to drainage or traffic.

4. Material Handling

- Excavated material shall be handled carefully to avoid damage to adjoining structures or utilities.
- No unauthorized stacking on road carriageway shall be permitted.

5. Workmanship

- Work shall be executed in a true line, level, slope, and camber as per design.
- Proper care shall be taken to avoid over-cutting or under-cutting.
- Subgrade shall be made firm and stable for subsequent road construction layers.

6. Safety Measures

- Proper barricading and warning signs shall be provided during execution.
- Necessary precautions shall be taken to ensure safety of traffic and workers.

7. Measurement

- Measurement shall be taken in Cubic meters (Cum) of actual box cut area.

Item – 71:

Providing & laying compacted W.B.M 100 mm thick Grade-I of machine crushed B.T.Metal of size 40 to 63mm with using 22% stone screening 13.20 mm size and 7% stone dust as a filler including spreading watering & consolidation by vibratory roller etc.comp.

1. Description of Item

Providing, laying, spreading, and compacting Water Bound Macadam (WBM) Grade-I of 100 mm compacted thickness using machine crushed broken stone metal of size 40 mm to 63 mm, including screening, stone dust filler, watering, rolling with vibratory roller, and all complete, as per specifications and direction of the Engineer-in-Charge.

2. Materials

2.1 Coarse Aggregates (Metal)

- Type: Machine crushed broken stone (BT metal)

- Size: 40 mm to 63 mm (Grade-I)
- Aggregates shall be:
 - Hard, durable, and angular in shape
 - Free from dust, dirt, clay, organic matter, and deleterious substances
- Shall conform to relevant specifications for road construction

2.2 Stone Screening

- Size: 13.20 mm nominal size
- Quantity: Approximately 22% by volume
- Used for filling interstices of coarse aggregates

2.3 Stone Dust (Binding Material)

- Fine material used as filler
- Quantity: Approximately 7% by volume
- Shall be clean, dry, and free from organic impurities

2.4 Water

- Clean water free from harmful salts and organic matter for sprinkling and binding

3. Preparation of Subgrade

- Subgrade shall be cleaned, shaped, and properly compacted
- It shall be checked for line, level, and camber before laying WBM
- Any soft spots shall be corrected before execution

4. Spreading of Aggregates

- Coarse aggregates (40–63 mm) shall be evenly spread in layers of specified thickness
- Spreading shall be done using suitable mechanical or manual means
- Proper profile and camber shall be maintained

5. Dry Rolling

- Initial compaction shall be done using vibratory roller
- Rolling shall be done from edges towards the centre
- Rolling shall continue until aggregates are well interlocked and stable

6. Application of Screening

- After initial rolling, 13.2 mm stone screening (approx. 22%) shall be spread uniformly

- Screening shall be swept into voids using brooms and mechanically assisted penetration
- Rolling shall be continued for proper interlocking

7. Application of Stone Dust

- Stone dust (approx. 7%) shall be spread evenly over the surface
- Water shall be sprinkled to aid penetration into voids
- Rolling shall be continued to ensure full binding and consolidation

8. Watering and Consolidation

- Adequate water shall be sprinkled during rolling
- Rolling shall be carried out using vibratory roller until full compaction is achieved
- Surface shall be checked for stability, uniformity, and smoothness

9. Thickness

- Final compacted thickness shall be 100 mm (Grade I WBM layer)

10. Workmanship

- Work shall be executed in layers ensuring proper interlocking of aggregates
- Surface shall be true to line, level, and camber
- No loose aggregates or uneven surface shall be permitted

11. Quality Control

- Compaction shall be checked by field density tests as required
- Proper gradation of materials shall be ensured
- Any defective portion shall be removed and relaid

12. Measurement

- Measurement shall be taken in Cubic meters (cum) of compacted WBM surface
- Thickness shall be as specified (100 mm compacted)

Item-72:

Rolling & watering of earthwork in layers with vibratory roller including filling in depressions which occurs during the process

1. Description of Item

Providing, laying, watering, and compacting earthwork in layers with vibratory roller, including filling and making up depressions formed during rolling, dressing, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Scope of Work

The work includes:

- Spreading earth in uniform layers
- Watering to achieve optimum moisture content
- Compaction using vibratory roller
- Filling and correction of depressions during rolling
- Dressing to required level, slope, and camber

3. Material

- Suitable earth/soil obtained from approved source or available excavated material
- Soil shall be free from:
 - Organic matter
 - Roots, grass, and debris
 - Stones larger than specified size

4. Layering of Earth

- Earth shall be spread in uniform layers not exceeding 200 mm (loose thickness) or as directed
- Each layer shall be properly leveled before watering and compaction

5. Watering

- Water shall be sprinkled uniformly to achieve optimum moisture content (OMC)
- Excess or insufficient moisture shall be avoided
- Watering shall be done using tankers or sprinkler system

6. Compaction

- Compaction shall be carried out using vibratory roller of suitable capacity
- Rolling shall be done systematically:
 - From edges towards centre
 - With required overlap of passes
- Each layer shall be compacted until required density is achieved

7. Filling of Depressions

- During rolling, any depressions or unevenness formed shall be immediately filled with suitable earth
- Filled areas shall be re-watered and re-compacted to match surrounding level
- No loose or un-compacted patches shall remain

8. Dressing and Finishing

- Final surface shall be true to line, level, slope, and camber
- Surface shall be smooth and uniform
- No loose soil, cracks, or uneven areas shall be permitted

9. Quality Control

- Field density tests shall be conducted as per relevant standards
- Compaction shall meet required specifications (typically 95% of MDD or as specified)
- Any weak or loose areas shall be reworked

10. Workmanship

- Work shall be executed in layers ensuring proper bonding between successive layers
- Care shall be taken to avoid segregation of soil
- Proper coordination between watering and rolling shall be maintained

11. Measurement

- Measurement shall be taken in cubic meters (cum) of compacted earthwork
- Volume shall be measured in finished condition after compaction

Item 73 :

Providing and casting in situ controlled cement concrete M-200 for avg.200 mm thick road work laid as directed including providing and laying M.S. side rail of road thickness with necessary nut bolts plates fixing as per width applying plate vibrator (electric or diesel) on channel filling joints with bitumen as directed etc.complete.As per Directed Engineer in charge

1. Description of Item

Providing, laying, compacting, and finishing in-situ controlled cement concrete M-200 grade for average 200 mm thick road pavement, including formwork/side rails of M.S. channel sections, reinforcement fixing (if required), vibration compaction using plate vibrator (electric or diesel),

joint filling with bitumen, curing, finishing, and all complete, as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 Cement Concrete (M-200 Grade)

- Concrete grade: M-200 (1:1.5:3 or as per approved mix design)
- Cement: OPC/PPC of approved make conforming to IS standards
- Coarse aggregate: Crushed stone, graded, clean and hard
- Fine aggregate: Clean river sand/ M-sand, well graded
- Water: Clean potable water free from impurities
- Mix shall be design mix concrete as per IS 10262 and IS 456

2.2 MS Side Rails / Forms

- Material: M.S. channel / steel sections of required thickness as per road width
- Rails shall be straight, rigid, and of adequate strength to withstand vibration and concrete pressure
- Fixed with proper nuts, bolts, base plates, and anchoring arrangements
- Alignment shall ensure correct line, level, and camber of road surface

2.3 Joint Filling Material

- Hot applied bituminous compound / bitumen sealing material of approved grade
- Used for sealing expansion/contraction joints

3. Preparation of Base

- Subgrade/WBM base shall be properly prepared, cleaned, and compacted
- It shall be free from loose soil, dust, and standing water
- Required camber and slope shall be checked before concreting

4. Fixing of Side Rails (Formwork)

- M.S. channel side rails shall be fixed accurately to line, level, and grade
- Proper anchoring shall be ensured to avoid movement during concreting
- Width of road slab shall be strictly maintained as per design
- Rails shall act as formwork for pavement edges

5. Mixing and Laying of Concrete

- Concrete shall be machine-mixed in batching plant or mechanical mixer

- Mix shall conform to M-200 design mix grade
- Concrete shall be laid uniformly within forms without segregation
- Placing shall be continuous to avoid cold joints

6. Compaction

- Concrete shall be compacted using plate vibrator (electric or diesel operated)
- Adequate vibration shall be ensured to remove air voids
- Over-vibration or under-vibration shall be avoided

7. Finishing

- Surface shall be finished smooth and true to required camber and slope
- Final finish shall be even and uniform without honeycombing or undulations
- Edges shall be sharp and properly formed

8. Joints

- Expansion/contraction joints shall be provided as per drawings or directions
- Joints shall be properly cleaned and filled with bitumen sealing compound
- Joint spacing shall be maintained uniformly

9. Curing

- Concrete shall be cured immediately after setting
- Curing shall be done by ponding, wet hessian, or continuous water spray
- Minimum curing period shall be 14 days or as specified

10. Workmanship

- Work shall be executed true to line, level, camber, and grade
- No segregation, honeycombing, or surface defects shall be permitted
- Proper coordination shall be maintained during laying and vibration

11. Quality Control

- Concrete shall be tested for slump, cube strength, and quality as per IS standards
- M-200 strength shall be achieved at 28 days
- Any defective portion shall be removed and replaced

12. Measurement

- Measurement shall be taken in Cubic meters (Cum) of finished pavement area

Item 74:

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.

1. Description of Item

Providing, supplying, and fixing precast reinforced cement concrete (RCC) kerb stone of M-250 grade concrete, of size 300 mm length × 300 mm height × 150 mm thickness, including excavation for foundation, bedding, alignment in proper line and level, joint filling with cement mortar 1:3 (1 cement : 3 fine sand), backfilling, and all complete, as per approved drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials**2.1 Precast Kerb Stone**

- Material: Precast RCC kerb stone
- Grade: M-250 concrete (design mix as per IS 456 and IS 10262)
- Size: 300 mm × 300 mm × 150 mm (or as per approved drawing)
- Shape: As per approved design (straight/curved as required)
- Finish: Smooth, uniform, and free from honeycombing or cracks
- Edges shall be properly chamfered as per design

2.2 Cement Mortar (Jointing)

- Cement mortar ratio: 1:3 (1 cement : 3 fine sand)
- Sand shall be clean, fine, well graded, and free from impurities

2.3 Bedding Material (if required)

- Cement sand bedding or lean concrete as directed by Engineer-in-Charge

3. Excavation

- Excavation shall be carried out for fixing kerb stones to required depth and alignment
- Excavated trench shall be:
 - True to line, level, and gradient
 - Free from loose soil and debris
- Excess excavated material shall be disposed of as directed

4. Laying and Fixing

- Kerb stones shall be placed in proper alignment, line, and level as per drawings
- Stones shall be seated firmly on prepared base and adjusted for correct position
- Proper spacing and vertical alignment shall be maintained
- Kerb shall be fixed rigidly to avoid displacement during service

5. Jointing

- Joints between kerb stones shall be filled with cement mortar 1:3 (1 cement : 3 fine sand)
- Joints shall be compacted and finished flush or as directed
- Excess mortar shall be removed immediately for neat finish

6. Backfilling

- After fixing, excavation on both sides shall be backfilled with suitable earth/material
- Backfilling shall be compacted in layers to avoid settlement

7. Workmanship

- Kerb stones shall be laid in true line, level, and gradient
- No misalignment, tilting, or uneven joints shall be permitted
- Finished work shall be strong, stable, and aesthetically acceptable

8. Curing

- Cement mortar joints shall be cured properly for a minimum of 7 days
- Proper moisture shall be maintained during curing period

9. Measurement

- Measurement shall be taken in running meters (Rmt.) of finished kerb stone work

Item No-78

Structural steel work (Confirming to IS 4923-1997) riveted, bolted or welded in builtup for all type sections, in framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer and Two coat oil paint all complete as per the structural designs and directions of Engineer in charge.

1. Scope of Work

Providing, fabricating, supplying and erecting **structural steel work** using hollow/other sections conforming to **IS 4923:1997**, in built-up or framed structures, including cutting, welding/bolting/riveting, hoisting, fixing in position, and applying protective coatings, complete as per approved structural drawings and directions of the Engineer-in-Charge.

2. Materials

2.1 Structural Steel

- Steel sections (RHS/SHS/CHS or other rolled sections) conforming to **IS 4923:1997**.
- Steel shall be free from cracks, laminations, bends, or defects.

2.2 Fasteners

- Bolts, nuts, and washers conforming to relevant IS codes (e.g., IS 1367).
- High-strength friction grip bolts where specified.

2.3 Welding Consumables

- Electrodes conforming to IS 814.
- Suitable grade as per parent metal.

2.4 Primer and Paint

- One coat of approved **red oxide/zinc chromate steel primer**.
- Two coats of **synthetic enamel/oil paint** of approved brand and shade.

3. Fabrication

- Fabrication shall be carried out as per approved shop drawings.
- Cutting of steel sections by **shearing, sawing, or gas cutting**.
- Edges shall be smooth and free from burrs.
- Proper alignment and squareness to be maintained.
- Built-up sections fabricated with required stiffeners, gusset plates, base plates, etc.

4. Connections

4.1 Welding

- Welding shall be done as per relevant IS standards.
- Continuous, uniform welds free from cracks, porosity, and slag.
- Slag removed and welds cleaned.

4.2 Bolting/Riveting

- Holes drilled or punched accurately.
- Bolts tightened properly to achieve firm connection.
- Riveting (if used) done hot and properly hammered.

5. Erection and Fixing

- Steel members hoisted, aligned, and fixed in position.
- Temporary supports/bracing provided during erection.
- Columns fixed to base plates with **anchor bolts**.
- Alignment, plumb, and level checked before final fixing.

6. Surface Preparation

- Steel surfaces cleaned of:
 - Rust
 - Oil/grease
 - Mill scale
- Cleaning by **wire brushing, sandpapering, or sand blasting** (if specified).

7. Painting

7.1 Priming Coat

- One coat of approved steel primer applied after cleaning.
- Primer thickness as per manufacturer specifications.

7.2 Finishing Coats

- Two coats of oil/synthetic enamel paint.
- Each coat applied after drying of previous coat.
- Uniform finish without streaks.

8. Tolerances

- Fabrication and erection tolerances as per IS standards.
- Proper alignment and dimensional accuracy maintained.

9. Inspection and Testing

- Visual inspection of welds and joints.
- Checking dimensions and alignment.
- Any defective work to be rectified/replaced.

10. Measurement

- Structural steel work measured in **kilograms (kg)**.
- Weight calculated from standard sectional weights.
- No extra payment for wastage, cutting, or overlaps.

11. Rate Includes

- Cost of steel, labour, fabrication, erection.
- Cost of bolts, nuts, welding, scaffolding.
- Surface preparation, primer, and two coats of paint.
- All tools, plant, and incidental charges.

12. Relevant Standards

- **IS 4923:1997**
- IS 800 – General construction in steel
- IS 816 – Welding in steel structures
- IS 1367 – Technical supply conditions for fasteners

Item 80 :

Drilling of 200 / 215 mm dia bore in over burden rocky or loose collapsible / boulder strata and lowering of UPVC / PVC / ERW casing pipe above 12 mt and upto 40 mt depth by DTH rig etc complete.

1. Description of Item

Drilling of 200 mm / 215 mm diameter bore hole in overburden, rocky strata, loose or collapsible/boulder formations, including drilling by DTH (Down-the-Hole) rig, stabilizing the bore hole, and lowering of UPVC / PVC / ERW casing pipe up to 12 m and beyond up to 40 m depth or as directed, complete in all respects as per site conditions, drawings, specifications, and direction of the Engineer-in-Charge.

2. Scope of Work

The work includes:

- Mobilization of DTH drilling rig and accessories
- Drilling in all types of strata (soil, clay, boulders, hard rock, weathered rock)
- Stabilization of bore hole during drilling
- Cleaning and flushing of bore hole
- Lowering and positioning of casing pipe
- Temporary support to prevent collapse
- Disposal of drilling debris
- All operations required for successful completion of bore

3. Drilling Method

- Drilling shall be carried out using Down-the-Hole (DTH) percussion drilling rig or rotary cum DTH system as suitable
- Suitable air compressor system shall be used for drilling and flushing
- Bore hole shall be drilled vertically and maintained true alignment

4. Bore Diameter

- Bore hole size shall be 200 mm / 215 mm diameter as specified
- Diameter shall be uniform throughout drilling unless otherwise directed

5. Strata Conditions

- Drilling shall be carried out in:
 - Overburden soil
 - Loose/collapsible strata
 - Boulder formation
 - Weathered rock
 - Hard rock formations
- Contractor shall not claim extra for variation in strata conditions within scope

6. Casing Pipe Work

- UPVC / PVC / ERW steel casing pipes shall be lowered as per requirement
- Casing shall be provided to stabilize bore hole in loose/collapsible strata
- Pipes shall be of approved quality, straight, and free from defects
- Joints shall be properly coupled and watertight

7. Depth of Bore

- Casing and drilling shall be done for depth:
 - Above 12 m and up to 40 m or as directed by Engineer-in-Charge
- Depth shall be measured from ground level

8. Stabilization and Flushing

- Bore hole shall be stabilized during drilling to avoid collapse
- Continuous air flushing shall be used to remove cuttings and debris
- Bore shall be cleaned properly before lowering casing

9. Handling of Debris

- All excavated material, sludge, and drilling waste shall be:
 - Properly collected
 - Disposed of at approved location
- Site shall be kept clean and safe

10. Alignment and Verticality

- Bore hole shall be drilled strictly vertical
- Deviation shall be within permissible limits as per IS standards
- Misalignment or collapse shall be rectified by contractor at own cost

11. Equipment and Manpower

- DTH drilling rig of suitable capacity
- Air compressor with required pressure and flow
- Skilled drilling operators and technicians
- Support equipment for casing lowering

12. Safety Measures

- Proper barricading shall be provided around drilling site
- Safety gear shall be used by all workers
- Care shall be taken to avoid damage to nearby structures and utilities

13. Measurement

- Measurement shall be taken in running meters (Rmt.) of bore drilled and casing lowered
- Depth shall be measured from ground level to final depth achieved

Item 81:

Drilling of 200 mm dia bore hole by DTH rig in rocky formation in All takuka of Zone III (0 to 350 Mtr)

1. Description of Item

Drilling of 200 mm diameter bore hole in hard rocky formation using Down-the-Hole (DTH) drilling rig in Seismic Zone III area, including drilling in all types of rock strata, stabilization of bore hole, flushing, and all necessary operations required for successful completion of bore hole up to 0 to 350 meters depth or as directed by Engineer-in-Charge, complete in all respects as per specifications.

2. Scope of Work

The work includes:

- Mobilization and setup of DTH drilling rig at site
- Drilling of bore hole in hard rock formation
- Maintaining vertical alignment of bore hole
- Air flushing during drilling for removal of cuttings
- Stabilization of bore hole where required
- Handling and disposal of drilling debris
- All ancillary works required for completion of bore

3. Drilling Method

- Drilling shall be carried out using Down-the-Hole (DTH) percussion drilling system
- High pressure air compressor shall be used for drilling and flushing
- Suitable drill bits and hammers shall be used depending on rock strata
- Drilling shall ensure smooth progress through hard rock formations

4. Bore Hole Specification

- Diameter: 200 mm (uniform throughout drilling)
- Depth: 0 to 350 meters or as directed by Engineer-in-Charge
- Bore hole shall be maintained vertical and true to alignment

5. Strata Conditions

- Drilling shall be carried out in:
 - Hard rock formations
 - Weathered rock
 - Bouldery strata (if encountered)
- No extra payment shall be admissible for variation in strata within specified depth

6. Drilling Operations

- Drilling shall be carried out in stages as per site conditions
- Continuous air circulation shall be maintained for removal of cuttings
- Bore hole shall be kept stable during drilling operations
- Necessary precautions shall be taken to prevent collapse or deviation

7. Equipment and Machinery

- DTH drilling rig of suitable capacity
- Air compressor with required pressure and discharge capacity
- Drill rods, hammers, and bits suitable for hard rock
- Supporting tools and accessories

8. Safety Measures

- Proper barricading around drilling site shall be provided
- All safety equipment shall be used by workers
- Care shall be taken to avoid damage to nearby structures, utilities, and environment

9. Disposal of Debris

- All rock cuttings, sludge, and drilling waste shall be:
 - Collected properly
 - Transported and disposed of at approved locations
- Site shall be kept clean throughout execution

10. Workmanship

- Bore hole shall be drilled strictly vertical
- Deviation shall be within permissible limits as per IS standards
- Smooth drilling progress shall be ensured without damage to bore walls
- Work shall be executed by skilled operators only

11. Measurement

- Measurement shall be taken in running meters (Rmt.) of bore hole drilled
- Depth shall be measured from ground level to final drilled depth

Item 84:

Supply of "U" PVC Casing pipe CM type (B) 200 mm dia

1. Description of Item

Supplying of "U" PVC casing pipe of CM Type (B) of 200 mm nominal diameter, including all necessary accessories such as couplers, threads, rubber ring joints (if applicable), handling, loading, unloading, and stacking at site in proper manner, complete as per specifications, relevant IS codes, and direction of the Engineer-in-Charge.

2. Material Specification

- Pipe Type: Unplasticized Polyvinyl Chloride (uPVC) casing pipe

- Classification: CM Type (B) suitable for bore well casing applications
- Diameter: 200 mm nominal bore (NB)
- Pipe shall be:
 - Heavy duty, rigid, and straight
 - Free from cracks, blisters, voids, and deformities
 - Uniform in colour and wall thickness
- Pipes shall conform to relevant IS standards for uPVC casing pipes for bore wells (e.g., IS 12818 or latest revision as applicable)

3. Construction / Manufacturing Requirements

- Pipes shall be manufactured from virgin uPVC compound only
- No recycled or reprocessed material shall be permitted
- Pipes shall be UV resistant and suitable for underground installation
- Ends shall be properly threaded or plain with suitable coupling arrangement as per system design

4. Joints and Couplings

- Pipes shall be provided with factory-made threaded joints or socketed couplings as applicable
- Joints shall be designed to ensure:
 - Leak-proof connection
 - Structural integrity under soil and water pressure
- Rubber ring (O-ring) sealing arrangement shall be provided where specified for water tightness

5. Workmanship and Handling

- Pipes shall be carefully handled during loading/unloading to avoid damage
- Stacking shall be done on flat surface with proper support to prevent bending or warping
- Pipes shall be protected from direct sunlight and mechanical damage at site

6. Application

- Pipes shall be suitable for use as:
 - Bore well casing in drilled tube wells
 - Stabilization of bore hole in loose/collapsible strata

- Pipes shall withstand installation stresses and subsurface loads

7. Quality Requirements

- Pipes shall be:
 - Chemically inert and corrosion resistant
 - Resistant to scaling and biological growth
 - Durable under underground conditions
- Each pipe shall be marked with:
 - Manufacturer name
 - Size and type
 - Batch number and IS marking (if applicable)

8. Measurement

- Measurement shall be taken in running meters (Rmt.) of supplied pipe
- Length shall be measured as supplied at site in good condition

Item-85:

Providing and fixing bail plug {Bottom Cap } Suitable for 200mm dia. Pipe

1. Description of Item

Providing and fixing bail plug (bottom cap) suitable for 200 mm diameter bore well casing pipe (uPVC / PVC / ERW as applicable), including proper fitting, sealing, alignment, and all necessary arrangements to ensure complete closure of the bottom end of casing pipe, as per specifications and direction of the Engineer-in-Charge.

2. Material Specification

- Type: Bail plug / bottom cap for bore well casing pipe
- Suitable for: 200 mm nominal diameter casing pipe
- Material shall be:
 - Heavy duty uPVC / PVC / approved engineering plastic or
 - Compatible material matching casing pipe system (as specified)
- The plug shall be:
 - Strong, rigid, and impact resistant
 - Non-corrosive and chemically inert

- Designed to withstand underground pressure and installation load

3. Functional Requirement

- The bail plug shall:
 - Effectively close and seal the bottom of casing pipe
 - Prevent entry of sand, gravel, and debris into casing during lowering
 - Provide stability to casing pipe during installation
- It shall ensure proper protection of bore hole during and after lowering of casing pipe

4. Design and Construction

- Plug shall be factory manufactured and compatible with 200 mm casing pipe system
- It shall fit tightly into or onto casing pipe end using:
 - Threaded connection / friction fit / coupling system as applicable
- Joints shall be:
 - Watertight
 - Firmly secured to avoid detachment during lowering operation

5. Installation / Fixing

- Bail plug shall be fixed at the bottom end of casing pipe before lowering into bore hole
- It shall be properly tightened and checked for secure fitting
- Care shall be taken to ensure:
 - No leakage or loosening during lowering operation
 - Proper alignment of casing pipe string

6. Workmanship

- Installation shall be carried out by skilled workers under supervision
- Plug shall not be damaged during handling or installation
- Any defective or loose fitting shall be replaced immediately

7. Quality Requirements

- Plug shall be:
 - Dimensionally accurate
 - Free from cracks, defects, or manufacturing flaws
 - Capable of withstanding borewell installation stresses

- It shall conform to relevant IS standards or manufacturer specifications

8. Measurement

- Measurement shall be taken in number (No.) of bail plugs installed and accepted
- Each plug shall be counted only after successful installation

Item – 84:

**Heavy duty clamp made from 4" x 1.5" iron strip suitable for column pipe 1.5" to 2" length.
(C) 65mm(2.1/2") dia. Pipe**

1. Description of Item

Providing, fabricating, supplying, and fixing heavy duty MS clamp made from MS flat iron strip of size 4" × 1½", suitable for holding column pipe of 1½" to 2" (approximately 65 mm / 2½" diameter pipe), including drilling, bolting, nut-bolt arrangement, fixing on support structure, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 MS Flat Iron Strip

- Size: 100 mm × 40 mm (approx. 4" × 1½")
- Material: Mild Steel of approved quality conforming to IS standards
- Thickness shall be sufficient to provide rigidity and load-bearing strength
- Strip shall be free from cracks, bends, and defects

2.2 Fasteners

- GI/MS bolts, nuts, washers of suitable size (minimum M10/M12 or as required)
- All fasteners shall be rust resistant and of approved quality

3. Design and Fabrication

- Clamp shall be fabricated in semi-circular / U-shape profile to tightly grip 65 mm (2½") dia pipe
- Inner surface shall be smooth and properly shaped to avoid damage to pipe coating
- Clamp shall be designed to:
 - Hold pipe firmly without slipping
 - Withstand vertical load and vibration
- Edges shall be properly finished and free from sharp burrs

4. Fixing Arrangement

- Clamp shall be fixed to structural support (wall/column/steel frame) using:

- Proper anchor bolts or embedded fasteners
- Pipe shall be properly seated inside clamp and tightened using nuts and bolts
- Alignment of column pipe shall be ensured vertical and stable

5. Surface Preparation & Protection

- All MS components shall be cleaned of rust, scale, oil, and dust before installation
- Clamp shall be provided with:
 - One coat of red oxide primer
 - Followed by two coats of synthetic enamel paint of approved shade (if not otherwise specified in BOQ)

6. Workmanship

- Fabrication shall be done using skilled labour and proper tools
- Clamp shall be installed without damaging pipe surface or coating
- Proper alignment and tightness shall be ensured
- No looseness or vibration shall be permitted after installation

7. Functional Requirement

- Clamp shall securely support 65 mm (2½") diameter column pipe (1.5"–2" range)
- It shall resist vibration, load, and operational stresses of pipe system
- It shall ensure safe and stable positioning of piping system

8. Measurement

- Measurement shall be taken in number (Nos.) of clamps installed and accepted
- Each clamp shall be counted only after complete fixing and approval

Item – 85:

Supplying & erecting G.I. bend for pipe connections suitable for .(E) 65 mm(2.5")

1. Description of Item

Providing, fabricating, supplying, and fixing heavy duty MS clamp made from MS flat iron strip of size 4" × 1½", suitable for holding column pipe of 1½" to 2" (approximately 65 mm / 2½" diameter pipe), including drilling, bolting, nut-bolt arrangement, fixing on support structure, and all complete as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Materials

2.1 MS Flat Iron Strip

- Size: 100 mm × 40 mm (approx. 4" × 1½")
- Material: Mild Steel of approved quality conforming to IS standards
- Thickness shall be sufficient to provide rigidity and load-bearing strength
- Strip shall be free from cracks, bends, and defects

2.2 Fasteners

- GI/MS bolts, nuts, washers of suitable size (minimum M10/M12 or as required)
- All fasteners shall be rust resistant and of approved quality

3. Design and Fabrication

- Clamp shall be fabricated in semi-circular / U-shape profile to tightly grip 65 mm (2½") dia pipe
- Inner surface shall be smooth and properly shaped to avoid damage to pipe coating
- Clamp shall be designed to:
 - Hold pipe firmly without slipping
 - Withstand vertical load and vibration
- Edges shall be properly finished and free from sharp burrs

4. Fixing Arrangement

- Clamp shall be fixed to structural support (wall/column/steel frame) using:
 - Proper anchor bolts or embedded fasteners
- Pipe shall be properly seated inside clamp and tightened using nuts and bolts
- Alignment of column pipe shall be ensured vertical and stable

5. Surface Preparation & Protection

- All MS components shall be cleaned of rust, scale, oil, and dust before installation
- Clamp shall be provided with:
 - One coat of red oxide primer
 - Followed by two coats of synthetic enamel paint of approved shade (if not otherwise specified in BOQ)

6. Workmanship

- Fabrication shall be done using skilled labour and proper tools
- Clamp shall be installed without damaging pipe surface or coating
- Proper alignment and tightness shall be ensured

- No looseness or vibration shall be permitted after installation

7. Functional Requirement

- Clamp shall securely support 65 mm (2½”) diameter column pipe (1.5”–2” range)
- It shall resist vibration, load, and operational stresses of pipe system
- It shall ensure safe and stable positioning of piping system

8. Measurement

- Measurement shall be taken in number (Nos.) of clamps installed and accepted
- Each clamp shall be counted only after complete fixing and approval

Item-86:

Supplying, & erecting C.I. swing, check type non-return (Reflux) Valve -ISI marked suitable for following size (B) 65 mm dia.

1. Description of Item

Supplying, conveying, erecting, testing, and commissioning of Cast Iron (C.I.) Swing Check Type Non-Return (Reflux) Valve, ISI marked, suitable for 65 mm nominal diameter pipe line, including necessary jointing, flange connections, nuts, bolts, gaskets, painting, and all complete as per drawings, specifications, manufacturer's instructions, and direction of the Engineer-in-Charge.

2. Material Specification

2.1 Valve Body

- Material: Cast Iron (FG 200 or equivalent grade)
- Designed for water supply / pumping applications
- Heavy duty construction suitable for pressure service

2.2 Type of Valve

- Type: Swing Check Type Non-Return (Reflux) Valve
- Function: Allows flow in one direction only and prevents backflow automatically

2.3 Size

- Nominal Diameter: 65 mm (2½ inch)
- Suitable for matching pipeline size and pressure rating

2.4 Standards

- Valve shall be ISI marked and conform to relevant BIS specifications for check valves

- Manufacturing shall follow approved engineering standards for pressure testing and durability

3. Construction Details

- Valve shall consist of:
 - Cast iron body
 - Hinged swing disc/door
 - Renewable seat arrangement (as applicable)
 - Leak-proof sealing surface
- Internal surfaces shall be smooth to minimize friction loss
- Disc shall move freely without obstruction

4. Coating and Protection

- External surface shall be coated with:
 - Anti-corrosive primer
 - Finish coat of epoxy / enamel paint of approved shade
- Internal surfaces shall be protected against corrosion and scaling

5. Installation / Erection

- Valve shall be installed in correct flow direction as indicated by arrow marking on body
- Erection shall be done in:
 - Horizontal pipeline position unless otherwise specified
- Proper alignment with pipeline shall be ensured
- Flanged joints shall be tightened uniformly using:
 - Suitable nuts, bolts, and rubber gaskets

6. Testing and Commissioning

- Valve shall be tested for:
 - Leakage
 - Free movement of swing disc
 - Pressure holding capacity
- Hydraulic testing shall be carried out as per site conditions and specification
- Any leakage or defect shall be rectified or replaced

7. Workmanship

- Installation shall be carried out by skilled technicians
- Care shall be taken to avoid damage to valve seat and disc during handling
- Proper support shall be provided to pipeline to avoid stress on valve

8. Functional Requirement

- Valve shall:
 - Prevent reverse flow of water automatically
 - Operate smoothly under designed pressure conditions
 - Ensure zero leakage in closed condition
- Suitable for pumping and water supply systems

9. Measurement

- Measurement shall be taken in number (Nos.) of valves supplied, erected, tested, and commissioned

Item No-87

Supplying submersible pump set Electric motor driven borewell submersible pump set confirming to IS 8034 and motor confirming to IS 9283 working at 3 phase 400 / 440 volt 50 Hz AC supply & 2900 RPM. (25) Cat o. 6.3, Discharge 400 LPM, 150 Mtr Head, 22.50 HP

1. Submersible Pump Set (Borewell Type)

Scope

Supplying, installing, testing and commissioning of electric motor driven borewell submersible pump set complete in all respects.

Standards

- Pump conforming to IS 8034
- Motor conforming to IS 9283

Technical Specifications

- Type: Borewell submersible pump set
- Power supply: 3 Phase, 400/440 V, 50 Hz AC
- Speed: 2900 RPM
- Category: (25), Cat. No. 6.3
- Discharge: 400 LPM

- Head: 150 meters
- Motor rating: 22.50 HP

Materials & Components

- Stainless steel/CI pump body
- Submersible motor with water-filled/water-lubricated design
- Column pipe, NRV, clamps
- Suitable PVC/HDPE cable
- Starter panel (DOL/Star Delta as required)

Installation

- Lowering pump into borewell with safety clamp
- Proper cable jointing and insulation
- Fixing delivery pipe and valves
- Alignment and connection to power supply

Testing & Commissioning

- Insulation resistance test
- Trial run for discharge and head
- Smooth and vibration-free operation

Measurement

- Measured as per complete set (Each) including installation.

Item 88:

Auto transformer starter suitable for local & remote pump control application consisting of Auto Transformer (vacuum impregnated, air cooled having three (3) tapings at 50%, 65% and 80%), incomer MCCB / MPCB, overload relay and contactors as per Type II including digital MFM with RS 485 communication port, analogue type ammeter with selector coordination switch, run hour meter, required protective relays & control accessories.

1. Description of Item

Providing, supplying, installing, testing, and commissioning of Auto Transformer Starter Panel suitable for local and remote control of pump motor application, complete with auto transformer, switchgear, protection devices, metering, control accessories, and communication interface, as per drawings, specifications, manufacturer's instructions, and direction of the Engineer-in-Charge.

2. System Requirement

The starter panel shall be suitable for:

- Starting and controlling three-phase induction motor driven pump sets
- Operation in local as well as remote mode
- Providing smooth starting with reduced starting current using auto transformer starting method (Type II coordination)

3. Auto Transformer Unit

- Type: Vacuum impregnated, air cooled auto transformer
- Tapping's provided at:
 - 50% voltage
 - 65% voltage
 - 80% voltage
- Designed for smooth reduced voltage starting of motor
- Adequate thermal rating for repeated starts
- Insulation class suitable for continuous industrial operation

4. Switchgear Components

4.1 Incomer Protection

- MCCB / MPCB (Motor Protection Circuit Breaker) of suitable rating
- Breaking capacity suitable for fault level of system
- Adjustable thermal and magnetic protection

4.2 Contactors

- AC-3 duty rated power contactors for:
 - Main contactor
 - Star/Start contactor
 - Run contactor
- Suitable for Type-II coordination as per IEC standards
- Electrically and mechanically interlocked

4.3 Overload Relay

- Thermal overload relay with adjustable setting range

- Suitable for motor full load current protection
- Trip indication and reset facility provided

5. Metering and Indication

- Digital Multi Function Meter (MFM) with:
 - Voltage, current, power, energy, frequency measurement
 - RS-485 communication port (Modbus compatible)
- Analog ammeter with selector switch for phase selection
- Run hour meter for pump operation tracking
- LED indicating lamps for:
 - Power ON
 - Motor ON (Run)
 - Trip / Fault

6. Control and Protection Accessories

- Start/Stop push buttons for local operation
- Selector switch for Local / Remote mode
- Control transformer (if required for control circuit)
- Control fuses / MCBs for auxiliary circuits
- Phase failure protection relay
- Single phasing prevention relay
- Under voltage / over voltage protection relay (if specified)
- Emergency stop push button

7. Enclosure / Panel Construction

- Sheet steel enclosure of dust and vermin proof design (IP-54 or higher)
- Powder coated finish with anti-corrosion treatment
- Proper internal wiring with ferrules and cable markers
- Cable entry glands and terminal blocks provided

8. Control Logic

- Auto transformer starter shall operate in:
 - Starting mode with reduced voltage (50% / 65% / 80%)

- Automatic changeover to full voltage running mode
- Smooth transition without electrical shock to motor
- Suitable interlocking to prevent incorrect operation

9. Remote Operation

- Provision for remote start/stop control through external control system/PLC/SCADA
- Dry contact terminals for remote interface
- RS-485 communication from MFM for energy monitoring

10. Wiring and Safety

- Internal wiring with FRLS copper conductor wires of adequate size
- Proper cable dressing and identification
- All terminals shall be properly ferruled and tightened

11. Testing and Commissioning

- Panel shall be tested for:
 - Insulation resistance
 - Functional operation of starter sequence
 - Protection relay tripping
 - Metering accuracy
- Trial run shall be conducted with connected motor load

12. Workmanship

- All components shall be mounted neatly and securely
- Wiring shall be properly routed and labeled
- Panel shall be installed in plumb condition on suitable foundation/support

13. Measurement

- Measurement shall be taken in number (Nos.) of complete starter panels supplied, installed, tested, and commissioned

Item 89:

Providing and erecting ISI marked PVC insulated flat submersible cable as per detailed technical specifications of R/C of GWSSB conforming to IS 694, IEC 60227 / 60228.(e) 1 R x3 Core x 10 Sq. mm.

1. Description of Item

Providing, supplying, laying, fixing, testing, and commissioning of ISI marked PVC insulated flat submersible cable, 1 Run × 3 Core × 10 Sq. mm, suitable for submersible pump motor application, conforming to IS 694, IEC 60227 / IEC 60228 and technical specifications of GWSSB Rural Construction (R/C), complete in all respects as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Material Specification

2.1 Cable Construction

- Type: Flat submersible cable
- Configuration: 1 Run × 3 Core × 10 Sq. mm
- Conductor: Stranded, annealed copper conductor (electrolytic grade)
- Insulation: PVC insulated (suitable for submersible pump application)
- Sheath: Heavy duty PVC outer sheath, water resistant and abrasion resistant

2.2 Standards

- Conforming to:
 - IS 694 (PVC insulated cables for working voltage up to 1100V)
 - IEC 60227 / IEC 60228 standards
 - Relevant GWSSB Rural Construction technical specifications

3. Electrical Characteristics

- Rated Voltage: 1100 V grade
- Frequency: 50 Hz
- Suitable for three-phase submersible motor operation
- Designed for continuous operation under submerged conditions

4. Mechanical Properties

- Cable shall be:
 - Flexible and durable
 - Resistant to water, oil, and moisture
 - Suitable for vertical and horizontal submersible installations
- Outer sheath shall provide protection against:
 - Abrasion

- Mechanical stress
- Chemical effects in water

5. Installation / Laying

- Cable shall be:
 - Lowered carefully along with submersible pump assembly
 - Properly clamped with GI clamps at regular intervals on rising main
- Care shall be taken to avoid:
 - Twisting, kinking, or mechanical damage during installation
- Cable shall be properly terminated at starter/control panel and motor terminals

6. Termination and Jointing

- Proper lugs/ferrules shall be used for termination
- Waterproof and insulated connections shall be ensured
- Jointing, if required, shall be done using approved waterproof joint kits

7. Testing

- Cable shall be tested for:
 - Insulation resistance (IR test)
 - Continuity of all cores
- Tests shall be conducted before and after installation

8. Workmanship

- Installation shall be done by skilled technicians
- Cable shall be handled carefully to avoid damage to insulation
- Proper dressing and alignment shall be maintained at panel and pump end

9. Safety Requirements

- Cable shall be properly earthed through system earthing arrangement
- Installation shall comply with electrical safety standards
- All live terminations shall be properly insulated

10. Measurement

- Measurement shall be taken in running meters (Rmt.) of cable supplied, laid, and commissioned

Item 90:

Providing & fixing of ISI marked HDPE Pipes suitable for potable water as per IS specifications no 4984/1995 including SS-316 nipple at both ends having 11 TPI threads as per specifications, press fitted and bolted incl all taxes, transportation, freight charges, inspection charges, loading, unloading along with lowering and laying the pipe including the cost of all labour & material for 63mm dia (PN-10) 10.00 kg/cm² pipe.

1. Description of Item

Providing, supplying, conveying, lowering, laying, jointing, testing, and commissioning of ISI marked HDPE pipe suitable for potable water supply, 63 mm outer diameter, PN-10 (10 kg/cm² pressure rating), conforming to IS 4984:1995 or latest revision, including SS-316 stainless steel nipples at both ends with 11 TPI threaded arrangement, press-fitted and bolted jointing system, complete in all respects including all labour, materials, transportation, inspection, and taxes, as per drawings, specifications, and direction of the Engineer-in-Charge.

2. Material Specification**2.1 HDPE Pipe**

- Type: High Density Polyethylene (HDPE) pipe
- Standard: IS 4984:1995 (or latest revision)
- Diameter: 63 mm (OD)
- Pressure Rating: PN-10 (10 kg/cm² working pressure)
- Grade: Suitable for potable water supply
- Pipe shall be:
 - Black with blue stripes (as per potable water standard)
 - UV stabilized and corrosion resistant
 - Flexible, durable, and leak-proof

2.2 SS-316 Nipples

- Material: Stainless Steel Grade SS-316
- Thread: 11 Threads Per Inch (11 TPI)
- Provided at both ends of pipe for jointing
- Designed for:
 - High corrosion resistance
 - Long service life in underground/wet conditions

3. Jointing System

- Pipe joints shall be press-fitted and bolted type connection system
- Joints shall ensure:
 - Leak-proof performance
 - Mechanical strength under pressure
- Suitable gaskets/sealing elements shall be used wherever required
- All joints shall be compatible with SS-316 nipple fittings

4. Laying and Installation

- Pipes shall be:
 - Lowered carefully into trenches or bore alignment
 - Laid true to line, level, and gradient as per design
- Proper bedding shall be provided in trenches to avoid damage
- Care shall be taken to avoid:
 - Kinking
 - Twisting
 - Mechanical stress during installation

5. Handling and Transportation

- Pipes shall be transported carefully to avoid scratches or deformation
- Pipes shall be stacked on flat surface with proper support
- Exposure to sharp objects or direct impact shall be avoided

6. Testing

- Pipeline shall be subjected to hydraulic pressure testing at site
- Testing pressure shall be as per PN-10 requirement and relevant IS standards
- System shall be checked for:
 - Leakage
 - Joint integrity
 - Pressure holding capacity

7. Workmanship

- Installation shall be carried out by skilled workers

- Proper alignment and joint tightness shall be ensured
- All fittings shall be securely tightened and tested
- No leakage or deformation shall be acceptable

8. Safety Requirements

- Proper trench safety measures shall be followed
- Pipes shall be protected from damage during backfilling
- Warning tapes and markers shall be provided if required

9. Measurement

- Measurement shall be taken in running meters (Rmt.) of HDPE pipe supplied, laid, and tested

10. Rate Includes

- Cost of HDPE pipe (63 mm dia, PN-10, IS 4984)
- SS-316 nipples with 11 TPI threads at both ends
- Jointing materials and fittings
- Loading, unloading, transportation, and inspection charges
- Lowering, laying, and alignment in trench
- Hydraulic testing and commissioning
- Labour, tools, and equipment
- All taxes, freight, and incidental charges

11. Mode of Payment

- Payment shall be made on actual measured running length of pipe successfully supplied, installed, tested, and certified by Engineer-in-Charge.

Item 91:

Geohydrological ground water investigation including vehicle charges (b) For three phase DTH bore / DR tube well including water sample testing charges.

1. Description of Item

Conducting geohydrological ground water investigation survey for identification of suitable bore well site, including mobilization of vehicle, field survey, scientific investigation using Three Phase DTH bore / DR tube well method, and collection and testing of water samples in approved laboratory, complete in all respects as per specifications and direction of the Engineer-in-Charge.

2. Scope of Work

The work includes:

- Hydrogeological survey of area
- Identification of potential groundwater zones
- Drilling of test bore using Three Phase DTH/DR technique
- Observation of lithology and water-bearing strata
- Collection of water samples
- Laboratory testing of water quality parameters
- Submission of detailed investigation report

3. Field Investigation Method

3.1 Survey and Site Selection

- Preliminary reconnaissance survey shall be carried out
- Selection of bore location based on:
 - Geological formations
 - Surface features
 - Existing borewell data (if any)
- Marking of suitable drilling point at site

3.2 DTH / DR Test Bore Drilling

- Drilling shall be carried out using Three Phase DTH rig or DR tube well method
- Bore shall be drilled up to required depth as directed by Engineer-in-Charge
- Different strata encountered shall be recorded systematically
- Water bearing zones shall be identified during drilling

4. Vehicle Charges

- The item includes vehicle charges for mobilization of equipment, personnel, and drilling rig
- Vehicle shall be suitable for transporting:
 - DTH drilling rig
 - Air compressor and accessories
 - Water tankers and tools

- No additional payment shall be admissible for transportation within scope

5. Water Sample Collection and Testing

- Water samples shall be collected from:
 - Test bore or aquifer zone
- Samples shall be tested in approved laboratory for:
 - pH value
 - Turbidity
 - Total dissolved solids (TDS)
 - Electrical conductivity
 - Hardness
 - Chlorides and other relevant parameters
- Test reports shall be submitted in prescribed format

6. Reporting

A detailed hydrogeological report shall be submitted including:

- Site location and coordinates
- Geological strata encountered
- Depth of water-bearing formations
- Yield estimation (if applicable)
- Water quality analysis report
- Suitability recommendation for borewell

7. Equipment and Manpower

- DTH drilling rig with compressor system
- Geological survey instruments
- Water sampling kits
- Skilled geologist / hydrogeologist
- Drilling operators and assistants

8. Safety Measures

- Proper barricading of drilling site
- Safety gear for all personnel

- Care to avoid damage to nearby structures/utilities

9. Measurement

- Measurement shall be taken as per job (each complete investigation work including bore, survey, and report submission)

Item 92:

Providing & erecting Monobloc pump 3 phase 400/440 volt, 50 Hz AC Supply & 2800 RPM as per IS 9079 at departmental stores with following MOC: Casing: CI- FG260, Impeller: Bronze & Shaft: SS:410 @ 24 Mtr head, 285 LPM Discharge, 5-HP

1. Description of Item

Providing, supplying, erecting, testing, and commissioning of monobloc centrifugal pump set, 3 phase, 400/440 Volt, 50 Hz AC supply, rated at 2800 RPM, conforming to IS 9079, including all accessories and erection at departmental stores/site, complete in all respects as per specifications, drawings, manufacturer's instructions, and direction of the Engineer-in-Charge.

2. Technical Details of Pump

- Type: Monobloc centrifugal pump set
- Power rating: 5 HP (Horse Power)
- Supply: 3 Phase, 400/440 V, 50 Hz AC
- Speed: 2800 RPM
- Standard: Conforming to IS 9079 (Latest revision)
- Duty point:
 - Head: 24 meters
 - Discharge: 285 LPM (Litres per minute)

3. Material of Construction (MOC)

- Pump Casing: Cast Iron FG 260 grade
- Impeller: Bronze (corrosion resistant and hydraulically balanced)
- Shaft: Stainless Steel SS 410 grade
- All components shall be precision machined for smooth operation and efficiency

4. Construction Features

- Monobloc design with directly coupled motor and pump
- Dynamically balanced impeller for vibration-free operation
- Heavy duty bearings for long service life

- Mechanical seal arrangement to prevent leakage
- Designed for continuous duty operation

5. Motor Specification

- Type: Squirrel cage induction motor
- Insulation class: Suitable for industrial continuous duty
- Protection: Adequate IP protection (minimum IP-55 recommended)
- Cooling: Self air-cooled type

6. Installation / Erection

- Pump set shall be erected on:
 - Rigid, level concrete foundation or base frame
- Proper alignment between motor and pump shaft shall be ensured
- Anti-vibration pads shall be provided if required
- Proper anchoring with foundation bolts shall be done

7. Piping and Connections

- Suction and delivery connections shall be properly aligned
- Leak-proof joints with suitable fittings shall be ensured
- NRV, valves, and pressure gauges shall be installed if required

8. Electrical Work

- Proper electrical connections shall be provided with:
 - Starter panel (DOL/Star-Delta as applicable)
 - MCCB/MCB protection
 - Overload relay protection
- Proper earthing shall be ensured for safety

9. Testing and Commissioning

- Pump shall be tested for:
 - Discharge capacity
 - Head development
 - Vibration and noise level
 - Power consumption efficiency

- Trial run shall be conducted for satisfactory performance

10. Workmanship

- Installation shall be carried out by skilled technicians
- Alignment shall be precise to avoid vibration and wear
- All connections shall be tight, leak-proof, and properly supported

11. Safety Requirements

- Proper earthing of motor and panel shall be provided
- Safety guards for rotating parts shall be installed
- Electrical safety norms shall be strictly followed

12. Measurement

- Measurement shall be taken in number (Nos.) of pump sets supplied, installed, tested, and commissioned

13. Rate Includes

- Cost of monobloc pump set (5 HP, 24 m head, 285 LPM discharge)
- Casing (CI FG 260), impeller (bronze), shaft (SS 410)
- Transportation, loading, unloading, and handling
- Installation, alignment, and commissioning
- Electrical connections (excluding main external power supply if not specified)
- Testing and trial run
- Labour, tools, and accessories
- All taxes, duties, and incidental charges

14. Mode of Payment

- Payment shall be made on successful installation, testing, and commissioning of pump set certified by Engineer-in-Charge.

Item 93:

Supplying & erecting approved make DOL / Star Delta starter suitable for local & remote pump control application consisting of MPCB, overload relay and contactors as per Type II coordination including digital voltmeter, analogue ammeter with selector switch, run hour meter, required protective relays & control (C) D.O.L. up to 7.5 HP

1. Description of Item

Supplying, installing, erecting, testing, and commissioning of approved make Direct-On-Line (DOL) starter panel, suitable for local and remote control of pump motor application up to 7.5 HP, complete with MPCB, overload relay, contactors (Type-II coordinated), metering instruments, protective relays, control accessories, and run hour meter, as per drawings, specifications, manufacturer's instructions, and direction of the Engineer-in-Charge.

2. Application

- Suitable for controlling 3-phase induction motor (pump set) up to 7.5 HP
- Designed for:
 - Local control at site panel
 - Remote operation from control room / float switch / SCADA (if applicable)

3. Switchgear Components

3.1 Motor Protection Circuit Breaker (MPCB)

- Adjustable thermal and magnetic settings
- Provides short circuit, overload, and phase failure protection
- Suitable breaking capacity as per system fault level

3.2 Contactors

- AC-3 duty rated contactor of approved make
- Suitable for motor rating up to 7.5 HP
- Designed as per Type-II coordination (IEC standard)
- Electrically and mechanically interlocked where required

3.3 Overload Relay

- Thermal overload relay with adjustable current setting
- Protection against motor overload and phase imbalance
- Manual/auto reset facility provided

4. Measuring Instruments

- Digital Voltmeter with phase selection switch
- Analog Ammeter with selector switch for phase-wise current measurement
- Run Hour Meter for recording motor operating hours

5. Control & Protective Accessories

- Start/Stop push buttons for local operation
- Selector switch for Local / Remote mode selection
- Control transformer (if required for control circuit)
- Phase failure relay
- Single phasing preventer relay
- Under-voltage / over-voltage protection relay (if specified)
- Indication lamps for:
 - Power ON
 - Motor ON (Run)
 - Trip/Fault

6. Panel Construction

- Sheet steel enclosure, dust and vermin proof
- Protection class: IP-54 or better
- Powder coated finish with anti-corrosive treatment
- Internal wiring with FRLS copper conductors
- Proper ferruling and cable identification provided

7. Control System

- DOL starter shall provide:
 - Direct starting of motor without reduced voltage starting
- Control logic shall ensure:
 - Safe starting and stopping
 - Protection against overload and faults
- Provision for remote start/stop through external control contacts

8. Electrical Safety

- Proper earthing of panel body and motor
- All live parts shall be properly insulated and enclosed
- Safety interlocks shall be provided to avoid accidental operation

9. Testing and Commissioning

- Panel shall be tested for:

- Insulation resistance
- Functional operation of all control circuits
- MPCB and overload relay tripping
- Metering accuracy
- Trial operation with connected pump motor shall be carried out

10. Workmanship

- All components shall be neatly mounted inside panel
- Wiring shall be properly dressed and terminated
- Panel shall be installed in vertical plumb condition
- Proper labelling of all circuits shall be done

11. Measurement

- Measurement shall be taken in number (Nos.) of complete DOL starter panels supplied, installed, tested, and commissioned.

Item 94:

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 (C) By mechanical means in area of light jungle

Item: Clearing and Grubbing of Road Land (Mechanical Means – Light Jungle)

What work is included

This item covers clearing of vegetation and preparing the ground surface for road construction & Building Ground area in light jungle areas, using mechanical equipment (like dozers, excavators, cutters, etc.).

It includes:

- Uprooting rank vegetation (wild, dense natural growth)
- Removal of:
 - Grass
 - Bushes
 - Shrubs
 - Saplings
 - Small trees up to 300 mm girth (diameter around 30 cm)
- Removal of tree stumps

- Includes stumps of trees that were cut earlier (not only freshly cut trees)
- Clearing the surface completely so it is suitable for earthwork or road formation
- Disposal of unserviceable materials
 - Vegetation, roots, branches, debris, etc. are removed from site
 - Disposal is done as per specification (usually outside right-of-way or at approved dumping locations)

“By mechanical means” means

- Work is done using machines such as:
 - Bulldozers
 - Excavators
 - Chain saws / cutters (as support tools)
- Reduces manual labour and increases speed and efficiency

“Area of light jungle” means

- Land with scattered to moderate vegetation
- Not dense forest, but not fully clear agricultural land either
- Typical roadside undeveloped terrain

Purpose of this activity

- To prepare a clean, obstruction-free base
- Ensures proper:
 - Earth cutting and filling
 - Embankment construction
 - Drainage and alignment marking

Important notes (as per typical specifications)

- Only vegetation within specified limits (up to 300 mm girth) is included in this item
- Larger trees (if any) are usually measured and paid separately under tree cutting items
- Burning is generally not allowed unless specified; disposal must follow environmental/local authority rules

Measurement

- Area shall be measured in Hectar (Hect) of ground actually cleared and grubbed