

Name of work :-

CONST. OF AANGANWADI BUILDING AT SHIVLAKHA - 2 VILLAGE OF BHACHAU TALUKA. UNDER DMF/PMKKY/FY 2025-26.

ITEM WISE SPECIFICATIONS FOR CIVIL WORK

Item No. 1

Excavation for foundation upto 1.50 m. depth including sorting out and stacking of useful materials and disposing of the excavated stuff upto 50 meter lead (A) Hard and dense soil..

1.0. General:

1.1. Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turf loam, clay, peat etc., fall under this category.

2.0 Clearing the site:

2.1 The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and tree shall be removed as directed. The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

3.0 Setting out:

After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume full responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply laborers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 Excavation:

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be leveled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation up-to 1.5 m. depth shall be measured under this item.

5.0. Disposal of the excavated stuff:

5.1. The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers including ramming and watering etc.

5.2. The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up-to 50 M. and all lift.

6.0. Mode of measurement and payment:

6.1. The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

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

Item No. 2

Providing and laying cement concrete 1:4:8 (1- Cement : 4- coarse sand : 8- machine crushed stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth.

Providing and laying ordinary cement concrete 1:5:10/1:4:8 for foundation including cost of formwork if required using cement, sand and machine crushed stone aggregates of 40mm nominal size.

1. In no case of ordinary cement concrete mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in item,

2. The ordinary cement concrete mix shall general be specified by volume for cement which normally cement in bags and is available by weight, volume shall be worked out taking 50 Kg. cement as 0.035 Cu.M. in volume. While measuring aggregate by volume, shaking ramming or hammering shall not be

done. Proportioning of sand shall be as per its dry volume incase it is damp allowance for bulking shall be made as IS : 2386 {Part III}

3. Ingredient required for ordinary cement concrete containing one 5 Kg. bag of cement for different proportions of mix shall be as given the table below.

| Grade of Concrete | Sand in Cu.M. | Aggregates in Cu.M. |
|-------------------|---------------|---------------------|
| 1 | 2 | 3 |
| 1:4:8 | 0.135 | 0.27 |
| 1:5:10 | 0.165 | 0.33 |

4. Cement :- Cement shall be ordinary Portland stab cement as per IS 1975 properties of cement as per IS 455 1976.

5. Sand

5.1 Sand shall be natural sand, clean well graded, hard strong, durable and gritty particularly free from immures amounts of dust, clay, kankar modules, soft or flaky particles shell, alkali slats, organic matter, lean mica or other deleterious substances and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of silt as determined by field test, if necessary the sand.

5.2 Coarse sand :- The fineness modules of coarse sand shall not be less than 2.5 and shall not exceeds

3.0. The sieve analysis of coarse sand be as under.

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

5.3 Fine sand :- The fineness module shall not exceeds 1.0 to sieve analysis of fine sand be as under :-

| I..S. Sieve Designation | % by weight passing |
|-------------------------|---------------------|
| 4.75 mm | 100 |
| 2.36 mm | 100 |
| 1.18 mm | 75 to 100 |
| 600 MC | 40 to 85 |
| 300 MC | 0 to 50 |
| 150 MC | 00 to 10 |

6.0 Stone coarse aggregates for nominal mix concrete :- Coarse aggregates shall be or machine crushed stone of black trap or equivalent and hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

The aggregates shall be generally be cubical in shape unless special stones of particular quarries are mentioned aggregated shall be machine crushed from the best black trap of equivalent hand done as approved. Aggregates shall have no deleterious reaction with cement. The size of the coarse aggregates for plain concrete and ordinary reinforced cement. The concrete shall generally be as per the table given below, if however in case of reinforced cement concrete the minimum limit may be

restricted to unless that the minimum lateral clear distance between bars or 6mm less than the cover whatever is smaller.

| I.S. Sieve Designation | Percentage passing for single sized aggregates of nominal size | | |
|------------------------|--|--------|--------|
| | 40 mm | 20 mm | 16 mm |
| 80 mm | -- | -- | -- |
| 63 mm | 100 | -- | -- |
| 40 mm | 85-100 | 100 | 0 |
| 20 mm | 0-20 | 85-100 | 100 |
| 16 mm | -- | -- | 85-100 |
| 12.5 mm | -- | -- | -- |
| 10 mm | 0.50 | 0.20 | 0.30 |
| 4.75 mm | -- | 0.50 | 0.50 |
| 2.35 mm | -- | -- | |

Note :- This percentage may be varied somewhat by the Engineer in charge when considered necessary containing better density and strength of concrete.

The grading test shall be taken in the beginning and at the change of source of material. The necessary test indicates in IS 383-1970 and IS 456-1976 shall have to be carried out to ensure the acceptability. Aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregate. If the aggregates are covered with dust, they shall be washed with water to make them clean.

7. All materials shall be stored as to prevent their deterioration or destruction 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 works.

8. Cement shall be stored above the ground level in perfectly dry and watertight sheds and shall be stocked not more than eight bags high. Cement more than 3 to 4 months old shall invariably be tested to ascertain that the acceptability requirements. The aggregates shall be stored in such a way as to prevent admixture of foreign materials different sizes of the fine or coarse aggregates shall be stored in separate stock piles sufficiently removed from each other to prevent mixing the materials at the edge of the piles.

9. The water for mixing shall be potable water to satisfaction of the Engineer in charge. The quality of water shall be just sufficient to produce a dense concrete of required workability for the job.

10. **Workmanship :** Before starting concreting the road of foundation trenches shall be cleared of all loose materials leveled, watered and rammed as directed.

11. **Mixing:-** The concrete shall be mixed in a mechanical mixer. If quantity of cement concrete is very small after taking prior permission of Engineer in charge. Mixing shall be done on a smooth water tight platform large enough to allow efficient turning over of the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material shall be mixed with concrete nor does the mixing water flow out. Cement in required numbers of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregates, which shall also be spread in layers of uniform thickness on the mixing platform. Dry coarse and fine aggregates and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour, enough water shall then be gradually added thoroughly by and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

12. For mass concrete work, the concrete shall be mixed in mechanical mixer. The method of transporting and placing concrete shall be approved by the Engineer in charge. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material take place. All formwork and reinforcement contained in it shall be cleared and made free from standing

water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer in charge has been obtained.

13. Unless otherwise agreed to by the Engineer in charge concrete shall not be dropped into place from a height exceeding 2 meter. When trenching or chutes are used they shall be kept clean and used in such a way as to avoid segregation. When concrete has to be resumed on a surface which has hardened, it shall be roughening, swept, clean, thoroughly wetted, and covered with a 13mm thick layer of mortar composed cement and sand in the same ratio as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing on new concrete. Where concrete has not fully hardened all balance shall be removed by scrubbing the wet surface with wire or bristle brushes, care should be taken to avoid dislodgement of any particles of coarse aggregates. The surface shall then be thoroughly wetted, all free water removed, and the coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150mm in thickness and shall be well rammed against old work particular attention being given to corners and close spots.

14. Formwork if required.

Form work shall include all temporary or permanent forms required for forming the concrete. Together with all temporary construction required for their support. Forms for concrete shall be constructed of metal or timber suitably line and be of substantial and rigid construction true to shape and dimensions shown on the drawings. Where metal forms are used, all bolts and rivets shall be countersunk and well ground to provide a smooth and plane surface. Where timber is used it shall be well seasoned. For exposed concrete faces, timbers for shuttering shall be wrought on all faces in contractor with concrete.

15. The Engineer in charge shall be informed in advance by the contractor of his intention to strike any formwork. While fixing the time for removal of formwork due consideration shall be given to local conditions, character or the structure. The weather and other conditions that influence the setting of concrete and of the materials used in the mix. Vertical forms of beams, columns and walls maybe removed after 2 days. All formwork shall be removed without causing any damage to the concrete.

16. The unit rate of concrete shall include the cost of all labour tools and plant required for mixing, placing in position, compacting, finishing as per directions of the Engineer in charge, curing and all other incidentals expenses for producing concrete of specified strength 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 centers and forms required for the work.

The payment should be made on Cmt.basis.

Item No. – 3

Providing and laying ordinary cement concrete M20 (1cement :1.5coarse sand:3 stone agg.20mm nominal size) and curing comp.incl.cost of form work but excl.the cost of reinforcement for reinforced concrete work in foundation,footing base of columns and mass concrete work etc comp.

And

Item No. 4

Providing and laying cement concreteM-20(1 Cement : 1.5 coarse sand :3 graded stone aggregates 20m.m. nominal size) and curring complete excluding cost of form work and reinforcement for reinforced concrete work in : (d) Columns,pillars posts and struts upto floor two level

And

Item No. – 6

Providing and Laying ordinary cement concrete M-20 1:1.5:3 (1-Cement 1.5-Coarse sand 3-Graded stone agg. 20mm nominal size) and finishing but excl. the cost of reinfor RCC work in Beam having C/S area .08 / .12 sq. mt.

And.

Item No. – 10

Providing & Laying cement concrete M -20 (1-Cement 1.5-Coarse sand 3-Stone aggregate 20mm nominal size) and curing comp. for SILL / LINTEL Incl. Cost of form work

And.

Item No. – 11

Providing & Laying cement concrete M -20 (1-Cement 1.5-Coarse and 3-Graded nominal size) for reinforced conc. Chhajjas not excluding 10 cm thickness upto floor two level incl. Finishing the exposed surface with cement mortar 1:3 (1-Cement 3-Fine sand to give a smooth surface centering and form work and curing comp. excl. the cost of reinforcement.

And.

Item No. – 12

Providing and laying ordinary cement concrete M20 (1 cement :1.5 coarse sand:3 stone agg.20mm nominal size) and finishing smooth with curing etc. complete including the cost of form work but excluding the cost of reinforcement for R.C.C. work in Slabs having more than 10 cm & upto 13 cm thickness.G.F.

1. In case of ordinary concrete mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in tables below for different grades of concrete designated as ordinary M100, M150, M200 and M250.
2. IN the designation of a concrete mix, letter "M" refers to the mix and the number the specified 28 days works cube compressive strength of that mix on 150mm cubes expressed in Kg/Cm².
3. The ordinary concrete mix shall generally be specified by volume. For cement which normally comes in bags and issued by weight, volume shall be worked out taking 50 Kg. of cement as 0.035 Cu.M. in volume. While measuring aggregates by volume, shaking, ramming or hammering shall not be done. Proportioning of sand shall be as per its dry volume. In case it is dump, allowance for bulking shall be made as per IS : 2386 {Part : III}
3. Ingredient required for ordinary cement concrete containing one 5 Kg. bag of cement for different proportions of mix shall be as given in the table below.

| Grade of Concrete | Mix by Volume | Total Quantity of dry aggregates by volume per 50 Kg. of cement to be taken as sum of the individual volumes of fine and coarse aggregates mix | Proportion of fine aggregates to coarse aggregates | Quantity of water per 5 Kg. of cement max. |
|-------------------|---------------|--|--|--|
| Ordinary | Liter | One Cubic meter = 1000 liters | | Liter |
| M100 | 1:3:6 | 300 | General 1:2 for fine agg. To coarse agg. By volumes but subject to a upper limit of 1 : 1 ½ & a lower limit of 1:3 | 34 |
| M150 | 1:2:4 | 220 | | 32 |
| M200 | 1:1 ½ : 3 | 160 | | 30 |
| M250 | 1:1:2 | 100 | | 27 |

Note :- The proportion of the aggregates shall be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer & the maximum size of coarse aggregates becomes larger.

Example : For an average grading of fine aggregates (that is zone II or IS 383-1963) the proportions shall be 1 : 1 ½ 1:2 and 1:3 for maximum size of aggregates 10mm, 20mm and 40mm respectively (after carrying out sieve analysis.

Note : 2 A mix leaner than M100 (1:3:6)m may be used for non structural parts, if provided in the contract, in such case grading of aggregates shall be by volume. Other requirement for mixing and placing & curing shall be the same.

5. Following shall be the maximum nominal size of coarse aggregates for the different items of work

| Sr. No. | Item of Construction | Maximum nominal size of coarse aggregates |
|---------|--|--|
| 1. | R.C.C. Well curbs, R.C.C. well staining and R.C.C. piles | 40mm |
| 2. | R.C.C. well staining | 63mm |
| 3. | Well cap or pile cap, solid type piers, abutment and wing walls and other pier caps | 40mm |
| 4. | R.C.C. work in cross girders, deck slab, wearing course, kerb, light post, blast walls, approach slab, etc. and hollow type piers, abutments, wing walls, and their pier cap | 20mm |
| 5. | R.C.C. bearings | 20mm |
| 6. | For any other items of construction not covered by Item 1 to 4. | As specified on the drawing or as desired by the Engineer in charge in |

| Sr. No. | Item of Construction | Maximum nominal size of coarse aggregates |
|---------|----------------------|---|
| | | case it is not specified on drawing. |

For heavily reinforced concrete members as in the case of ribs of main beams nominal maximum size of aggregate shall be usually be restricted to 5mm less than the minimum cover to the reinforcement which is the smaller.

6. Fine aggregates shall be clean hard, coarse sand. It shall be free from dust and such other substance. The sand be got approved by the Engineer in charge.

7. All materials shall be stored as to prevent their deterioration or destruction 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 works.

8. Cement shall be stored above the ground level in perfectly dry and watertight 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 one very 3 to 4 months. The aggregates shall be stored in such a way as to prevent admixture of foreign materials different sizes of the fine or coarse aggregates shall be stored in separate stock piles sufficiently removed from each other to prevent inner mixing of the materials.

9. The water for mixing shall be potable water to satisfaction of the Engineer in charge. The quality of water shall be just sufficient to produce a dense concrete of required workability for the job.

10. For all work concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregates show complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

11. When hand mixing is permitted by the Engineer in charge for small jobs or for certain other reasons. It shall be done on a smooth watertight platform large enough to allow efficient turning over of the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material shall be mixed with concrete nor does the mixing water flow out. Cement in required numbers of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregates, which shall also be spread in layers of uniform thickness on the mixing platform. Dry coarse and fine aggregates and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour, enough water shall then be gradually added thoroughly by and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

12. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in new batch. Unless otherwise agreed to be the Engineer in charge, the first batch of concrete from the mixer shall contain only two thirds of normal quantity of coarse aggregates. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

13. The method of transporting and placing concrete shall be approved by the Engineer in charge. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All formwork and reinforcement contained in it shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer in charge has been obtained.

14. If concreting is not started within 24 hours of the approval being given, it shall have to be obtained again from the Engineer in charge. Concreting being given it shall proceed continuously over the area between construction joints. Fresh concrete shall not be laid against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly designed agitators, operating continuously. When this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise depth of not more than 45 minutes when internal vibrators are used and not exceeding 0.30 meter in all other cases.

15. Unless otherwise agreed to by the Engineer in charge concrete shall not be dropped into place from a height exceeding 2 meters. When trunking or chutes are used they shall be kept clean and used in such a way as to avoid segregation. When concreting has to resume on surface which has hardened it shall be roughened, swept, clean, thoroughly wetted and covered with a 13mm thick layer of mortar composed of cement and sand in the same ratios as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened all laitance shall be removed by scrubbing the wall surface with wire or bristly brush, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150mm in thickness and shall be well rammed against old work particular attention being given to corner and close spots.

16. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless otherwise permitted by the Engineer in charge for exceptional cases such as concrete under water, where vibrators can

not be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

17. Immediately after compaction, concrete shall be protected against harmful effect of weather including rains, running water, shocks, vibration, traffic, rapid temperature changes, frost and driving out process. It shall be covered with wet sacking hessian or other similar absorbent material approved by the Engineer in charge soon after the initial set and shall be kept continuously wet for a period not less than 14 days from the date of placement. Masonry work over the foundation concrete may be started after 48 hours of its laying but the curing of concrete shall be continued for a minimum period of 14 days.

18. Formwork shall include all temporary or permanent forms required for forming the concrete together with all temporary construction required for their support. Formwork shall however be divided into following two distinct categories.

1. Shuttering i.e. formwork required for forming the concrete
2. Scaffolding i.e. formwork required for supporting shuttering.

Forms for shuttering shall be constructed only in metal suitably lined. Forms for scaffolding shall be constructed of metal or timber. Both shuttering and scaffolding shall be of substantial rigid construction and shuttering shall be true to shape and dimension shown on the drawings. All bolts and rivets shall be countersunk and well ground to provide a smooth plane surface.

19. Forms shall be made mortar tight and shall be made sufficiently rigid by the use of ties and bracings to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration, without deflection from the prescribed line occurring during and after the placing of concrete. Screw jack or hard wood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete. Suitable camber shall be provided in horizontal member of structure, specially in long spans so counteract the effect of any fixed camber to provide for such camber. Forms shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other section. Unless otherwise specified or directed, chamfers or fillets of size 25mm x 25mm shall be provided at all angles of formwork to avoid sharp corners.

20. The inside surfaces of shuttering shall except in the case of permanent formwork or where otherwise agreed to by the Engineer in charge be coated with an approved material to prevent adhesion of concrete to the formwork. Release agents shall be applied strictly in accordance with the manufacturer's instructions and shall not be allowed to come into contact with any reinforcement or prestressing tendons and anchorages. Different release agents shall not be used in formwork for concrete which will be visible in the finished work.

21. Special measures shall be taken to ensure that the formwork does not hinder or shrinkage of concrete because without these cracking could occur before the formwork is removed. Where ever applicable arrangements must be made to ensure that the formwork does not restrain the shortening and hogging of the beams or slabs during tensioning of the tendons. The formwork should take due account of the calculated amount of positive or negative camber so as to ensure the correct final shape for the structure having regard to the deformation of a false work, scaffolding or propping and the instantaneous or deferred deformation due to various causes affecting prestressed structures. Where there are re-entrant angles in the concrete sections the formwork should be removed at those sections as soon as possible after the concrete has set in order to avoid cracking due to shrinkage of concrete. Formwork shall be tight enough to prevent any appreciable loss of cement during vibrations, suitable tolerance cleaned. Contractor shall give the Engineer in charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for safety of men, machinery, material and results obtained.

22. The Engineer in charge shall be informed in advance by the contractor of his intentions to strike any formwork. When fixing the time for removal of formwork due consideration shall be given to local condition, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. Where field operations are controlled by the strength tests of concrete the removal of the load supporting or soffit forms may commence when concrete has attained strength equal to at least twice the stress to which the concrete will be subjected at the time of striking props including the effect of any further addition of loads. When field operations are not controlled by strength tests of concrete the vertical forms of beams, columns and wall may be removed after 2 days. The props of slabs and beams may be removed after 14 and 21 days respectively. All formwork shall be removed without causing any damage to the concrete. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stress due to its own weight uniformly and gradually. Where internal metal ties are permitted they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanent embedded metal part shall have less than 25mm cover to the finished concrete surface. Where it is intended to reuse the formwork, it shall be cleaned and made good to the satisfaction of the Engineer in charge.

23. Immediately after the removal of forms all exposed bars or bolts passing through the cement concrete members and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25mm below the surface of the concrete and the resulting holes be filled by cement mortar. All fins caused by form joints all cavities produced by the removal of the form ties and all other holes and depressions, honeycomb spots,

broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and of as dry as consistency as is possible to sue. Considerable pressure shall be applied in filling and pointing to ensure through filling in all voids. Surface which have been pointed shall be kept moist for a periods of twenty four hours. If rock pockets / honeycombs in the opinion of the Engineer in charge are of such an extent or character as to affect the strength of the structure materially or to endanger the lime of the steel reinforcement he may declare the concrete defective and required the removal and replacement of the portion of the structure affected.

24. In the case of reinforcement work workability shall be such that the concrete surrounds and properly grips all reinforcement. The degree of consistency which shall depend upon the nature of work and methods of vibration of concrete shall be determined by regular slumps tests. Following slump shall be adopted for different type of works.

| | Type of work | Slumps | |
|-------|--|-------------------------|-----------------------------|
| | | Where vibrator are used | Where vibrator are not used |
| (i) | Mass concrete in RCC foundations, footing and retaining walls. | 10mm to 25mm | 80 mm |
| (ii) | Beams, slab and columns simply reinforced. | 25mm to 40 mm | 100mm to 120 mm |
| (iii) | Thin RCC section or section with congested | 40mm to 50mm | 125mm to 150mm |

25. Works strength test shall be made in accordance with IS 516. Each test shall be conducted on ten specimens five of which shall be tested at seven days and the remaining five at 28 days. The sample of concrete shall be taken on each day of concreting and cubes shall be made at the rate of one for every 5 Cu.M. of concrete or a part thereof. However if concreting done in a day is less than t15 Cu.M. the minimum number of cubes can be reduced to 6 with the specific permission of the Engineer in charge. Similar works test shall be carried out whenever the quality and grading of materials is charges irrespective of the quantity concrete proud. The number of specimens may be suitably increased as deemed necessary by the Engineer in charge, when procedure of tests given above reveal a poor quality of concrete and in other special cases.

26. The average strength of the group of cubes cast for each day shall not be less than the specified work cub strength 20 percent of the cubes cast for each day may have values less than the specified strength, provided the lowest value is not less than 85 percent of the specific strength.

27. R.C.C. work shall have exposed concrete surfaces. Centering design and its erection shall approved by the Engineer in charge. One carpenter with helper will invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited over reinforcement laid in position. For access to different parts, suitable mobile platforms shall provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose. Concreting of important structural members shall always be done in the presence and under the supervision of departmental person not below the rank of Assistant Engineer / Addi. Asst. Engineer, Overseer or as instructed by the Engineer in charge. After removal work checks that concrete produced is of good quality. Plastering shall not be allowed to the expressed faces of concrete.

28. In reinforced concrete the volume occupied by reinforcement shall not be deducted. The slap shall be measured as running continuously through and the beam as the portion below the slab.

29. All necessary labours, materials, equipment etc for sampling preparing test cubes, curing etc. comp. shall be provided by the contractor. Testing of the materials and concrete may be arranged by the Engineer in charge in an approved laboratory at the cost of contractor

30 The payment shall be made on Cu.M. basis for the finished work.

31. The unit rate for concrete shall include the cost of all materials, labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing as per the directions of the Engineer in charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown on the drawings and according to these specifications. The rate shall also include the cost of making / fixing and removing of all centers and forms required for the work.

Item No. - 5

Uncoursed rubble masonry with hard stone of approved quality in foundation and plinth in cement mortar 1:5 (1-Cement 4-Course sand) including levelling up etc. complete

1.0 Materials: The cement mortar shall conform to M-11. Stones shall conform to M-16.

2.0 Workmanship:

2.1 Dressing of stones: Stone used for uncoursed rubble masonry work shall be hammer dressed on the sides, and beds in such a way as to close up with the adjacent stone in the masonry work as strongly as possible. The face stones shall be dressed in such a manner as to give a specified Pattern such as Blygonal tucing etc. The race of the stones shall be so dressed that bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on the face to be plastered. It shall not project by more than 19 mm. nor shall have depressions more than 10 mm. from the average wall surface.

2.2 Laying: All the stones shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall be built true to plumb (or true to required batter when so specified). All connected walls in a structures shall normally be raised up uniformly and regularly. However if for any specific reason, one part of masonry is required to be left behind, the wall shall be racked back at an angle not steeper than 45°. Vertical Toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 metre in height.

2.3 The stones shall be laid in an uncoursed fashion or randon facint etc. However, the masonry is required to be brought to level at various stages viz. plinth level, window still level, roof level and any other level specifically shown in the drawings. This may be done by first by adjusting the laying or stones to one level and then by providing levelling coarse of cement concrete 1:6:12 (1 cement: 6 sand : 12 graded stone aggregate 20 mm. nominal size) or as otherwise specified.

2.4 Proper bonding shall be achieved by closely filing in adjacent stones as well as by using bond stones ore through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be carefully set so as to break joints and avoid formation of vertical joints. The depth of stone from the face of wall inwards shall not be less than weight or breadth at the face. The hearting or interior filling of the wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 150 mm. internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

2.5 All stones shall be carefully laid, hammered down by a wooden mallet into position and solidly embedded in mortar, chips and spawls of stones may be used wherever necessary to avoid thick mortar beds or joints at the same time ensuring that no hollow space is left anywhere in the masonry. The chips used shall not be more than 20% by volume of masonry. The hearting shall be laid nearly level with face stones except that at about one metre intervals vertical bond stone or plums projecting about 150 to 200 mm. shall be firmly embedded to form vertical bonding in masonry.

2.6 Bond stones: Bond stones or through stones running right across the thickness of the wall shall be provided in walls upto 600 mm. thick. In thicker walls two stones overlaping each other by atleast 150 mm. shall be provided across the thickness of the wall to form bond stones. There shall be atleast one bond stone for every 0.5 Sq.m. of wall surface. The bond stone shall be marked by a distinguishing letter during construction of subsequent verification and shall be laid staggered in subsequent layers.

2.7 Quoins: The quoins or corners stone shall be selected stone nearly dressed with hammer and /or chisel to form the required corner angle and laid header and stretcher alternatively. The bed and top surface of quoins shall be chiselled dressed to give horizontal joints. The quoins shall have a uniform chisel draft of at least 25 mm. width at four edges of each exposed face, all the edges of the same face being in one plane. No quoins stone shall be smaller than 0.025 Cum. in volume.

2.8 Jamb Stones: The jamb stone shall be made with stone specified for quoins, except that the stone provided on the jambs shall have their length equal to thickness of wall upto 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

2.9 Joints: All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. When plastering or pointing is not required to be done, the joints shall be struck flush and finished simultaneously while laying the stone. Otherwise the joints shall be racked to a minimum depth of 20mm. by a racking tools, during progress of laying while the mortar is still green.

2.10 Scaffolding: Single or double scaffolding shall be used. The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled and made good before plastering.

2.11 Curing: Gree work shall be projected from rains by suitably covering the same. Masonry shall be kept constantly moist on all the faces for a period of atleast 7 days. The top of masonry shall be flooded at the close of the day.

3.0 Mode of Measurement & payment: **3.1** All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment made for the following:

- a) Ends of joints, beams, posts, girders, rafters, trusses, corbels, etc. each upto 500 sq.cm. in section.

- b) Opening each upto 0.1 sq.m.
- c) Wall plates and bed plates bearings of chajja and like upto 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).
- d) Drain holes and recesses for cement concrete blocks to embed hole fasts for doors windows.
- e) Building in the masonry iron fixtures pipes upto 300 mm. dia. hold fasts of doors and windows.
- i) Forming chases in masonry upto section of 350 sq.cm.

3.2 The rate shall be for a unit of one cubic metre.

Item no. 7

Filling in plinth with sand under floors including watering ramming, consolidating and dressing etc. comp.

1.0. Workmanship:

1.1. Materials: 1.1. Sand shall conform to M. 6.

1.2.

1.3. The sand to be used for filling shall be free from salts, organic or other foreign matter.

1.4. As soon as the work in foundation has been completed and measured, the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc; and filled with earth in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

1.5. The plinth shall be similarly filled with sand in layers not exceeding 20 Cms. adequately watered and consolidated ramming with iron or wooden rammers. When filling reaches finished level, the surface shall be flooded with water for atleast 24 hours and allowed to dry and then rammed and consolidated.

1.4. The finished level of filling shall be kept to shape intended to be given to floor.

1.5. In case of large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required shall also be as specified.

1.6. The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

2.0. Mode of measurement and payment:

2.1. The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

2.2. The rate shall be for a unit of one cubic metre.

Item No. - 8

White stone Bela masonry block in course in super structure with stone of approved quality in cement mortar 1:5 (1 cement : 5 course sand) including racking the joints etc. complete. COMPLETE

2.0. Materials & Workmanship : Workmanship:

2.1. Dressing of stones : Stone used for uncoursed rubble masonry work shall be hammer dressed on the sides, and beds in such a way as to close up with the adjacent stone in the masonry work as strongly as possible. The face, stones shall be dressed in such amanner as to give a specified Pattern such as Blygonal tucing etc. The tace of the stones shall be so dressed that busing on the exposed face shall not project by more than 40 mm. from the general wall surface and on the face to be plastered. It shall not project by more than 19 mm. nor shall have depressions more than 10 mm. from the average wall surface.

2.2. Laying : All the stone shall be sufficiently wetted before laying to prevent absorption of water from mortar. The wall shall be built true to plumb (or true to required batter when so specified). All connected walls in a structures shall normally be raised up uniformly and regularly. However if for any specific reason, one part of masonry is required to be left behind, the wall shall be racked back at an angle not steeper than 45 . Vertical Toothed joints in masonry shall not be allowed. The work shall be carried out regularly and masonry of any day will not be raised by more than 1 metre in height.

2.3. The stone shall be laid in an uncoursed fashion or randon facing etc. However the masonry is required to be brought to level at various stages viz. plinth level, window still level, roof level and any other level specifically shown in the

drawings. This may be done by first by adjusting the laying of stones to one level and then by providing levelling course of cement

concrete 1: 6 : 12 (1 cement: 6 sand : 12 graded stone aggregate 20 mm. nominal size) or as otherwise specified.

2.4. Proper bonding shall be achieved by closely filling in adjacent stones as well as by using bond stones or through stones as described herein below. Face stones shall extend back sufficiently and bond well with the masonry. The stone shall be

carefully set so as to break joints and avoid formation of vertical joints. The depth of stone from the face of wall inwards shall not be less than weight or breadth at the face. The hearting or interior filling of the wall shall consist of rubble stones which may be of any shape. Neither the face stone nor the hearting stone shall be so small to pass through circular ring of 150 mm. internal diameter in any direction nor shall any of them shall have minimum thickness 100 mm.

2.5. All stone shall be carefully laid, hammered down by a wooden mallet into position and solidly embedded in mortar, chips and spawls of stone may be used wherever necessary to avoid thick mortar beds or joints at the same time ensuring that no hollow space is left anywhere in the masonry. The chips used shall not be more than 20% by volume of masonry. The hearting shall be laid nearly level with face stones except that at about one metre intervals vertical bond stone or plums projecting about 150 to 200 mm. shall be firmly embedded to form vertical bonding in masonry.

2.6. Bond stones : Bond stones or through stones running right across the thickness of the wall shall be provided in walls upto 600 mm. thick. In thicker walls two stones overlapping each other by atleast 150 mm. shall be provided across the thickness of the wall to form bond stones. There shall be atleast one bond stone for every 0.5 Sq. M. of wall surface. The bond stone shall be marked by a distinguishing letter during construction for subsequent verification and shall be laid staggered in subsequent layers.

2.7. Quoins: The quoins or corners stone shall be selected stone nearly dressed with hammer and/or chisel to form the required corner angle and laid header and stretcher alternatively. The bed and top surface of quoins shall be chiselled dressed to give horizontal joints. The quoins shall have a uniform chisel draft of at least 25 mm. width at four edges of each exposed face, all the edges of the same face being in one plane. No quoins stone shall be smaller than 0.025 Cum. in volume.

2.8. Jamb Stones: The jamb stone shall be made with stone specified for quoins, except that the stone provided on the jambs shall have their length equal to thickness of wall upto 600 mm. and a line of headers shall be provided for walls thicker than 600 mm. as specified for bond.

2.9. Joints: All the joints shall be completely filled with mortar and their width shall not exceed 25 mm. When plastering or pointing is not required to be done, the joints shall be struck flush and finished simultaneously while laying the stone. Otherwise the joints shall be raked to a minimum depth of 20 mm. by a racking tools, during progress of laying while the mortar is still green.

2.10. Scaffolding : Single or double scaffolding -ha! be used. The scaffolding shall be strong and sound. The holes left in masonry for supporting scaffolding shall be filled And made good before plastering.

2.11. Curing: Gree work shall be projected from rains by suitably covering the same. Masonry shall be kept constantly moist on all the faces for a period of atleast 7 days. The top of masonry shall be flooded at the close of the day.

Mode of measurements & payment: 3.1. All work shall be measured on the basis of finished dimensions and measured net except where otherwise specified. Only specified dimensions shall be allowed. Anything extra shall be ignored. The masonry work in foundation and plinth shall be measured under this item. No deduction shall be made nor extra payment made for the following :

(a) Ends of joints, beams, posts, girders, rafters, purlins, trusses, corbels, etc. each upto 500 Sq. cm. in section.

(b) Opening each upto 0.1 sq. m.

(c) Wall plates and bed plates bearings of chhaja and like upto 10 cm. depth (bearing of floor and roof slabs shall be deducted from masonry).

(d) Drain holes and recesses for cement concrete blocks to embed hole fasts for doors windows.

(e) Building in the masonry iron fixtures pipes upto 300-mm. dia. hold fasts of doors and windows.

(f) Forming chases in masonry upto section of 350 Sq. Cm.

3.2. The rate shall be for a unit of one cubic metre.

Item No. 9

Precast concrete block masonry (including quoin blocks Jamb blocks, closer etc.) with solid concrete blocks of approved size made of cement concrete 1:3:6 mix (1cement : 3 coarse sand : 6 graded stone aggregate of 20mm. and down gauge) in foundation and 'plinth in cement mortar 1:5 (:1- Cement 5- Coarse sand).

1.0 Materials : (a) Aggregate shall conform to M-12 (b) Sand shall conform to M-6. Cement shall conform to M-3.

1.1. The solid cement concrete block shall be precast with concrete of 1: 3 :6 mix (1 cement; 3 coarse sand; 6 graded stone aggregate).

1.2. A block shall be deemed to be solid if the solid material is not less than 75% of the trial volume of the block calculated from over all dimensions.

1.3. The concrete mix used for blocks shall not be richer than 1 part by volume of cement 3 to 6-parts by volume of combined aggregate. The actual size of the blocks shall be one of the following. Size-A 39 x 23 x 15 cms.

The size other than those specified above may be used with the approval of Engineer-in-charge.

1.5. The blocks may be either machine made or hand made. The concrete mix, the mix of concrete, the manufacture of blocks, curing and drying shall be in accordance with para-6 to 10 under I.S. 2185-1967.

1.6. Faces of blocks shall be flat and rectangular. Surface finish shall be rendered smooth or plastered with cement mortar 1: 3 (1 cement: 3 coarse sand).

1.7. The average compressive strength of eight blocks when determined in the manner described in I.S.: 2185 1967 shall not be less than 50 Kg/Sq. Cm. of gross area. The strength of lowest individual block shall not be less than 75 percent of average compressive strength of eight blocks.

1.8. Concrete blocks shall be stored and stacked properly in such a way as to avoid any contact with moisture at site. They shall be stock piled on planks or other supports free from contact with ground and covered to protect against wetting. Cement under mortar of-proportion 1 : 6 shall conform to M-11.

2.0. Workmanship:

2.1. The blocks need not be wetted before or during laying in the walls. In case climatic conditions so required, the top and the sides of block may only be slightly moistured so as to prevent absorption of water from the mortar and ensure the development of required bond with mortar.

2.2. Operations of laying precast cement concrete block masonry shall be carried out in accordance with instructions detailed in I.S. 6042-1962. The mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and lose its plasticity, thereby resulting in poor bond. For most of the work; the joints, both horizontal and vertical shall be 10 mm. thick except in the case of extended Joint construction. The mortar joints shall be struck off flush with wall surface and when the mortar has started stiffening, it shall be compressed with rounded or U-shaped tool. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened in effect intimate contact between the mortar and the masonry and obtained a weather tight joint.

2.3 Quoins & closers: Special quoins blocks (with a return face equal to half the length of normal face) shall be cast for all building blocks and slabs for external work. Proper half length closers shall be cast and not cut from full size blocks. The returned ends of blocks for door and windows reveals and quoins shall be finished with a fair face in the mould.

2.4. Only double scaffolding shall be used, The scaffolding shall be strong and sound. No holes in the masonry for supporting shall be allowed.

2.5. Curing: The curing of concrete block masonry shall be carried out for 7 days.

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 7.6 (I) shall be followed.

3.2. The work of concrete block masonry in foundation and plinth shall be measured under this item.

3.3. The rate shall be for a unit of one cubic metre

Item – 13

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

The work include P & L. in position / HYSD / Mild Steel / Thermo – Mechanically Treated bar of the following grade.

| Grade Designation | Bar Type Conforming to governing IS specification | Characteristic strength Fy MPa | Elastic Modulus GPa |
|-------------------|---|--------------------------------|---------------------|
| S 500/500D | IS 1786 High yield strength deformed bar | 500 | 200 |
| S 240 | IS 432 Part II | 240 | |

TMT Bar

415 TMT Bar shall conform to min 415 MPa yield strength. Tensile strength of min 500 MPa and elongation percentage min 32. The chemical composition of bars shall be as below:-

| | Max |
|----------------------|------|
| Carbon | 0.25 |
| Sulphur | 0.05 |
| Phosphorus | 0.05 |
| Sulphur & Phosphorus | 0.01 |

1. All steel shall be procured from original producers, no re-rolled steel shall be incorporated in the work. Only new steel bars shall delivered to the site, Every bar shall be inspected before assembling in the work and defective brittle or brunt bar shall be discarded Cracked ends of bars shall be discarded.
2. The work shall consist of furnishing and placing reinforcement of the shape and dimensions shown on the drawings or as directed by the Engineer in charge.
3. Steel shall be clean and free from loose rust and loose mill scale at the tune of fixing in position and subsequent concreting .Steel shall apply treatment of anticorrosive with powder of polymer base material before use.
4. Reinforcing steel conform accurately to the dimensions given in Bar bending schedules shown on relevant drawings. Bars shall be bent cold to the specified shape and dimensions or as directed by the Engineer in charge using a proper bar bender operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on work they shall be not heated to facilitate bending. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably provided. The radius of the bend shall not be less than 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 the diameter of the round bar. In the case of bars which are not round and in the case of deformed bars ten diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.
5. 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 conforming to IS: 280 and by using stay blocks or metal chairs, spacers, metal hangers supporting wires or other approved device at sufficiently close intervals. Bars will not be allowed to sag between supports nor displaced during concreting or any other operation of the work. All devices used for positioning shall be of non corrodible material wooden and metal supports will not extent to the surface of concrete except where shown on the drawings, placing bars on layers of freshly laid concrete laid concrete as the work progresses for adjusting bar spacing will not be allowed pieces of broken stone or brick and wooden blocks shall not be used layers of bars shall be separated by spacer bars precast mortar blocks or other approved devices. Reinforcement after being 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 protect reinforcement from corrosion concrete cover shall be provided as indicated on the drawings. All bars pronuding from concrete and to which other bars are to be spliced and which are likely to be exposed for an indefinite period shall be protected by a thick coat of neat cement grout.
6. Bars crossing each other where required, shall be secured by binding wire (annealed) of size not less than 1 mm and conforming to IS:280, in such a manner that they do not slip over each other at the time of fixing and concreting.
7. As far as 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 of 25 mm or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them where not feasible overlapping bars shall be bound with annealed steel wire, not less than 1 mm thickness twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither sphere not bending moment is a normal.
8. Whenever indicated on the drawings of desired by the Engineer-in-charge bar shall be jointed by couplings which shall have a cross-section sufficient to transits the full stresses of bars. The ends of the bars that are jointed by coplings shall be upset for a 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 standard white worth threads steel for coupling shall conform to IS :226
9. When permitted or specified on the drawings joints of reinforcement bars shall be butt welded so as to transmit their full stresses welded joints shall preferably be located at points where steel 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 metal and conforms to any or all other special provisions for the work will be accepted suitable means

shall be provided for holding the bars securely in position during welding. It must be ensured that no voids are left in welding and when welding is done in 2 or 3 stages, previous scale, rust, grease, paint and other foreign matter before welding shall conform to IS 814 welded pieces of reinforcement shall be tested specimen shall be taken from the actual site and their number and frequency of tests shall be as directed by the Engineer – in – charge.

10. Reinforcement shall be measured in length excluding overlaps, separately for different diameters as actually used in the work, where welding or coupling is restored in place of lap-joints such joints shall be measured for payment as the equivalent length of over-lap as per design requirement, From the length so measured the weight of reinforcement shall be calculated in tones on the same basis of IS : 1732. Length shall include hooks at ends wastage and annealed steel wire for binding shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement.

11. Rates for reinforcement shall include cost of all steels carrying to work site and cutting, bending , placing, binding and fixing in position as shown on the drawings and as directed by the Engineer – in – Charge. It shall also include cost of all devices for keeping reinforcement in approved position cost of joint age as per approved methods and all wastage and spacer bars.

12. Payment shall be made one Kg. basis.

Item No. – 14

20mm. thick sand faced cement plaster on walls upto height 10meters above ground level consisting of 12mm. thick backing coat of c.m. 1:3 (1cement : 3 sand) and 8mm. thick finishing coat of c.m. 1:1 (1cement : 1 sand) etc. complete.

1.0. Materials:

1.1. Water shall conform to M-12. Cement mortar shall conform to M-1 1.

2.0. Workmanship:

2.1. The work shall be carried out in the coats. The backing coat (base coat) shall be 12 mm. thick in C. M. 1 : 3. The relevant specifications of item No. 48 shall be followed except that the thickness of back coat shall be 12 mm. average & without floating coat. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface. The subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days depending upon the weather conditions. The surface shall not be allowed to dry during this period.

2.2. The second coat shall be completed to 8 mm. thickness in C. M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.

2.3. Curing: The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this 'period, it shall be protected from all damages.

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 35 shall be followed except that the sand face plaster on outside up to in. above ground level shall be measured under this item.

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

Item No. – 15

Providing 15mm. thick cement plaster in single coat on fair side Brick/concrete walls for interior plastering upto floor two level and finished even and smooth in :C.M.1:3 (1cement:3sand) with 1x1 cm grooves G.F.

1.0. Materials:

1.1. Water M-1. The cement mortar of proportion 1 :3 shall conform to M-13.

2.0. Workmanship:

2.1. **Scaffolding:** Wooden bailies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

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

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

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

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

2.3. Applications of plaster:

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

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

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

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

~~1.0. Materials & Workmanship for floating coat :~~

~~**1.1.** The relevant specifications of plastering shall be followed for materials and workmanship except that this work is only of providing smooth cement finish with floating coat of neat cement slurry.~~

~~**1.2.** The coat of cement and fine sand mortar of proportion 1:1 (1.5 mm. thick about) shall be applied to the plastered surface with a trowel to provide uniform texture while the base coat is still plastic.~~

~~**1.3.** In any continuous face of wall the finishing treatment should be carried out continuously and day to day break made to coincide with architectural breaks in order to avoid unsightly junctions.~~

~~**1.4. Curing:** All the plaster work shall be kept damp continuously for a period of 7 days.~~

3.0. Mode of measurements & payment (Plastering & floating coat) :

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

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

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

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

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

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

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

(b) Deduction for openings exceeding 0.5 sq. m. but not exceeding 3 sq. m. each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.

(i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

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

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

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

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

Item No. 16

Providing 10mm. thick cement plaster in single coat on fair side Brick/concrete walls for interior plastering upto floor two level and finished even and smooth in :C.M.1:3 (1cement:3sand) finishing plaster in single coat on ceiling and soffits of stairs upto floor two level and finished even and smooth G.F.

1.0 Materials & Workmanship:

1.1. The relevant specifications of item No. 15 shall be followed except that this work is for ceiling soffits of stairs up to two floor level instead of plaster on walls and thickness shall be 10 mm

1.2. The smooth concrete surface shall be suitably roughened to provide necessary bond before plastering

Item No. 17

Providing and laying Kota stone slab flooring over 20mm. (average thick base of cement mortar) 1:6 (1 cement : 6 coarse sand) or L.M. 1:1.5 laid over and jointed with grey cement slurry including rubbing and polishing complete. 25 mm thick.

1.0. Materials:

1.1. Water shall conform M-I. Lime mortar shall conform to M-10. Cement mortar shall conform to M-I 1 polished kotah stone shall conform to M-49.

2.0. Workmanship:

2.1. Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges.

The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be- true square and free from drippings and giving a plane surface. The thickness shall be 25 mm. (Average) as specified in the item but not less than 20 mm. at any place of the slab.

2.2. Bedding for the kotah stone slabs shall be cement mortar 1 : 6 (1 cement; 6 coarse sand) or L.M. 1 : 1.5. of average thickness 20 mm. as given in the description of the item. Sub grade shall be cleaned, wetted and mopped. Mortar of the specified mix and thickness shall be then be spread on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar at hollows or depressions. The mortar shall then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied- The slab shall then be gently placed in position and tapped with wooden mallet till it is properly padded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slabs fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall floor shall be finished neatly. The finished surface shall be level to levels and slopes as directed.

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

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

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

3.0. Mode of measurements & payment:

3.1. The rate shall include the cost of all materials and labor involved in all the operations described above. The kotah stone flooring shall be measured in square meters correct to two places of decimal, length and breadth shall be measured correct to a centimeter and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for any opening in floor of areas up to 0.1 sq. m.

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

Item No. 18

Distempering (two coats) with oil bound distemper of approved brand & manufacture & of required shade on wall surfaces to give an even shade, over & including a priming coat with a distemper primer of approved brand & manufacture after thoroughly brushing the surface free from mortar dropping & other foreign matter & also including preparing the surface even & sand papered smooth.

Materials : 1.1. Oil bound washable distemper and primer shall be of approved brand and manufacture.

The distemper shall be required colour and shade and the same shall conform to I.S. 428-1969.

2.0. Workmanship: 2.1. Scaffolding: Where scaffolding is required, it shall be erected in such a way that as far as possible no part of scaffolding shall rest against the surface to be distempered. A properly secured strong and well tied suspended platform (Joola) may be used for distempering. Where ladders are used, pieces of old gunny bags shall be tied at top and cotton to prevent scratches to the walls and floors. For distempering to ceiling, proper stage scaffolding shall be erected where necessary.

2.2. Preparation of surface :

The undecorated surface to be distempered shall be thoroughly brushed off from dust, dirt, grease, mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for atleast 2 months before applications of distemper.

2.2.1. All unnecessary nails shall be removed. Pitting in plaster shall be made good with plaster of paris mixed with dry distemper of colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of distemper shall be applied over the patches. The surface shall be allowed to dry thoroughly before the regular coat of distemper is allowed. The surface affected by moulds, moss, fungi algae lichens, efflorescence etc. shall be treated in accordance with I.S. 2395 (Part-I) 1966. Before applying distempering, any unevenness shall be made good by applying putty made of plaster of paris mixed with water on entire surface including filling up the undulation and then sand papering the same after it is dry.

2.3. Priming coat:

2.3.1. A priming coat or distemper prime of approved manufacture and shade shall be applied over the papered surface in case of new work on undecorated surface. If the distemper priming is done after the wall surface dries completely, the distemper primer shall be applied.

2.3.2. Application of Primer shall be done as under:

The primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks. It shall be allowed to dry for atleast 48 hours before oil bound distemper or Paint is applied.

2.3.3. Oil bound distemper is not recommended to be applied within six months of the completion of wall plaster.

2.4. Preparation of oil bound distemper : 2.4.1. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacture only. Sufficient quantity of distemper required for a day's work shall be prepared.

2.5. Application of Distemper coat:

2.5.1. For undecorated surfaces, after the primer coat is dried for atleast 48 hours, the surface shall be lightly sand papered to make it smooth for receiving the distemper, taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. Minimum two coats of distemper shall be applied with brushes in horizontal strokes followed immediately by vertical strokes which together shall constitute one coat. The subsequent coats shall be applied after a time interval of atleast

24 hours between consecutive coats to permit proper drying of the proceeding coat. The finished surface shall be even and uniform without patches, brush marks, distemper drops etc.

2.5.2. Sufficient quantity of distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room which cannot be completed on the same day.

2.5.3. 15 cm. double bristled distemper brush shall be used. After day's work brushes shall be thoroughly washed in hot water soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

2.6. Protective measurements : The surfaces of doors, windows, floors, articles of furniture etc. and such other parts of the buildings as are not to be distempered shall be protected from being splashed upon. Such surfaces shall be cleaned of distemper splashes if any.

3.0. Mode of measurements & payment:

3.1. Priming coat of distemper primer, scraping of surface spoiled by stunk soots removal of oil and grease spots, treatment for infection of effloresces mould moss, fungi, algae and lichen and patch repairs to plaster shall be included in this item for which nothing extra shall be paid.

3.2. All the work shall be measured net in the decimal system as in place subject to the following limits unless otherwise stated hereinafter:

(a) Dimensions shall be measured to the nearest 0.01 m.

(b) Area in individual items shall be worked out to the nearest 0.01 sq. m. All work shall be measured in sq. metre. No deductions shall be made for ends of joints, beams, posts etc., and openings, not exceeding 0.5 sq. m. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around ends of joints, beams, posts etc.

(c) 3.3 . Deductions of opening exceeding 0.5 sq. m. but not exceeding 3 m. in each shall be made as follows and net addition shall be made for reveals, jambs, soffits etc. of these openings:

(a) When both the faces of walls are provided with same finish deductions shall be made on one face only.

(b) When each face of wall is provided with different finish, deduction shall be made for that side of frame for doors, windows etc. on which width of reveal is less than that of the other side but no deduction shall be made on the other side. Where the width of reveals on the both the faces of wall are equal, deduction of 50% of area of opening of each face shall be made from area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of the reveal on treated side is less than that on untreated sides but if the width of the reveal is equal or more than that on untreated side neither deductions nor addition to be made for reveals, jambs, soffits, sills etc.

3.4. In case opening of area exceeding 3 sq. m. each, deduction shall be made for openings but jambs, sills and soffits shall be measured.

3.5. No deductions shall be made for attachments such as casings, conduits, pipes, electric wiring and the like.

3.6. Item includes removing nails, making good holes, cracks, patches with material similar in composition of distemper.

3.7. The rate includes cost of all materials, labours, scaffolding, protective measures etc. involved in all the operations described above. This shall also include conveyance, delivery, handling, unloading, storing work etc.

3.8. The rate shall be for a unit of one sq. metre.

Item No. 19

Finishing wall with water proofing cement paint of on wall surface (two coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials.

1.0. Materials:

1.1. The water shall conform to M-I. Cement water proofing shall conform to I.S. 5410-1969.

2.0. Workmanship:

2.1. Scaffolding: The relevant specifications of item No. 18 shall be followed.

2.2. Preparation of surface: The relevant specifications of item No. 18 shall be followed except that the word white wash color wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

2.3. Preparation of paint: Portland cement shall be prepared by adding paint powder to water and stirring to obtain a thick paste, which shall then be diluted to a brushable consistency. Generally, equal volumes of paint powder and water make a satisfactory paint. In all cases, the manufacture's instructions shall be followed. The paint shall be mixed in such

quantities as can be used up within an hour of mixing as otherwise the mixture will set and thicken, affecting flowing and finish. The cans of cement paint drums shall be kept tightly when not in use.

2.4. Application of Paint:

2.4.1. No painting shall be done when the paint is likely to be exposed to a temperature of below 7°C within 48 hours after application.

2.4.2. When weather conditions are such as to cause damage the work shall be carried out "in the shadow" as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. For undercoated surfaces, the surfaces shall be treated with minimum two coats of water proof cement paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the preceding coat shall be allowed between two coats. Next coat shall not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather, the preceding coat shall be slightly moistened before applying the subsequent coat.

2.4.5. The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops etc.

2.4.6 The cement paint shall be applied with a brush with relatively short stiff hog or fiber bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.

2.4.7. Water proof cement paint shall not be applied on surfaces already treated with white wash color wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

2.5. Curing: Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application.

2.6. Protection measures shall be taken as per item No. 18

3.0. Mode of measurements & payment:

3.1. The relevant specifications of item No. 18 shall be followed.

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

Item No. – 20

Pro. And Fixt. In position M. S. angle 40 x 40 x 6 mm angle frame for door and 35 x 35 x 5 mm angle frame for shutter with 16 gauge M. S. sheet welded to shutters frame as per approved drawings and design including a coat of priming coat of red oxide and three coat of oil paint including all necessary fittings, Fixtures, Locking arrangement etc. complet.

1.0. Materials:

The structured steel work shall conform to M-22. Red lead paint primer shall conform to I.S.: 102-1962.

2.0. Workmanship:

2.1. The steel sections as specified or required shall be cut, square and to correct lengths, as per drawings and design. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up the required length of member, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted.

2.2. Steel riveted or bolted in built up sections, frame work.

2.2.1. The steel structure as shown in the drawings or as per direction of the Engineer-in-charge shall be laid out on a level platform to full scale and to full size or in parts. A steel tape shall be used for measurements to ensure maximum accuracy.

2.2.2. Wooden templates 12 mm. to 19 mm. thick or metal sheet template shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members, and holes of the steel members shall also be marked for cutting. The base of steel columns and the position of Anchor bolts shall be carefully set out.

2.2.3. All stiffeners shall be formed by pressure and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including location type size, length and details of rivets, bolts, or weld shall be prepared in advance of the actual fabrication and as approved. The drawings shall indicate the shop and field rivets and bolts. The steel members shall be distinctly marked or stenciled with paint with the identification mark as given in the shop drawings.

The bars shall be thickened at the ends, so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in fabrication of various member, so that these can be assembled without being unduly packed, strained or forced into position and when built up, shall be true and free from twists, knicks, buckles, or

open joints. Before making holes individual members for fabrication, the steel work intended to be riveted or bolted together shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping of the different members. All stiffeners shall bear tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or dressed true and straight and fitted close together.

Web splice plates and fillers under stiffeners shall be cut to fit within 3 mm. or flange Angles, web plates of Girders shall have not cover plates, shall have their ends flush with the top of angles forming the flanges unless otherwise required. The web plates when spiced shall have clearance of more than 6 mm.

The erection, clearance for cleared ends of members connecting steel to steel shall preferably be not greater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for a practical reason greater clearance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it. In columns caps and bases, the ends of shafts together with the attached gussets Angles, channels etc., after riveting together shall be accurately mechanized so that the parts connected butt against each other over the entire surfaces of contact connecting angles or channels shall be fabricated and placed in position with greater accuracy so that they are not unduly reduced in thickness by machining.

The ends of bearing stiffeners shall be mechanized or ground to fit tightly both at the top and bottom. All holes shall generally be drilled to the required size and at required position. Sub punching shall be permitted, provided it is done 3 mm. or less in diameter and reamer thereafter to the required size. The holes for rivets and bolts shall be larger by 0.4 to 6 mm. than the nominal diameter of rivets or black bolts depending upon the diameter of rivets.

Holes shall have their axis perpendicular to the surface bored through. The drilling or reamering shall be free from butts, and the holes should be clean and accurate. Holes for counter sunk bolts shall be made in such a manner that their heads fit flush with the surface after fixing.

The fabrication work shall be completed in workshop as far as it is practicable to do so. Site joints shall be done with rivets and fitted bolts or black bolts, as shown in the drawings or as directed. Generally the following principles shall govern the use of rivets turned and fitted bolts, and black bolts.

(i) Rivets and turned and fitted bolts shall be used where the connection is such that slip under load has to be avoided.

(ii) Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal of stresses.

2.2.4. Riveting: The parts assembled for riveting shall be in close contact with each other and the bearing stiffeners shall bear lightly both at top and bottom without being drawn or caulked. Members to be riveted shall be properly pinned or bolted and rigidly held together while riveting. Drilling of holes shall not be permitted except to draw the parts together and the drifting tools so used shall have maximum diameter not exceeding the nominal diameter of rivets or bolts. Drifting done during assembling shall not distort the metal or enlarge the holes.

The shanks of rivets shall project beyond the plate-surface sufficiently so as to fill the hole thoroughly and from the required head after riveting.

The riveting shall be done by hydraulic or pneumatic process. However, where such facilities are not available, hand riveting may be permitted. The rivet shall be heated red hot, care being taken to control the temperature of heating so as not to burn the steel. Rivets of diameter less than 10 mm. may be filled cold. Rivets shall be of heat finish with heads full and of equal size. All loose, burnt or badly formed rivets with concentric or deficient heads shall be cut out and replaced. The heads of rivets shall be central to shanks and shall grip the assembled members firmly. In culling out rivets, care shall be taken so as not to injure the assembled members, caulking or recopying shall not be permitted.

For testing rivets, hammer weighing approximately 0.25 kg. shall be used. Both heads of the rivets shall be tapped, slack rivets will give a hollow sound and a jar.

All rivet heads shall be painted with red lead paint within a week of their fixing.

2.2.5. Bolting all bolt heads and nuts shall be hexagonal and of equal size unless specified otherwise. The screwed heads shall conform to I.S.: 1363-1960 and the threaded surface shall not be tapered. The bolts shall be of such length so as to project two clear threads beyond the nuts when fixed in position and these shall fit in the holes without any shakes. The nut shall be fit in the threaded ends of bolts properly. Where turned and fitted bolts are required to be used in place of rivets they shall be provided with washers not less than 6 mm. thick so that the nut when tightened shall not bear on the unthreaded body of the bolt. Tapered washers shall be provided for all heads and nuts bearing on leveled surfaces. The threaded portion of the bolts shall not be within the thickness of the parts bolted together. The faces of the bolt heads and nuts abutting against steel members shall be machine finished. Where there is a risk of the nut being removed or becoming loose due to vibrations or reversal of stresses, these shall be secured from slackening by the use of locknuts, spring washers, cross-cutting or hammering down of threads as directed. Bolts, nuts and washers shall be thoroughly cleaned and dipped in double boiled linseed oil before use. The whole steel work shall be painted with a coat of priming coat of red lead, as per relevant specifications of painting.

2.0 Workmanship:

2.1 The item covers the requirement of preparation of door frame and shutters for doors, windows, clerestory windows, their supply and fixing as per describe in the item

2.2. Fixtures & Fastenings:

2.2.1. The rate shall include anodized aluminum butt hinges including fixing with iron

3.0. Mode of measurements & payment:

3.1. The rate for shutter includes cost of providing block and clear for keeping the shutter in open position as directed.

3.2. The dimensions shall be measured clear size of the frame.

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

Item No. – 21

Pro. And Fixi. In position M. S. angle 35 x 35 x 6 mm angle frame for window and ventilator with safty grill of 10 mm square bar @ 10 cm. C/C and 25 x 25 x 5 mm angle frame for shutter with 16 guage M. S. sheet welded to shutters frame as per approved drawigs and design including a coat of priming coat of red oxide and three coat of oil paint including all necessary fittings, Fixtures, Locking arrangement etc. complet.

The relevant specification of it. No. 28 shall be followed.

Safty grill :-

Materials:M.S. bars flats shall conform to M-18 and M- 22 respectively.

1.0. Workmanship:

1.1. The M.S. bars shall be fabricated as shown in the drawing or as directed. It shall conform to I.S. 226-1975 and I.S. 961 and I.S. 1977-1975. The M.S. bars of shall be fixed at the required spacing in mild steel flats, after drilling holes in the latter. The diameter and spacing of these bars shall be as mentioned in the drawing or as directed. The bars shall be passed through drill holes drilled into the mild steel flats, fixed in the recess in the frames. The flats shall be fixed with iron screws.

Item no. - 22

Providing and fixing cast iron (spun) Nahni trap of the following nominal diametre of self cleaning design with C.I. Screwed down or highed grating including cost of cutting and making good the walls and floors 100mm. inlet and 50mm. outlet.

1.0. Materials:

1.1. The cast iron (spun) Nahni trap shall be conform to M-69. The C. I. hinged of screwed down cover shall be of best quality.

2.0. Workmanship:

2.1. The Nahni trap with 100 mm. dia. inlet and 50 mm. rib outlet shall be fixed as per drawing or as directed.

2.2. The Nahni trap shall be jointed with C. I. Pipe, 75 mm. dia. with lead joints. The lend joints shall be done in conformation with I.S. 782-1976.

3.0. Mode of measurements & payment:

3.1. The rate includes cost of all labor, materials, tools and plants etc. required for satisfactory completion of this item including lead jointing and testing.

3.2. The rate shall be for a unit of one number.

Item no. - 23

Providing and laying (Two level or slopes) and jointing with stiff mixture of cement mortar in proportion 1:1 salt glazed stone ware pipes following nominal internal diametres including testing of pipes and joints etc. complete. 100 mm dia

1 .0 Materials:

(1) Water shall conform to M-I.

(2) Cement mortar of proportion 1 : 1 shall conform to M-1 I.

(3) 100 mm. dia. Or 150mm. dia. glazed stoneware pipe shall conform to M-71.

2.0. Workmanship:

2.1. The trenches for stoneware pipe drains shall be carried out as per relevant specifications of item No. 59 except that the work is for stoneware pipes of 100 mm. dia.

2.2. Laying:

2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made or left on the bed to receive the sockets of the pipes.

2.3. Jointing:

2.3.1. Tarred gaskin or yarn socked in neat cement slurry first be placed around the spigot of each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in

the correct position and gaskin caulked home so as to fill not more than 1/4th of the total dept or (13 mm. in depth) of the socket.

2.3.2. The remainder of the socket shall be filled with stiff mixture of cement mortar in proportion of one part of cement and one part of sharp sand. When the socket is filled, a fillet shall be formed round the joints trowel, forming an angle of 45° with the barrel of the pipe.

2.3.3. The mortar shall be mixed as necessary for immediate use.

2.3.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper of 'badger'. The newly made joint shall be protected, until set, from the sun, dry winds, rain or frost, sacking or other suitable materials which shall be used for the purpose.

2.3.5. The mortar shall be cured to 10 days.

2.4. Testing of Joints: The pipe line shall be tested as directed.

2.4.1. If any leakage is visible, the defective part of the work shall be made good at no extra cost.

2.4.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

3.0. Mode of measurements & payment:

3.1. Pounding or bottaning of the trenches bed to fit the lower part of the pipe and 'Grips' left to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete.

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

Item No. 24

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 and mixing Dr.Fixit chemical or equivalent in mortar including rounding off junctions and extending them upto 15 cm along the wall,clearing with water and oxalic acid etc. as directed..

1- Bedding: sub grade shall be C.C. flooring 1:2:4 of 50 mm thick

The relevant ossification for the item no shall be followed for this except that the water proofing materials of approved brand and make with ISI mark approved by engineer in charge shall be used in with cement as per instruction of manufacturer of water proofing materials or as per instruction of engineer in charge

2- Fixing tiles in pieces

The relevant specification for the item no shall be followed for this except that the water flooding materials of approved brand and make with ISI mark approved by engineer in charge shall be used with cement as per instruction of manufacturer of water proofing materials or as per instruction of engineer in charge and white glazed tiles shall be used in pieces of required size or as per instruction of engineer in charge

3- The mode of measurement and payment

3.1 The rate shall include the cost of all materials and labors involved in all operations described above. No deduction shall be made or extra paid for any opening up to 0.1 sq. meters. Ir. Area in floor, nothing extra shall be paid for laying the floor at different levels in the same room or courtyard

3.2 The rate shall be for unit of 1 sq. meter.

Item No. 25

Providing and laying white glazed tiles 6mm thick in skirting risers of steps and dedo on 10mm thick cement plaster 1:3 (1-cement : 3-coarse sand) and jointed with white cement slurry.

1.0. Materials:

Water shall conform to M-I. Cement mortar shall conform to M-I I. While glazed tiles shall conform to M-55.

2.0. Workmanship:

2.1. Bedding:

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

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1 : 3. The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

2.2. Fixing tiles:

2.2.1. The tiles before laying shall be soaked in water for at least two hours. Neat grey cement grout at 3.3. Kg/Cement/Sq. m. of honey like consistency shall be spread over the mortar bedding as directed. The edges of the tiles he-smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehni trap coming in the flooring shall be so positioned that its grating shall replace only one tile as far as possible. Where full size tiles cannot be fixed, they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush or trowel to a depth of 5 mm and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

2.3. Cleaning:

2.3.1. The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged many way till the completion of the construction.

3.0. Mode of measurements & payment:

3.1. The work done shall be measured in sq. ml. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dados or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area up to 0.1 sq. ml. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

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

Item No. 26

Providing and fixing to wall ceiling and floor galvanised mild steel tubes (Medium grade) of the following nominal bore,tube,fittings and clamps including making good the wall,ceiling and floor. (A) 15mm.

And

Item No. 27

Providing and fixing to wall ceiling and floor galvanised mild steel tubes (Medium grade) of the following nominal bore,tube,fittings and clamps including making good the wall,ceiling and floor. (B) 20mm.

Materials: Galvanised mild steel tubes of specified dia. nominal bore shall conform to I. S. 1239-1968. The galvanised fittings, clamps, etc. required for specified dia. bore pipes shall be of best quality and make as approved by the Engineer-in-charge.

2.0. Workmanship : 2.1. Cutting, Laying and Jointing:

2.1.1. When the tubes are to be cut or rethreaded the end shall be carefully filed out so that no obstruction to bore is offered. The ends of the tubes shall then be threaded conforming to the requirements of I. S. 554-1955 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together.

2.1.2. The taps and dies shall be used only for straightening screw threads which have become bent or damaged and dies shall not be used for turning of the threads so as to make them slacks as the latter procedure may not result in a watertight joints. The screw threads for tube and fittings shall be protected from edge until they are fitted.

2.1.3. In jointing the tubes, the inside of the socket and the screwed end of the tubes shall be oiled and smeared with white or red lead and wrapped around with a few turns of fine spun yarn round the screwed end of the tube. The end shall then be tightly screwed in the socket, tees, etc. with a pipe wrench. Care shall be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust, and dirt during fixing. Burr joints shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of water, soil, or any other foreign matter.

2.1.4. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anti corrosive paint to prevent corrosion.

2.2. Fixing of the tube fitting to wall ceiling and Floors :

2.2.1. In case of fixing of tubes and fittings to the walls or ceiling, these shall run on the surface of the wall or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern, holder clamps keeping the pipes about 15 mm. clear of the wall. When it is found necessary to conceal the pipes and when specified so, chasing may be adopted or pipe fixed in duets or recesses etc. provided that there is sufficient space to work on the pipe with usual tools. The pipe shall not ordinarily be buried in walls or solid floors, where unavoidable, pipes may be buried for short distances provided that adequate protection is given against damage and where so required joints are not buried. Where required M.S. tube sleeve shall be fixed at a place a pipe is passing through a wall or floor for expansion and contraction and other movements. In case the pipe is embedded in walls or floors, it should be painted with anti-corrosive bitumastic paint of approved quality. The pipe

should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors, the pipe shall be laid in layer of sand filling.

2.2.2. All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable. The pipes shall be fixed to walls with standard pattern clamps of required size and shape, one end of which shall be properly plugged or cemented into walls with cement mortar 1 : 3 (1 cement: 3 coarse sand) and the other tightened round the pipes to hold it securely. These clamps shall be spaced at regular intervals in straight length at 2 M C/C interval in horizontal run and 2.5 M. interval in vertical run. For pipe of 15 mm dia. upto 25 mm. dia. the holes in the walls and floors shall be made by drilling with chisel or jumper and not by dismantling the brick work or concrete. However for bigger diameter pipes, the holes shall be carefully made of the smallest required size. After fixing the pipe the holes shall be made good with cement mortar 1:3(1 cement: 3 coarse sand) and properly finished to match the adjacent surface.

2.3. Testing of joints :

2.3.1. After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone, and all leaking pipes removed and replaced without extra cost.

2.3.2. The pipes and fillings as they are laid shall be tested to hydraulic pressure of 6 Kg./sq. cm. The pipe shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock and water hammer. The draw off takes and stopcock shall then be closed and specified hydraulic pressure shall be applied gradually. The pressure gauge must be accurate. The pipes and fillings shall be tested in sections as the work of laying proceeds keeping the joints exposed for inspection during the testing.

3.0. Mode of measurements & payment:

3.1. The description of each item shall unless otherwise stated, be held to include where necessary, conveyance, and delivery, handling, unloading, storing fabrication, hoisting, all labour for finishing to required shape and size; testing, fitting in position, straight, culling and waste, return of packing etc.

3.2. The length shall be measured on running metre basis of finished work. The length shall be taken along the centre line of the pipe and fittings. The pipes fixed to walls, ceiling, floors etc. shall be measured and paid under this item.

3.3. All the work shall be measured in decimal system as fixed in its place, subject to tolerance given below unless otherwise stated:

(i) Dimension shall be measured to the nearest 0.01 metre, (ii) Area shall be worked out to the nearest 0.01 sq. metre.

3.4. All measurements of culling shall unless otherwise stated be held to include the consequent waste.

3.5. In case of filling of unequal bore, the largest bore shall be measured for the test.

3.6. Testing of pipe lines filling sand joints include for providing all plant and appliances necessary for obtaining access to the work to be tested and carrying out the tests.

3.7. The rate includes galvanised steel tubing with screwed socket joints, together with all fittings (such as bends, sockets, springs, elbows, tees, crosses, short pieces, clamps and plugs unions etc.) and fixing complete with clamping wall-hooks, wooden plugs etc. and also cutting, screwing and waste and for making forged (or hand mad) bends on piping as required.

Connector shall be inserted, where required or directed. The rate also includes cutting through walls, floors etc. and their making good and painting exposed threads with anti-corrosive paint as above and testing. Where lugs are to be fixed to wall, ceiling and flooring, the rate shall not include painting of pipes, providing sleeves and sand Oiling under floor for which separate payment shall be made.

3.8. The rate shall be for a unit of one Running metre.

Item No. 28

Providing and fixing C.I. Spigot and ventilating pipes of 75 mm. Dia.

1.0. Materials:

1.1. The specified dia. C.I. Spigot and socket soil or waste pipe shall conform M-68.

2.0. Workmanship:

2.1. The pipes shall be fixed in the masonry work as it proceeds. The pipe shall be kept vertical or to the line as directed. The pipe shall have minimum surroundings of 12 mm. thick cement mortar at every portion of external surface. The length shall be caulked with spun yarn and cement mortar as soon as the next length of pipe is placed in position. The

socket end the pipe shall be kept closed till the next length of pipe is fitted and jointed to prevent any brick-bats or concrete or pieces of wood falling in and chocking the pipes. The joints shall be fixed with cement mortar 1 : 2 (1 cement: 2 sand) and spun yarn. The pipes without ears shall be fixed tow all with M.S. clamps. The pipes with ears shall, be secured with 40 mm. before steel or iron barrel distance pieces or bobils and strout galvanized iron nails 10 cm. long driven it no hand wool plugs fixed in walls. Access doors to fittings shall be provided with 3 mm. rubber insertion packing and secured without screws to make air and water tight.

2.2. All soil pipes shall be carried up above the roof and shall have a wire balloon guard or a cowl.

2.3. The ventilating pipe or shaft shall be carried out to a height of at least one meter above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer windows, it shall be carried up to the ridge of the roof or at least two meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out up to a height of at least one meter above the parapet or two meters measured vertically from the top of any windows in opening which may exist up to a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.

2.4. Where ventilating pipe are carried in pipe shafts, the shafts shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the shaft.

2.5. The sand cast iron pipes above parapet shall be fixed with M. S. clamps and stays. The clamps shall be made from 1.5 mm. thick M. S. flat or 3 mm. width band to the required shape and size to fit tightly on the sockets when tightened with screw blots. It shall be formed of two semi circular pieces with flanged ends on both sides; with holes to fit in the screw bolts and nut 40 mm. dia. M. S. Bars. One end of the stay shall be bent to from a hook to be fixed with clamps by means of bolts and the other end shall be bent for embedding in wall in cement concrete block of size 200 mm. x 100 mm. x 100 mm. in

1 : 2 : 4 mix. The concrete shall be finished to match the surrounding surfaces.

2.6. The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.

2.7. The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floors. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gulley trap.

3.0. Mode of measurements & payment:

3.1. The length of pipe shall be measured included all fittings along its length in running meters correct to a centimeter. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.

3.2. The rate includes all labor, and materials, tools and plant etc. required for satisfactory completion of this item.

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

Item No. 29

Providing and fixing in position C.I. cowl vent to pipes 75mm. Dia.

1.0. Materials:

1.1. The specified dia. C.I. cowlvent conform M-68.

2.0. Workmanship:

2.1. The vent shall be fixed on opening of pipe by cement mortar at every portion of external surface.

3.0. Mode of measurements & payment:

3.1. The vent shall be measured on cowl vent fixed in position.

3.2. The rate includes all labor, and materials, tools and plant etc. required for satisfactory completion of this item.

3.3. The rate shall be for a unit of one no.

Item No. 30

Providing and fixing water closet squatting pan (Indian type W.C. pan) size 580mm. (Earth work, Bed concrete foot rests and trap to be measured and paid for separately) (A) Vitereous china. (i) Long patter white colour incl. Providing and fixing 100 mm. size 'P' or 'S' trap for water closet squatting pan including jointing the trap with the pan and soil pipe in cement mortar 1:1 (1 cement : 1 sand)

1.0. Materials:

Wash down water closet (European type W.C. Pan) shall conform to M-60. Cement mortar shall conform to M-11.

2.0. Workmanship:

Closet shall be fixed to the floor by means of 75 mm. long 6.5 mm. diameter center sunk bolts and nuts embedded in the floor concrete using rubber or fiber washers so as not to allow any lateral displacement. The joint between the trap of W. C. and soil pipe shall be made with C.M. 1:1(1 cement: 1 fine sand).

3.0 100 mm. size 'P' or 'S' trap for water closet squalling pan including jointing the trap with the pan and soil pipe in cement mortar 1 : 1 (1 cement: 1 fine sand) Vitreous china.

1.0. Materials:

The 100 mm. size 'P' or 'S' trap for water closet shall conform to M.62 Cement mortar shall conform to M-11.

2.0 Materials:

Workmanship 'P' or 'S' trap shall be fixed with pan and cast iron 'S' trap as specified in the item with an approximately 50 mm. seal. The joint between the pan and the trap shall be made leak-proof with cement 1:1(1 cement: 1 fine sand).

3.0. Mode of measurements & payment:

3.1. The rate includes cost of all labor, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of one number.

Item No. 31

Providing and fixing screw down bib taps of following size : (B) Brass chromium plated screw down bib tap (I) 15mm. dia.

1.0. Materials :

1.1. 15 mm. dia. brass screw down with bright polished finish shall conform to I.S. 781-1977. The bib shall be best Indian make and quality.

2.0. Workmanship:

2.1. The screw down bib cock 15 mm. dia. as specified above shall be fixed as directed. The threaded portion shall be smeared with white or red lead and around with a few turns of fine spun yarn round the screwed end of the pipe. The bib cock shall be then screwed and fixed to water tight position. ,

3.0. Mode of measurements & payment:

3.1. The rate includes cost of all labor, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of one number

Item No. 32

Providing and fixing gun metal check or non - return fullway wheel valve. 20 mm.

.1.0. Materials:

1.1. The gun metal check or non return full way wheel valve of specified dia. shall conform to I.S. 778-1964. The non return valve shall be of tested quality.

2.0. Workmanship:

2.1. The gun metal check or non return valve shall be fully cleared of all foreign matter before fixing. The fixing of valve shall be done by means of bolts nuts and 3 mm. rubber insertions with flanges of spigot and socketed tail pieces, drilled to the same specification as in case of socket and spigot and with flanges in case of flanged pipes. The jointing shall be done leak proof.

3.0. Mode of measurements & payment:

3.1. The rate includes all labors, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of one numbe

Item No. – 33

Providing and fixing G.I. rain water spout of 50 mm. dia. and 30 cm. length.

1.0 Materials:

G.I.M.S. pipe of 50 mm dia shall conform to M-56

2.0 Workmanship:

2.1 The G.I. pipe of 30 cms fixed as rain water pipe as directed. The pipe shall be fixed about ¼ dia below the floor level so as to make approach of water easy. The inlet of pipe shall be rounded off for easy entry of rain water pipe. The pipe shall be fixed in C.M. 1:3

3.0 Mode of measurement & payment:

3.1 The rate includes of all labour and materials required for satisfactory complementation of this item.

3.2 The rate shall be for a unit of one running meters

Item No. – 34

Supp. And fixi. Approved brand PVC water storage tank of 500 liter storage capacity and make with ISI mark with all necessary fittings, inlet out let shoket, washer etc. complete.

1.0 Materials:

P.V.C... Water storage tank shall be of SYNTEX Brand & Make of 500 liter storage capacity

2.0 Workmanship:

2.1 The .P.V.C... Water storage tank shall be for water storage the tank shall be fixed or placed at terrace level or as and where as directed by engineer in charge. Tank shall be connected with water supply line (inlet) for it and with outlet line (delivery line) with all necessary fitting such as inlet and outlet connection, coupling washer, solution and any other fitting required for complete the leakage proof connection for supply and delivery line including all labour

3.0 Mode of measurement & payment:

3.1 The rate includes of all labour and materials required for satisfactory complementation of this item.

3.2 The rate shall be for a unit of one No.

Item No. – 35

Constructing brick masonry road gully chamber 450mm. x 450mm. X 775mm. with vertical grating complete.

1.0 Materials: water shall conform to M-1. Cement shall conform to M-6. Brick shall conform to M-15. C.I. grating of 500 x 450 mm size of standard make shall be approved quality. Stone aggregate 40 mm nominal size shall conform to M-12. Coal tar shall conform to relevant M-5

2.0 Workmanship:

2.1 The chamber shall be of size 455 mm x 610 mm internal clear dimensions between the masonry wall faces. The height of 775 mm shall be measured from the top of the bed concrete to the top of the C.I. frame. The size of the grating indicates the clear internal dimensions of the C.I. frame of the gratings.

2.2 The excavation shall be done to true dimensions and levels

2.3 The foundation concrete shall consist of 150 cms x 130 cms. 15 cm thick C.C. 1:5:10 (1cement: 5 sand: 10 graded stone aggregate 40 mm. nominal size)

2.4 The wall of the chamber shall be constructed in brick work with C.M. 1:5 and 23 cms thick as per relevant specifications of item 6.12 (B) of specification booklet for building

2.5 The walls and the bed concrete of chamber shall be plastered inside with 12mm thick cement plaster 1:3 (1 cement: 3 coarse sand) finished smooth

2.6 The gully grating cover shall be hinged to frame to facilitate its opening for leaning and repairs. The frame of the gully gratings shall be fixed on the top of masonry walls of the chamber in 15cm thick C.C. 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) laid over the full thickness of walls.

2.7 The chamber shall have connection pipe, the length of which in meter between the road gully chamber and manhole of the drain shall not be less than 1/40 times the nominal diameter of the pipe in MM i.e. for 150 mm connection pipe, the length shall not be less than 3.75 meter. The invert of the pipe at the junction with the wall shall be flush with the top of the cement plaster on the bed concrete.

2.8 Painting: after the completion of the work the exposed surface of the grating and the frame shall be painted with a thick coat of coal tar

3.0 Mode of measurement & payment:

3.1 The cost of connection pipes is not included in the item and shall be paid separately. However fixing connection pipes in the walls of gully chambers is included in the rate for gully chambers and nothing extra shall be paid for this separately.

3.2 The rate includes all labors and materials required for satisfactory completion of this item as described above

3.3 The rate shall be for a unit of one number

3.0. The rate shall be for a unit of one number.

Item no. - 36

Providing sock pit of 2.00 Cu.M. Volume including excavating and filling brickbats with dry masonry work at top for 45cm. height including covering the top with stone including providing vatas in C.M. 1:3 with finishing curing etc. complete as directed.

1.0 Materials : water conform to M-1. Cement mortar shall conform to M-11. Burnt bricks shall conform to M-15.

Rough stone slab 40x50 mm thick shall conform to M-48. Brick bat shall conform to M-14

2.0 Workmanship :

2.1 The excavation for soak pit shall be carried out as per relevant specifications of item 4.00.1 (A) except that the size of soak pit shall be such that the clear volume shall remain 2 cum. The diameter and depth shall be as directed.

2.2 The periphery of the soak pit shall be provided with dry masonry with burnt bricks in 23 m thick. The masonry wall be done with best workman like manner in true line and plumb.

2.3 The soak pit shall be filled in with brick bats of burnt brick 40 mm nominal size in 45 cm height. The work of filling brick bats shall be done in such a way that no dry masonry shall be damaged during filling of brick bats.

2.4 The top of the soak pit shall be covered with R.C.C.slab..

2.5 The cement mortar 1:3 shall be used to fill up the joints and preparing vata as directed.

2.6 The cement work shall be cured for 4 days

3.0 Mode of measurement and payment

3.1 The rate includes cost of all labour and materials required for satisfactory completion of this item as described above

3.2 The rate shall be for the unit of one number

Item no. - 37

Providing and laying cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm. nominal size) laid in one layer finished with a floating coat of neat cement. 50 mm thick

Cement concrete 1:2:4 proportion measured by volume shall conform to relevant specification or ordinary grade 1:2:4 concrete

2.0 workmanship:

2.1 the cement concrete flooring of 40 mm thick (average) is to be laid as per the site condition. The concrete shall be mixed in a mechanical mixer at the work. Hand mixed may however be allowed for smaller quantity of work and in case of failure of machines or as permitted by engineer in charge. It shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in color and consistency. However in such case ten percent more cement than otherwise required shall have to be used without extra cost. The mechanical mixing shall be done for period of ½ to 2 mins. The quantity of water shall be just sufficient to produce a dense concrete of required work ability for the purpose. Flooring of specified thickness shall be laid in accordance with approved pattern or as directed. Finishing operation shall start shortly after the session of beating and shall be spread over a period of 1 to 6 hours depending upon temperature and atmosphere conditions. The surface shall be left for sometime till moisture disappears from it. Fresh quantity of cement shall mixed with water to form a thick slurry and spread over the surface while the concrete is still green. Use of dry cement or cement and sand mixture sprinkled on this surface to stiffen the concrete or absorb excessive moisture shall not be permitted. The cement slurry shall than be properly pressed twice by means of iron floats. Once when the slurry is applied and the second time when cement starts setting and finished smooth. The surface shall be marked with string or B.R.C. fabric jail to make the surface non slippery as and when directed. The junction of floors with wall plasters dado or skirting shall be rounded off where so required up to 25 mm radius. Flooring in lavatories and bathrooms shall be laid after fixing of water closet and squatting pans and floor traps which shall be plugged while laying the floors and opened after the floors are completed. Any damage done to water supply or sanitary fitting during execution of work shall made good.

2.2 after final set concrete shall be kept continuously wet if required by ponding for a period of not less than 7 days from the date of placement.

2.3 The form work shall be provided if necessary as directed by the engineer in charge. Concreting shall be done as per alternate bay method with necessary centering either by mastic or cement mortar as directed

3.0 modes of measurements and payment

3.1 The rate shall include the cost of all materials and labors involved in all operations described above. No deduction shall be made or extra paid for any opening up to 0.1 sq. meters. Ir. Area in floor, nothing extra shall be paid for laying the floor at different levels in the same room or courtyard

3.2 The rate shall be for unit of 1 sq. meter.

Item No. – 38

Providing and fixing wash basin with single hole for pillar tap with C.I or M.S. brackets painted white incl. cutting holes and making good the same incl. 32mm dia. C.P. brass waste, and 15mm dia. capstan head pillar tap union. Vitreous china flat back wash basin 550mm * 400mm size white in colour.

1.0. Materials:

1.1. The white glazed earthenware wash basin shall be 550 cm. x 400 mm. of 1st quality and make as approved by the Engineer-in-charge. The wash basin shall conform to M-59.

2.0. Workmanship:

2.1. The wash basin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M. S. or C.I. brackets fixed in CM. 1 : 3 (1 cement: 3 sand). The bracket shall conform to I. S.: 775-1962. The wall plaster on the rear shall be cut to rest the top edge of the wash basin. After fixing the basin, plaster shall be made good and surface finished to match with the existing one.

2.2. The bracket shall be painted white with ready-mixed paint.

2.3. The C.I. brass trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct into the gully-trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under the basin and the waste is discharged into vertically.

2.4. The height of the front edge of the wash basin from the floor level shall be 80 cm.

2.5. The necessary inlet, outlet connections and fittings such as pillar cocks. C.P. dress waste trap waste pipe, stop cock, chain with rubber plug etc. shall be fixed.

2.6. The payment of fittings shall be made separately under separate item.

Providing and fixing 32 mm. dia. C. P. brass waste for wash basin or sink.

1.0. Materials:

1.1. The C.P. brass waste trap and unions shall be of 32 mm. dia. and of best quality and make as approved by the Engineer-in-charge.

2.0. Workmanship:

2.1. C. P. brass waste trap and union shall be connected to 32 mm. dia. waste pipe which shall be suitably bent towards the wall and which shall discharge into drain through a floor trap. The C. P. brass waste trap shall be provided for wash basin or sink as the case may be.

Providing and fixing 32 mm. dia. M. I. Fisher union shall be of best quality and make as approved by the Engineer-in-charge.

1.0. Materials:

1.1. The 32 mm. dia. M. I. Fisher union shall be of best quality and make as approved by the Engineer-in-charge.

2.0. Workmanship:

2.1. The 32 mm. dia. M. I. Fisher union shall be fixed to wash basin or sink in best workman like manner.

Providing and fixing pillar tap capstan head screw down high pressure with screw shank and back nuts : (A) 15 mm. dia.

1.0. Materials:

1.1. The capstan head pillar tap of specified dia. of C.P. over brass shall be of best quality and shall conform to I.S. 1795-1961. The pillar taps shall be of tested quality.

2.0. Workmanship:

The capstan head pillar tap of specified dia. shall be fixed as directed with required washer of selected leather or rubber asbestos composition or of plastic as directed. The cock shall be fixed with pipe line with white zinc end spun yarn to make joint water tight. The work shall be carried out in best workman like manner.

3.0. Mode of measurements & payment:

3.1. The rate includes cost of all labor, materials; tools and plant etc. required for satisfactory completion of this item as specified in workmanship.

3.2. The rate shall be for a unit of one number.

Item No. –39

Supplying & erecting approved make self-priming domestic monoblock water pump with 0.5 H.P. motor, suitable for operation on 230 volts 50 c/s. AC supply with metallic flange, delivery and discharge of 32 LPM at 10 mtrs.head.

1.0 Materials:

Electric monoblock submersible water pump of 1.0 HP. Single faze of approved brand and make with ISI mark with all necessary fittings cable wire etc. complete approved by engineer in charge

2.0 Workmanship:

2.1 Work consist of supplying and fitting The Electric monoblock submersible water pump of 1.0 HP. Single faze of approved brand with ISI mark with all necessary fittings cable wire etc. complete Electric monoblock submersible water pump shall be fixed as and where directed by engineer in charge. Electric monoblock submersible water pump shall be connected with suction line for it and with outlet line (for over head storage) with all necessary fitting required for complete the leakage proof connection for water supply and delivery line including all labour

3.0 Mode of measurement & payment:

3.1 The rate includes of all labour and materials required for satisfactory complementation of this item.

3.2 The rate shall be for a unit of one number.

Item No. 40

Providing and fixing pre-cast Rubber Dye / steel Dye inter locking concrete block 60mm thick with grade of concrete M300 pneumatic compressed / vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35 mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidelines of IRC : SP 63-2018 etc. Complete

1504. INTERLOCKING CONCRETE BLOCK PAVEMENT

1504.1. Scope

Interlocking Concrete Block Pavement (ICBP) shall consist of a surface layer of appropriate sized concrete paving blocks paved and compacted over a thin bedding sand layer of specified grading, which is spread over a properly constructed and profiled base course and is bounded by properly installed edge restraints. The joints shall be filled by fine sand of specified grading. The work shall include supplying laying and paving of blocks including all materials, labour and equipment and performing all operations in connection with the laying of ICBP as per these Specifications.

1504.2. Materials

1504.2.1. The Concrete Paving Block shall conform to the relevant IS standard.

1504.2.2. Bedding sand : Bedding sand shall conform to the grading given in Table 1500.6.

1504.2.3. Joint filling sand : Joint filling sand shall conform to grading given in Table 1500.6.

TABLE 1500.6 : GRADINGS FOR BEDDING AND JOINT FILLING SAND

| IS Sieve Size (mm) | Per cent Passing | |
|--------------------|------------------|------------------------|
| | For Bedding Sand | For Joint Filling Sand |
| 10.00 | 100 | 100 |
| 4.75 | 90-100 | 90-100 |
| 2.36 | 60-95 | 75-100 |
| 1.18 | 15-34 | 55-90 |
| 0.60 | 25-60 | 35-59 |
| 0.30 | 5-20 | 8-30 |
| 0.15 | 0-10 | 0-10 |
| 0.075 | 0-5 | 0-5 |

1504.3. Buffer

Buffer of specified quantity of paving blocks (of the same shape, size and thickness) required for normal maintenance of paved area as specified by the Engineer, shall be supplied and stored for replacement as and when needed. Normally this will be 5 per cent of the blocks used in the paved area.

1504.4. Block Thickness

For rural roads catering to heavy vehicles, the minimum thickness of paving blocks shall be 60 mm for traffic up to 100 vehicles per day, and 80 mm for projected traffic from 100 to 250 vehicles per day.

1504.5. Dimensions and Tolerances

The dimensions and tolerances of paving blocks shall conform to the Specifications given in Table 1500.7. Aspect ratio is the ratio of length to thickness of blocks. Chamfer is the bevelled edge, provided on the top surface of a block. Plan area is the horizontal area bounded by the vertical faces. Wearing surface area is the horizontal area bounded by the vertical faces, minus the area reduced due to the presence of chamfer.

TABLE 1500.7 : DIMENSIONS AND TOLERANCES FOR PAVING BLOCKS

| S. No. | Dimension | Recommended Values | Tolerance Limit |
|--------|-------------------|----------------------------------|-----------------------|
| (1) | Width W | To be specified by Manufacturer | ±2 mm |
| (2) | Length L | To be specified by Manufacturer | ±2 mm |
| (3) | Thickness T | 60 to 80 mm | ±3 mm |
| (4) | Aspect Ratio L/T | Maximum : 4.0 | ±0.2 |
| (5) | Chamfer (Arris) | Maximum : 5 mm Maximum : 7 mm | ±1 mm |
| (6) | Plan Area | Maximum : 0.03 m ² | +0.001 m ² |
| (7) | Wearing Face Area | Minimum 75% of Plan Area | -1% |
| (8) | Squareness | Nil | ±2 mm |

1504.6. Compressive Strength

1504.6.1. The average 28 days compressive strength of 8 blocks shall be 30 MPa and strength of individual block shall not be less than 26 MPa.

1504.6.2. The 28 days compressive strength of paving blocks tested as per relevant IS specification shall be determined as explained hereinafter.

1504.6.2.1. Compression testing machine of adequate capacity shall be used for testing of blocks. The steel bearing plates shall have a minimum thickness of 25 mm. The surface area of the bearing side of the plate should be such that no edge of the bearing plate is less than 10 mm from the outer edge of the paving block being tested.

1504.6.2.2. In case the testing surface of the paving block departs from a plain surface by more than 0.05 mm, capping using suitable materials shall be adopted for testing as per IS:516.

1504.6.2.3. The blocks shall be stored for 24 ± 4 hours in water maintained at a temperature of $(20 \pm 5)^{\circ}\text{C}$ before testing. The dimensions and plan areas of the block shall be determined. The bearing plates of the testing machine shall be wiped clean. The specimen shall be clamped between the plates in such a way that the axes of the specimen are vertically aligned with those of the bearing plates.

1504.6.2.4. The load shall be applied without shock and increased continuously at a rate of 15 ± 3 N/mm²/minute until no greater load can be sustained by the specimen or delamination occurs. The maximum load applied to the specimen shall be noted.

1504.6.2.5. The apparent compressive strength of individual block shall be calculated by dividing the maximum load (N) by the plan area (mm²). The corrected compressive strength shall be calculated by multiplying the apparent compressive strength by the appropriate correction factor from Table 1500.8. The strength shall be expressed to the nearest 0.1 N/mm².

TABLE 1500.8 : CORRECTION FACTORS FOR THICKNESS AND CHAMFER OF PAVING BLOCK FOR CALCULATION OF COMPRESSIVE STRENGTH

| Paving Block Thickness (mm) | Correction Factor for | |
|-----------------------------|-----------------------|-----------------|
| | Plain Block | Chamfered Block |
| 60 | 1.00 | 1.06 |
| 80 | 1.12 | 1.18 |

1504.6.2.6. Water Absorption: The water absorption being the average of five blocks shall be not more than 6 per cent by mass.

1504.7. Edge Blocks

The edge blocks shall have equivalent cube compressive strength not less than 30 MPa. The road kerbs provided on the edges of the road also serve the purpose of edge blocks. In case the end kerbs are not provided, 300 mm x 300 mm x 150 mm of M30 grade concrete edge blocks or other suitable size as per drawings or direction of the Engineer shall be provided.

1504.7.2. Subgrade

The Subgrade shall conform to Clause 1501.5.1 of these Specifications. The soaked CBR of subgrade soil shall not be less than 4 per cent.

1504.8. Sub-base

The sub-base shall be 100 mm thick granular layer conforming to Clause 401 or 100 mm thick WBM Gr.I conforming to Clause 405 of these Specifications. In case the subgrade soil is clayey, the sub-base shall be extended over the full formation width for proper drainage.

1504.9. Base Course

A minimum 100 mm thick layer of granular/stabilized base course shall be provided. The base course layer shall be extended at least 300 mm beyond the edge restraints. The material shall conform to Clause 402 of these Specifications.

1504.10. Bedding Sand

Bedding sand conforming to Table 1500.6 shall be uniformly laid to a compacted thickness of 25 mm for 60 mm thick blocks and 30 mm for 80 mm thick blocks. Bedding sand shall be unloaded in small piles regularly placed over the base course and shall preferably have a moisture content of about 6 per cent which will facilitate its spreading and compaction. Bedding sand shall be screeded in a uniform layer over the base course. The screed can be guided to level by tensioned string lines set above the base course. At the time of screeding, the thickness of sand must allow for the amount by which it will be subsequently compacted which is normally about 25 per cent more than the compacted thickness. Screeding shall not proceed beyond about 1 m ahead of the planned end of block paving for the day. Sand shall preferably be compacted with a manual, fabricated plate compactor and the level shall be readjusted using the screed. The surface profile of the screeded bedding sand shall match that required for the completed pavement.

1504.11. Paving Pattern

The pattern in which blocks are to be paved shall be decided in advance and got approved from the Engineer in charge.

1504.11.1. By and large, these patterns are the same as adopted for brick paving. All shapes of blocks are not amenable to the above paving patterns. For paving in trafficked areas, herringbone pattern shall be adopted for ensuring better performance. Paving shall commence and progress from one starting line only. Wherever possible, paving shall commence adjacent to or against edge restraint.

1504.12. Paving and Compaction of Blocks

Blocks shall be placed at the correct angle to the start line to achieve the final orientation of the laying pattern. For curved or unfavourably oriented edge restraints, a string line shall be established to permit fast, easy laying such that it is not required to force a block between the blocks already paved. Control over alignment, laying pattern and joint width can be assisted by the use of chalked string lines set at about 5 m intervals. Nominal joint width of 2 to 4 mm shall be maintained by holding the paving unit lightly against the face of the adjacent block and allowing it to slide into position. Cutting paving units for filling the paving gaps occurring against edge restraints etc. shall be deferred until sufficient work has progressed to allow reasonably continuous operation. When space does not permit the use of cut pieces of blocks, premixed or dry packed concrete shall be used. After a section has been paved, compaction shall be effected by using vibrating plate compactors in the following sequence of operations:

- (i) Vibrate the blocks with 3 passes of the plate vibrator of adequate capacity.
- (ii) Spread a thin layer of fine joint filing sand on top of the paved blocks and sweep it into the joints, using suitable brooms.
- (iii) Vibrate the sand into the joints by making 3 passes of the compactor.
- (iv) Sweep off the excess sand from top of blocks.

As a guide to the characteristics of typical vibrating plate compactors, standard compactors have a weight of 90 kg, a plate area of 0.3 m² and apply a centrifugal force of 1500 kg. Heavy duty compactors weigh between 300 to 600 kg, have a plate area of about 0.5 to 0.6 m² and apply a centrifugal force in the range of 2000-3000 kg. Use of heavy duty compactors is desirable for trafficked pavements.

1504.12.1. Trial length : The contractor shall lay a trial length of 30 m and get it inspected and approved by the Engineer before proceeding with the regular paving work. The trial length shall be rectified/re-laid if found deficient in any respect. The procedure demonstrated in the laying of trial length shall be followed while executing the main construction work.

1504.13. Opening to Traffic

The pavement can be opened to traffic as soon as the construction work is completed.

1504.14.1. Transverse profile : When measured by a camber template, the transverse profile shall not deviate by more than 10 mm from the design profile.

1504.14.2. Longitudinal profile : When measured by a 3 m straight edge, the longitudinal profile shall not deviate by more than 12 mm from the design profile.

1504.15. Acceptance Criteria

From each lot of 500 blocks, 5 blocks shall be selected at random for water absorption and compressive strength tests. In case the number of blocks in the lot is less than 500, a minimum 1 per cent of the blocks delivered to site shall be tested for water absorption and strength. The blocks shall be first tested for water absorption and these shall meet the requirement of Clause 1504.5.2.6 of these Specifications. The same five blocks (or minimum 1 per cent) shall be tested for strength and shall conform to the strength as per Clause 1504.5.1 of these Specifications.

The paved surface shall meet the tolerances for lines, levels, and grades etc. as given in Section 1800 of these Specifications.

1504.16. Measurements for Payment

The measurement of the paved area shall be in square metres measured from the inner edge of edge restraints on one side of the pavement to the inner edge of the edge restraints on the transverse side of the pavement. The measurement of the edge restraints shall be in number of units or in Sq. metres.

1504.17. Rate

The contract unit rate shall include the cost of blocks, cost of stacking, transportation to site and paving including supply and application of bedding sand and joint filling sand. The rate shall include full compensation for labour, tools, plant, equipment, testing and all incidentals to the work, including all royalties, taxes, storage rents wherever necessary, and all leads and lifts.

**Signature of
contractor**

**Deputy Executive Engineer
Panchayat R. & B. Sub Division
Bhachau-Kachchh**

**Executive Engineer
Panchayat R. & B. Division
Bhuj-Kachchh**