

**NAME OF WORK :- CONSTRUCTION OF GODOWN BUILDING (2500 METRIC TON CAPACITY) AT
KHUSHALPURA, TALUKA-VYARA DIST. TAPI.**

ITEM WISE SPECIFICATION

Item No:- 1

Excavation for foundation upto 1.5 m depth including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(A) Loose or soft soil

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.0.0. (A) P.No.29.

Item No:- 2

Excavation for foundation for depth from 1.5 m to 3.0 m including sorting out and stacking of useful materials and disposing off the excavated stuff upto 50 Meter lead.(B) Dense or Hard soil

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No. 4.001. (C) P.No.32

Item No:- 3

Filling in foundation and plinth with sand in layers of 20 cm. Thickness including watering ramming and consolidating etc. comp.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.24. P.No.35 except that using for sand instead of murrum.

Item No:- 4

Filling available excavated Earth (Excluding Rock) in trench plinth side of foundation . in layer not excluding 20 cm in depth consolidation each deposited layer by ramming and watering etc. complete

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.12. P.No.35

Item No:- 5

Filling foundation and plinth with murrum or selected soil in layer of 20 cm in thickness including ramming watering and consolidating etc. complete

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.004. P.No.35.

Item No:- 6

Anti Termite System

P/L of Permanent piping technology Anti Termite treatment before flooring work by installing LLDP (Low linear density Polyethylene) tube of 8 mm O.D.& 6.4 mm I.D. With in Built Pressure Compensation chif every 30 cm interval in the tube, having working pressure of 2 kg/cm² and release rate of 1.9 ltr/Hour fixed by P-Clip and nails . The LLDP pipe shall be installed at the entire periphery of the building and at internal network of building depth of 20 to 200 mm under floor every 2 to 3 mtr.c/c distance (adjustable as per building layout) & Ends of loop pass through a PVC Elbow of minimum 32 mm ID at junction box of wall and floor level, entering into a steel reinforced grooved flexible pipe mini.22 mm LD leading into junction box and during injecting chemicals for termite control treatment. The anti-termite chemical Imidcloprid 30.5% SC Mix as per IS 6313(part-III) shall be injected by the pressure pump diluted with water @ 10.5 ml/5ltr of water at the rate of 2 kg/sq.cm.@ 5 ltr /Smt .the contractor shall submit approved line plan for piping system and junction boxes dully approved By Engineer -in-charge with bond of 5 Years warranty .

The relevant specifications of Building Booklet It. No.20.00.9. +22.00.10+22.00.11 Page No157 shall be followed as well as following points

P/L of Permanent piping technology Anti Termite treatment before flooring work by installing LLDP (Low linear density Polyethylene) tube of 8 mm O.D.& 6.4 mm I.D. With in Built Pressure Compensation chif every 30 cm interval in the tube, having working pressure of 2 kg/cm² and realise rate of 1.9 ltr/Hour fixed by P-Clip and nails . The LLDP pipe shall be installed at the entire periphery of the building and at internal network of building depth of 20 to 200 mm under floor every 2 to 3 mtr.c/c distance (adjustable as per building layout) & Ends of loop pass through a PVC Elbow of minimum 32 mm ID at junction box of wall and floor level, entering into a steel reinforced grooved flexible pipe mini.22 mm LD leading into junction box and during injecting chemicals for termite control treatment. The anti-termite chemical Imidcloprid 30.5% SC Mix as per IS 6313(part-III) shall be injected by the pressure pump diluted with water @ 10.5 ml/5ltr of water at the rate of 2 kg/sq.cm.@ 5 ltr /Smt .the contractor shall submit approved line plan for piping system and junction boxes dully approved By Engineer -in-charge with bond of 5 Years warranty.

The rate shall be measured of including all material and labour work charge included.

The Item shall be measured as finished work in Sqmt.

Item No:- 7

Providing and laying controlled cement concrete M.150 and curing complete including the cost of formwork and excluding reinforcement for reinforced concrete work in (A) Foundations and plinth pcc

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.1.(A) P.No.46 except that using for including the cost of form work for Foundations and plinth instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (A) P.No.63

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 8

Providing and laying controlled cement concrete M.250 and curing complete including the cost of formwork and excluding reinforcement for reinforced concrete work in (A) Foundations, footings and Mass concrete.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.3.(A) P.No.47 except that using for including the cost of form work for G.FLOOR instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (A) P.No.63

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 9

Providing and laying controlled cement concrete M-250 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in (d) Columns Up to Plinth level.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.3.(D) P.No.47 except that using for including the cost of form work for G.FLOOR instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (G) (I) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 10

Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- machine cut stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

The relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 5.3.2. (A) P.No.38 except that using for including the cost of form work for G.FLOOR instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (A) P.No.63

Consolidated item shall be measured and paid for actual size of RCC member casted on **Cubic meter** basis.

Item No:- 11

Providing and laying controlled cement concrete M200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Columns, pillars posts and struts Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (D) P.No.47 + It.No.5.4.13. P.No.46

Except that using for including the cost of form work for Floor Two Level instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 9.1 (G) (I) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 12

Providing and laying controlled cement concrete M200 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Columns, pillars posts and struts First Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (D) P.No.47 + It.No.5.4.13. P.No.46

Except that using for including the cost of form work for Floor Two Level instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 9.1 (G) (I) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis. On First floor

Item No:- 13

Providing and laying controlled cement concrete M-250 and curing complete including the cost of form work but excluding the cost of reinforcement for reinforced concrete work in Ground & Plinth BEAMS

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.3.(C) P.No.47 except that using for including the cost of form work for G.FLOOR instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (H) (1) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 14

Providing and laying trimix flooring of 200mm thick controlled cement concrete M-200 and curing complete excluding the cost of form work but including the cost of reinforcement for reinforced concrete work in FLOORING SLABS including Compaction and finishing of cement concrete surface

by trimix process inclusive of labour charges for the trimix vacuum dewatering process on cement concrete surface by using vacuum dewatering pump, surface floater, surface vibrator including Channelling & making grooves and rough finish to surface by providing expansion Joints, Contraction joints & construction joints with filling of joints with asphalt filler as directed by Engineer In charge & as per specification.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2.(C) P.No.46 except that using for including the cost of form work for trimix flooring of 200mm thick controlled cement concrete M-200 and curing complete excluding the cost of form work but including the cost of reinforcement for reinforced concrete work in FLOORING SLABS including Compaction and finishing of cement concrete surface by trimix process inclusive of labour charges for the trimix vacuum dewatering process on cement concrete surface by using vacuum dewatering pump, surface floater, surface vibrator including Channelling & making grooves and rough finish to surface by providing expansion Joints, Contraction joints & construction joints with filling of joints with asphalt filler as directed by Engineer In charge & as per specification. instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (I) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis

Item No:- 15

Providing and laying controlled cement concrete M200 and curing complete including the cost of formwork and excluding reinforcement for reinforced concrete work in (C) Ground Floor Beams

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2.(C) P.No.47+5.4.13/P.no 46 except that using for including the cost of form work for Floor Two Level instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (H) (1) P.No.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis

Item No:- 16

Providing and laying controlled cement concrete M200 and curing etc. complete including the cost of form work and reinforcement for reinforced concrete work in (C) Chhajja for Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (C) P.No.47+ 5.4.13 P.46 + 5.4.13(A) including the cost of form work and excluding cost of reinforcement for reinforced concrete work for Floor Two Level instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 9.1 (L) P.66

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 17

Providing and laying controlled cement concrete M200 and curing etc. complete including the cost of form work and reinforcement for reinforced concrete work in (C) Lintel for Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2.(C) P.No.47+ 5.4.13 P.46 including the cost of form work and excluding cost of reinforcement for reinforced concrete work for Floor Two Level instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 9.1 (H) (1) P.65

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis

Item No:- 18

Providing and laying controlled cement concrete M-200 and curing etc. complete including the cost of form work and excluding the cost of reinforcement etc. complete in (E) Stair case up to floor two level for Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (E) P.No.47 + 5.4.13 P.46 including the cost of form work for Ground Floor to Second floor.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (M) P.No.66

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 19

Providing and laying controlled cement concrete M200 and curing etc. complete including the cost of form work and excluding the cost of reinforcement etc. complete in RCC Vertical and Horizontal wall for Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (F) P.No.47 + 5.4.13 P.46 including the cost of form work for Floor Two Level.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (Q) P.No.66

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 20

Providing and laying controlled cement concrete M200 and curing etc. complete including the cost of form work and excluding the cost of reinforcement etc. complete in RCC Vertical and Horizontal wall for First Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.8.2. (F) P.No.47 + 5.4.13 P.46 including the cost of form work for First Floor.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (Q) P.No.66

Consolidated item shall be measured and paid for actual size of RCC member casted on Cubic meter basis.

Item No:- 21

Providing IS Mark TMT FE 500D bar reinforcement for RCC work including bending & placing in position complete up to All floor Level

1.0. GENERAL

This work shall consist of furnishing and placing TMT Fe-500 Conforming to IS 1786 2008 reinforcement Providing and applying anticorrosive treatment with polymer base materials to the steel reinforcement including descaling the dust and applying the preventive coating of approved make etc. complete, bars (intentioned) of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

2.0. MATERIAL**2.1. TMT Bars**

Reinforcements may be either **TMT Fe-500** tensile steel, high strength deformed bars. They may be uncoated or coated with epoxy or with approved protective coatings.

2.2. T.M.T. bars reinforcement for R C C work shall conform IS 432 (Part II) 1966 and shall be of tested quality. It shall also comply with relevant part of IS 456-1966

2.3. All reinforcement shall be clean and free from dirt, paint, grease or oil, all scale or loose or thick rust at the time of placing

2.4. All steel shall be procured from original producers no re-rolled steel shall be incorporated in the work

2.5. Only new steel shall be delivered to the site every bar shall be inspected before placing to its position and defective brittle or burnt bar shall be discarded cracked ends of bars shall be discarded

3.0. Pitch

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

4.0. Binding wire

4.1. Mild steel binding wire shall be of 1.63 mm or 1.22 mm (16 to 18 gauge diameter and shall conform IS 280-1972

4.2. The use of black wire will be permitted for binding reinforcement bars. It shall be free from dirt, paint, grease or oil, oil scale or loose or thick rust and any other undesirable coating which may prevent adhesion of cement mortar at the time of binding

4.3. Only new binding wire shall be delivered to the site all binding wire shall be inspected before binding to its position and defective brittle, rusted, used wire, shall be discarded

5.0. PROTECTION OF REINFORCEMENT

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

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

6.0. Workmanship

6.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed by The Engineer in charge.

6.2. Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawing

7.0. BENDING OF REINFORCEMENT

7.1. Bar bend g schedule shall be furnished by the Contractor and got approved by the Engineer before start of work.

7.2. Reinforcing steel shall conform to the dimensions and shapes given in the approved bar bending Schedules.

7.3. Bars shall be bent cold to the specified shape and dimensions or directed by the Engineer using a proper bar bender operated by hand power to obtain the correct radius of bends and shape.

Bars shall not be bent or straightened in a manner that will damage parent material or the coating bars bent during transport or handling shall, be straightened before being used on work and shall not be heated to facilitate straightening.

8.0. PLACING OF REINFORCEMENT

8.1. The reinforcement cage should generally be fabricated in the yard at ground level, and then shifted and placed in position. The reinforcement shall be placed strictly, in accordance with the drawings and shall be assembled in position, only when structure is otherwise ready for placing of concrete. Prolonged time gap, between assembling of reinforcements and casting of concrete, which may result in rust formation on the surface, shall not be permitted.

8.2. Reinforcement bars shall be placed accurately in position as shown on the drawings. The bars, crossing one another shall be tied together at every intersection with binding wire (annealed),

conforming to IS 280 to make the skeleton of the reinforcement rigid such that the reinforcement does not get displaced during placing of concrete, or any other operation. The diameter of binding wire shall not be less than 1 mm.

8.3. Bars shall be kept in position usually by the following methods

In case of beam and slab construction, industrially produced polymer cover blocks of thickness equal to the specified cover shall be placed between the bars and formwork subject to Satisfactory evidence that the polymer composition is not harmful to concrete and reinforcement. Cover blocks made of concrete may be permitted by the Engineer, provided they have the same strength and specification as those of the member.

8.4. In case of dowels for Columns and walls the vertical reinforcement shall be kept in position by means of timber templates with slots in them accurately, or with cover blocks tied to the Reinforcement Timber templates shall be removed after the concreting has progressed up to a level just below their location.

8.5. Layers of reinforcements shall be separated by spacer bars at approximately One meter intervals. The minimum diameter of spacer bars shall be 12 mm or equal to maximum size of main reinforcement or maximum size of coarse aggregate, whichever is greater. Horizontal reinforcement shall not be allowed to sag between supports.

8.6. Necessary stays, blocks, metal chairs, spacers, metal hangers supporting wires etc, or other subsidiary, reinforcement shall be provided to fix the reinforcements firmly in its correct position.

8.7. Use of pebbles, broken stone, metal pipe, brick, mortar or wooden blocks etc as devices for positioning reinforcement shall not be permitted.

8.8. Bars coated with epoxy or any other approved protective coating shall be placed on supports that do not damage the coating. Supports shall be installed in a manner such that planes of weakness are not created in hardened concrete. The coated reinforcing steel shall be held in place by use of plastic or plastic coated binding wires especially manufactured for the purpose.

8.9. Placing and fixing of reinforcement shall be inspected and approved by the Engineer before concrete is deposited.

9.0. Lapping

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

10.0. Welding

10.1 Splicing by welding of reinforcement will be permitted only if detailed on the drawing or approved by the Engineer. Weld shall develop an ultimate strength equal to or greater than that of the bars connected.

10.2. While welding may be permitted for T.M.T. reinforcing bars conforming to IS 432, welding of deformed bars conforming to IS 1786 shall in general be prohibited. Welding may be permitted in

case of bars of other than S 240 grade including special. Welding grade of S 415 grade bars conforming to IS 1786, for which necessary chemical analysis has been secured and the carbon equivalent (CE) calculated from the chemical composition using the formula

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mg + V}{5} + \frac{Ni + Cu}{15}$$

is 0.4 or less.

10.3. The method of welding shall conform to IS 2751 and IS 9417 and to any supplemental specifications to the satisfaction of the Engineer

10.4. Bars shall be bent cold to the specified shape and dimensions or as directed by Engineer in charge using the proper bender tool, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used in the work. Bars shall not be heated to facilitate bending

10.5. Unless otherwise specified a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the 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 of the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any spalling of the concrete

10.6. All reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size and by using say blocks or metal chairs spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports not displaced during concreting or any other operations of the work All devices used for positioning shall be of non-corrodible material wooden and metal supports shall not extend to the surface of the concrete, except where shown in drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used Layers of bars shall be separated by spacer bars pre-cast mortar blocks or other approved devices. Reinforcement after bending placed in position shall be maintained in a clean condition until completely embedded in concrete, Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All bars protruding from concrete and to which other bars are to be lapped and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout

10.7. Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm in such a manner that they do not slip over at the time of fixing and concreting.

As far possible bars of full length shall be used in case this is not possible, overlapping of bars shall be done as directed by the Engineer in charge When practicable overlapping bars shall not touch each other, but be kept apart by 25 mm Where no feasible overlapping bars shall be bound with annealed wires not less than 1 mm thick twisted tight The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending moments is maximum.

10.8. Whenever indicated on drawing or desired the Engineer in charge bars shall be jointed by coupling which shall have a cross section sufficient to transmit the full stresses of bars The end of the bars that are jointed by coupling shall be upset for sufficient length so that the effective cross section

at the base of threads is not less than the normal cross section of the bar. Threads shall be standards threads Steel for coupling shall conform to IS 226

10.9. When permitted or specified on the drawings joints of reinforcement bars shall butt-welded so as to transmit their full stresses Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded Only electric arc welding using a process which excludes air from the molten metal and conforms to any or other special provisions for the work shall be accepted Suitable means shall be provided for holding bars securely in position during welding It shall be ensured that no voids are left in welding and when welding is done in two or three stages previous surface shall be cleaned properly Ends of bars shall be cleaned of all loose scale rust stages paint and other foreign matter before welding Only competent welders shall be employed on the work. The M S electrodes used for welding shall conform IS 814 Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number shall frequency to test shall be as directed by the Engineer in charge

11.0 MODE OF MEASUREMENTS and PAYMENT

For the purpose of payment the bar shall be measured correct up to 10 mm length and weight payable works out at the rate specified below

Sr. No	Diameter of steel	weight of steel per running meter	Sr. No	Diameter of steel	weight of steel per running meter
1	6 mm	0.22 Kg Rmt	8	20 mm	2.47 Kg Rmt
2	8 mm	0.39 Kg Rmt	9	22 mm	2.98 Kg Rmt
3	10 mm	0.62 Kg Rmt	10	25 mm	3.85 Kg Rmt
4	12 mm	0.89 Kg Rmt	11	28 mm	4.83 Kg Rmt
5	14 mm	1.21 Kg Rmt	12	32 mm	6.31 Kg Rmt
6	16 mm	1.58 Kg Rmt	13	36 mm	7.99 Kg Rmt
7	18 mm	2.00 Kg Rmt	14	40mm	9.86 Kg Rmt

Excess consumption over 5% will be charged at penal rate.

Reinforcement shall be measured in length including hooks, if any, separately for different diameters as actually used in work, excluding overlaps. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the basis of IS 1732. Wastage, overlaps, couplings, welded joints, spacer bars, chairs, stays, hangers and annealed steel wire or other methods for binding and placing shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement..

The contract unit rate for coated uncoated reinforcement shall cover the cost of material, fabricating, transporting, storing, bending, placing, binding and fixing in position as shown on the drawings as per these specifications and as directed by the Engineer, including all labour, equipment, supplies, incidentals, sampling, testing and supervision.

The unit Rate for coated reinforcement shall be deemed to also include cost of all material, labour, tools and plant, royalty, transportation and expertise required to carry out the work. The rate shall also cover sampling, testing and supervision required for the work. **No Payment shall be given for Lap.**

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

Item No:- 22

Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:5. (1- Cement : 5 -fine sand) (B) Conventional

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.6.13.(B)/P.No.51

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

Item No:- 23

Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in foundation and plinth in Cement Mortar 1:5. (1- Cement : 5 -fine sand)(B) Conventional for GF+FF

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.6.19.(B) P.No.53 + 6.20 P.54

The rate shall be for a unit of one cubic meter on Ground Floor

Item No:- 24

Providing 15mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls / concrete wall for interior plastering and finished even and smooth in C M 1:4 (1 cement : 4 coarse sand) with finished with trove including scaffolding curing etc. complete. For Ground floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.17.61 (II), P.No.121 except that using for 15mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls / concrete wall for interior plastering and finished even and smooth in C M 1:4 (1 cement : 4 coarse sand) with finished with trove including scaffolding curing etc. complete. For Ground floor

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

Item No: - 25

Providing 15mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls / concrete wall for interior plastering and finished even and smooth in C M 1:4 (1 cement : 4 coarse sand) with finished with trove including scaffolding curing etc. complete.. For first floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.17.61 (II), P.No.121 except that using for 15mm thick cement plaster in single coat on Rough (Similar) side of single or half brick walls / concrete wall for interior plastering and finished even and smooth in C M 1:4 (1 cement : 4 coarse sand) with finished with trove including scaffolding curing etc. complete.. For first floor

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

Item No: - 26

Providing 10 mm. Thick Mala cement plaster in single coat for plastering on ceiling and soffits of stairs and finished even and smooth in : (I) Cement mortar 1:4 (1 cement : 4 sand) with finished with trove lincluding scaffolding curing etc. complete. Ground Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.17.58.(I)/P.119 +17.69 & 17.91/ P.121 +17.94(II)/ P.122 with Mala troveled finish etc. complete. For Ground floor

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

Item No:- 27

Providing 10 mm. Thick cement plaster in single coat for plastering on ceiling and soffits of stairs and finished even and smooth in : (I) Cement mortar 1:4 (1 cement : 4 sand) with finished with trove lincluding scaffolding curing etc. complete. First Floor

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.17.58.(II)/P.120 +17.69 & 17.91/ P.121 +17.94(II)/ P.122 with Floating Coat etc. complete. First Floor

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

Item No:- 28

20 mm Thick sand faced cement plaster on walls upto all height above ground level consisting of 12 mm Thick backing coat of c.m. 1:3 (1 cement : 3 sand) and 8 mm Thick finishing coat of c.m. 1:1 (1 cement : 1 sand) with 1x1cm Groves at junction of structure member etc. comp.etc. complete.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.17.95 P.No.122 with sand faced cement Gutka plaster 1x1cm Groves at junction of structure member etc. complete.

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

Item No:- 29

Providing throating or plaster drip and moulding to R.C.C. Chhajja.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.5.4.18. P.No.39

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

Item No:- 30

White washing with lime on wall surfaces (three coats) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.11. P.No.125 + It.No.18.13. P.No.126

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

Item No:- 31

White washing with lime on ceiling surface and/or sloping roofs (three coats) to give an even shade including thoroughly brooming the surface to remove all dirt, dust, mortar drops and other foreign matter.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.11. P.No.125 + It.No.18.14. P.No.127

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

Item No:- 32

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

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.18.51 P.No.135 and It.No.18.53 P.No.136. For weather proof exterior acrylic emulsion paint.

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

Item No:- 33

Providinf and fixing 16mm dia MS bar grills of required pattern for windows/ Door using 16mm dia M.S angle/ M.S pipe, M.S flats and other structural steel at required spacing with galvanized wire jali 20mm x 20mm including cutting, welding and fabricion etc. including one coat of primer of approved quality and two coats of oil painting as per detail drawing etc complete.

This work shall consist of **Providing and fixing M.S.grill of required pattern** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge.

1.0 MATERIAL

1.0. STRUCTURAL STEEL

1.1. M S flats & Square pipes

Specification No M-22 of specification of materials shall confirm for Mild steel

1.2. OIL PAINTS

Specification No M-44 of specification of materials shall confirm for Paint

2.0. WORKMAN SHIP

2.1. The grills shall be so welded that welding spots does not appear on the surface. All welding spots shall be grinded by a machine grinder to give a smooth surface

2.2. The grill shall be fabricated in true shape and angles meeting the shape of the location where it is to be fitted

2.3. When grills are supplied by the contractor test certificate of the manufacturers shall be obtained according to IS 226-1975 and other relevant Indian standards

2.4. When grills are supplied by the contractors its weight shall be recorded by weighing it on a standard weigh-bridge in presence of engineer in charge and contractor before it is fitted in specified location

3.0. PAINTING WITH COLOUR

3.1. Material required for work of painting work shall be obtained directly from approved manufacturers or approved dealer and brought to the site in maker's drums. Kegs.etc. in sealed and unbroken condition.

3.2. All materials not in actual use shall be kept properly protected lids of containers shall be kept in closed and surface of the paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin

3.3. The material which have become state or flat due to improper and long storage shall not be used

3.4. the paint shall be stirred thoroughly in its container before purring into small containers

3.5. While applying also the paint shall be continuously stirred in smaller container,

4.6. No left over paint shall be put back into stock tins When not in use the container shall be kept properly closed

3.7. If for any reason thins is necessary the brand of thinner recommended by the manufacture shall be used

3.8. The surface to be painted shall be thoroughly cleaned and dusted All rust dirt and grease shall be thoroughly removed before painting is started No painting on exterior or other exposed part of the work shall be carried out in wet damp or otherwise unfavourable weather and all the surfaces shall be thoroughly dry before painting work is started.

3.9. Application of paint

3.9.1. Brushing operations are to be adjusted to the spreading capacity advised by the manufacturers of particular paint The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternatively in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same in this process no brush marks shall be left after the laying off is finished The full process of crossing and laying off will constitute one coat.

3.9.2. Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand paper and loose particles brushed off before next coat is applied Each coat shall very slightly in shade and shall be got approved from Engineer in charge before next coat is started.

3.9.3. Each coat shall be lightly rubbed down with sand paper of fine pumice stone and cleaned of dust before the next coat is applied No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings etc.

3.9.4. Special care shall be taken while painting over bolts nuts rivets overlaps etc. Approved best quality brushes shall be used for painting work.

4.0 MODE OF MEASUREMENT & PAYMENT :

4.1. The unit rate of M S Grill shall include the cost of all materials, tools and plant required for fabrication, fitting the same to specified position as per drawings, finishing, painting with three coats including priming coat, etc, and all other incidental expenses for producing M S Grill work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of M S Grill shall include the cost of all labour, materials tools and plant scaffolding and all incidental expenses as described herein above.

4.2. The Grill work shall be measured for its **weight**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Kilogram

4.3. The payment will be made **on Kilogram basis** of the finished work.

Item No:- 34

Providing and fixing rolling shutters of approved make made of 80 mm wide M.S. laths inter-locked together through their entire length and jointed together at the ends by end locks mounted on specially designed pipe shaft with bracket plates, guide channels and arrangements for inside and outside locking with push-pull operation including the cost of hood cover and spring etc. complete. (B) Shutters having width 3.5 M. and above

General

The work shall be consist of furnishing and placing Providing and fixing **rolling shutters** of approved make of the shape and dimension Shown in figure and conforming to these specification of as approved by engineer in charge.

Material & Workmanship

Rolling shutter shall conform to i.s 6248-1979 Rolling shutters shall be supplied of specified type with accessories. The size of rolling shutter shall be specified in drawing. The shutter shall be constructed with inter locking lath section formed from cold rolled steel strip not less than 0.9 mm. wide for shutter up to 3.5m. width not less than 1.25mm. thick and 80mm wide for shutters 3.5m in width and above unless otherwise specified

Guide channel shall be mild steel deep channel section and rolled pressed or build up (fabricated) joint less construction the thickness of sheet used shall not be less than 3.15mm.

Hood covers shall be made of m.s sheet not less than 0.90mm thick for shutter having width 3.5 meter and above the thickness of M.S sheet for the hood cover shall be not less than 1.25mm.

The spring shall be of best quality and shall be manufactured from tested high tensile steel wire of strip of adequate strength to balance the shutter in all position. The spring pipe shall etc. shall be supported on strong M S of malleable C I brackets . The brackets shall be fixed on or under the lintel as specified with raw plunge and screw bolt etc.

The rolling shutter shall be self rolling up to 8 sq. m. clear area without ball bearing and up to 12 Sq.m clear with ball bearing. If the rolling shutter area of larger , then gear operated type shutters shall be used.

The locking arrangement shall be provided at the bottom of shutter at both ends the shutter shall be open from outside.

The shutter shall be completed with door suspension shaft locking arrangement , pulling hooks , handles and other accessories.

Mode of Measurement & Payment

The payment shall be made on **SQMT** basis of the finished work

The necessities labour material Equipments tools and plant conveyance including loading

And unloading etc shall be provided by the contractor as directed by engineer in charge.

The item shall be measured for its **length & width** limiting damnation in this specified on this plan or as directed .

The rate shall be for a unit of one **SQMT**.

Item No:- 35

P & L 60x60cm Hand Dressed Mirror polished Blue Kota Stone slab 30 mm thick flooring over 20 mm (average)thick base of cement mortar 1:6 (1-cement 6-coarse sand) or L.M 1:1.5 (1 Lime putty : 1.5 coarse sand laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc.complete(30 mm thick)

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.14.43 (A) / P.No.98

The payment shall be made on **square Meter** basis of the finished work.

Item No:- 36

P & L 41x57cm Hand Dressed Mirror polished Blue Kota Stone slab 30 mm thick in riser of steps,skirting dedo and pillars laid on 10 mm thick cement mortar 1:3 (1-cement 3-coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc.complete(30 mm thick)

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.14.43 (B) / P.No.98

The payment shall be made on **square Meter** basis of the finished work.

Item No:- 37

Providing Plinth Protection to Building including excavation in ordinary soil and laying cement concrete 1:3:6 using stone aggregates of 40mm nominal size in foundation layer 100 mm thick below pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M300 pneumatic compressed by mechanically pressed and as per approved design including 75mm Sand layer for levelling and filling the joint with sand in proper line and level etc. complete, Including Providing and fixing pre-cast concrete kerb stone of grey cement based concrete block 30cm length, 30cm height and 15cm thick of M250 grade concrete as per approved design and

including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1cement:3 fine sand) etc. complete.

Excavation

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.0.0. (A) P.No.29.

Cement Concrete

The relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 5.3.2. (A) P.No.38 except that using for including the cost of form work for G.FLOOR instead of excluding the cost of form work.

For form work use the relevant specification shall be followed as per General Technical specification for Building work booklet It.No.9.1 (A) P.No.63

Pre-cast Rubber Dye inter locking concrete block 60mm thick

The relevant specification shall be followed as per Item No:- 57

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

Item NO:- 38

Providing and laying broken chine mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall,clearing with water and oxalic acid etc. as directed. and 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 and finished with a floating coat of neat cement. (B) 50mm thick.

1.0 Material

Water shall confirm Material Specification no M- 1

Cement shall confirm Material Specification no M- 3

Sand shall confirm Material Specification no M- 6

Crushed stone aggregates shall confirm Material Specification no M- 12

Brick aggregates shall confirm Material Specification no M- 14

White Cement Shall confirm Material Specification no M- 4

Water proofing compound shall be done as per Specification no 17.70 Page No. 121

Chemicals and compounds of approved shall be of approved quality and make. The proportion of the compound shall be of specified proportion as specified by the manufacturer

2.0 Workmanship

Cleaning the slab surface by mechanical means or wire brush to remove old paint, dust, dirt and all loose material

(a) Providing first layer of C.M. 1 4 of 40 mm thickness mixed with water proofing compound at rate prescribed by manufacturer, including putting of brick bats of average thickness 40 mm Well

immerssed in water laid uniformly on first layer of mortar including applying cement slurry @ rate of 0.08 bag sqm. on fixed layer of brick bats including maintaining necessary slope

(B) providing second layer 40 mm thick C.M 1 4 mixed with water proofing compound as directed, including finishing smooth with cement slurry as directed complete.

(C) after finishing the whole terrace shall be flooded with water for a period of two weeks as directed

The waterproofing material of approved quality shall be mixed with the cement slurry as per specified proportion as directed by the manufacturer of the compound and as directed by The engineer in charge the mixture shall be applied uniformly to the surface in required coats as directed by the engineer in charge

A guarantee bond on appropriately stamped paper shall be given by the contractor to the department in the manner and form prescribed below

FORM OF GUATANTEE BOND

I We (Contractor) hereby guarantee that water proofing work will remain leakage proof for period of 3 years after completion of the work of water proofing treatment as per the terms and conditions of the contact and leakage that might be caused in building where the water proofing treatment is done we hereby Guarantees to make good any loss of damages suffered by the Government of Gujarat and further grantee to redo effective work without claiming any extra cost

2.1 This guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 Years.

2.2 The deposit at the rate of 50% of the cost of this item the running and final bills shall be recovered and retained for the first one years after completion of the guarantee period balance of guarantee period and shall be refunded only after the completion of the guarantee period.

3.0 MODE OF MEASUREMENT and PAYMENT

3.1 The unit rate of water proofing treatment shall include the cost of all materials, tools and plant chemicals and compounds required for water proofing, Applying the same to specified surface as per drawings, finishing, painting with three coats, etc, and all other incidental expenses for producing water proofing work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of water proofing shall include the cost of all labour, materials chemicals and compounds tools and plant scaffolding and all incidental expenses as described herein above.

3.2 The water proofing work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one sq. Meter

3.3 The payment will be made on sq. meter basis of the finished work.

Item NO:- 39

Providing and fixing polished 18 mm thick Granite stone with full round edge and polished of approved quality in clading on sill and around the doors/ windows/ ventilation with 20 mm thick cement plaster CM (1:4) and fixing with cement slurry & adhesive including moulding of exposed edges as directed by engineering in charge etc. complete.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.14.44 / P.No.99 except using of polished 18 mm thick black granite with full round edge and double side polished of approved quality in between urinal and fixing with cement slurry & adhesive including moulding of both exposed edges as directed by engineering in charge etc. complete.

The payment shall be made on **square Meter** basis of the finished work.

Item NO:- 40

Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with briocks having croshing strength not less than 35Kg. Cm2 in C.M. 1:5 precast RCC cover 455mm x 610mm intenal dimensions with frame (R.C.C. top slabe with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete (i) Inside dimensions 455mmx 610mm and 450mm deep for single pipe line.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No. 24.44(i) P.No.183

Item NO:- 41

Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with briocks having croshing strength not less than 35Kg. Cm2 in C.M. 1:5 C.I. cover with frame (Light duty) 455mm x 610mm intenal dimensions total weight of cover with frame to be not less than 38Kg. (Wt. of cover 23 Kg.) and Wt. of frame 15Kg.) (R.C.C. top slabe with 1:2:4 mix (1-cement :2- coarse sand :4-graded stone aggregate 20mm size) foundation concrete 1:5:10 inside plaster 15mm thick with cement mortar 1:3 finished smooth with a floating coat of neat cement on walls and bed concrete etc. complete.(i) Inside dimensions 500mmx 700mm and 450mm deep for single pipe line.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No. 24.44(ii) P.No.184

Item NO:- 42

Extra over items for every additional depth of 0.1M. of part thereof beyond 450mm depth for Brick masonry chamber.(i) for 455mm x 610mm size.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.24.46. P.No.184 except that using for 455mm x 610mm size

Item NO:- 43

Extra over items for every additional depth of 0.1M. of part thereof beyond 450mm depth for Brick masonry chamber.(i) for 500mm x 700mm size.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.24.46. P.No.184 except that using for 500mm x 700mm size.

Item NO:- 44

Providing cement vata (10cm x 10cm size) quarter round in cement mortar 1:1 including neat cement finishing watering etc. Complete

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No. 17.0.0.1 P.No.124

The work shall be measured and paid on one Rmt

Item NO:- 45

Providing and fixing in position 150 mm high, English letters made from 1.0 mm thick stainless steel sheet as directed by Engineer in charge with all necessary tools & plants etc. complete.

GENERAL

This work shall consist of furnishing and placing providing and fixing in position 150 mm high 150 mm wide English letters of the shape and dimensions shown on the drawings and conforming to these specifications or as approved by the Engineer in charge.

MATERIAL

Stainless steel English letters

The Stainless steel English letters shall be of 150mm size in height The Stainless steel letters shall be made of approved quality of Stainless steel sheets of approved thickness the

With of letters shall be in proportion of its height and later shall be made in capital the spelling shall be grammatically true with reasonable spacing as directed

The Stainless steel English letters shall be free from any defect in surface and shall be glossy polished as directed

WORKMANSHIP

The English letters shall be firmly fitted in true line and level as and where directed. The English letters shall be fitted by wooden plugs

MODE OF MEASUREMENT & PAYMENT:

The payment will be made on Number basis of the finished work.

All necessary labour materials Equipment tools and plant, conveyance including loading and unloading etc shall be provided by the contractor as directed by the Engineer in charge

The item shall be measured for its Number limiting dimensions to those specified on plan or as directed.

The rate shall be for a **unit of one number**

Item NO:- 46

Providing and fixing Germany glass brick German size 19 x 19 x 10 cm is opening and fixed with white cement and boundary adhesive as per design and sealing the joints with silicon structural sealant SSG-4000 including all labour cost etc complete.

Generals:

Providing and fixing Germany glass brick German size 19 x 19 x 10 cm is opening and fixed with white cement and boundary adhesive as per design and sealing the joints with silicon structural sealant SSG-4000 fixed in free live and plants including necessary scaffolding etc. complete for all height.

Appearance

The texture and color of glass blocks can vary in order to provide a range of transparency Patterns can be pressed into either the inner void or the outside surface of the glass when it is cooling in order to provide differing effects. Glazes or inserts may also be added in order to create a desired private or decorative effect.

Standards and grading

Glass blocks in Europe are manufactured in accordance with the European Standard EN1052-2. The International Standard is ISO TC 160/SG1. The Standards allow for variation in sizes and production irregularity. Blocks fall within three classifications; Class1, Class 2 and Class 3 with Class 1 being the highest and best rating with a maximum permissible deviation from designed size and rectangularity of 1 mm.

Insulation

Glass brick has an r value between 1.75 and 1.96, close to that of thermopane windows.[1][2] There are newer glass blocks injected with argon gas and having a layer of low-emissivity glass between the halves, which increases the insulative (U) value to 1.5 W/m²·K, which is between triple glazed windows (1.8 W/m²·K) and specialty double glazed windows with advanced frame and coatings(1.2 W/m²·K).[3] is ISO TC 160/SG1. The Standards allow for variation in sizes and production irregularity. Blocks fall within three classifications; Class1, Class 2 and Class 3 with Class 1 being the highest and best rating with a maximum permissible deviation from designed size and rectangularity of 1 mm.

Mode of Measurement and Payment

The payment will be made on **Sqm** basis of the finished work.

All necessary labour materials Equipment tools and plant, conveyance including loading and unloading etc shall be provided by the Contractor as directed by the Engineer in charge

Item NO:- 47

Providing and fixing approved quality prefabricated 0.80 mm thick colour coated GALVALUME self-supporting roofing system, 100% leak proof, of Proflex / Steel Craft or equivalent make approved by GSCSC Ltd., at height up to 10.0 m from base level, with proper perfect curve geometry, true to line and level, including placing and fixing complete, for Bay-3 (SPAN/5) having span 23.00 m, arch rise 4.60 m, arch length 26.78 m, length 42.00 m, height 6.00 m, , including on-site manufacturing and simultaneous installation facility, necessary roll forming, fabrication, seaming, all civil works, steel works, fabrication works, erection, supply and fixing of hangers, clamps, fasteners and accessories, complete in all respects, including providing and fixing turbo ventilators at approved

locations with proper cut-outs and all required sealants of GE / Wacker or approved equivalent for complete waterproofing; the contractor shall submit detailed specifications, structural design data, test certificates and drawings prior to commencement of work, carry out minimum three (3) metallurgical tests, fabricate, corrugate, lift, place, erect and fix the roofing sheets at site at any height with excellent workmanship, the colour of sheets shall be as approved by the Architect, and the contractor shall provide 3 years guarantee, performance bond and maintenance for the prefabricated self-supporting roofing system without any extra cost, complete as per directions and to the full satisfaction of the Engineer-in-Charge, including Imported Galvalume material having BMT 0.80 mm (APT 0.85 mm) or BMT 1.10 mm (APT 1.15 mm) with thickness tolerance ± 0.02 mm and coil width 912 mm with tolerance ± 4 mm

Technical specifications & Additional conditions for galvalume steel sheets:

3. (a) Technical specifications for galvalume steel sheets:

- Steel grade: D
- Standard: Colour coated galvalume steel sheets complying to ASTM A792
- Coil width: 610 mm, tolerance ± 4.00 mm Profiled width : 305 mm, tolerance ± 10.00 mm
- Base metal thickness (BMT): 0.90 mm (tolerance as ± 0.04 mm) for 17 m span
- Total coated thickness (TCT): 0.95 mm (tolerance as ± 0.04 mm) for 17 m span
- Base metal thickness (BMT): 1.00 mm (tolerance as ± 0.04 mm) for 20 m span
- Total coated thickness (TCT): 1.05 mm (tolerance as ± 0.04 mm) for 20 m span
- Base metal thickness (BMT): 1.20 mm (tolerance as ± 0.04 mm) for 30 m span
- Total coated thickness (TCT): 1.25 mm (tolerance as ± 0.04 mm) for 30 m span
- Base metal thickness (BMT): 1.60 mm (tolerance as ± 0.04 mm) for 35 m span
- Total coated thickness (TCT): 1.65 mm (tolerance as ± 0.04 mm) for 35 m span
- Alloy coating: AZ150 (150 gram/Sqm) minimum (Aluminium 55%, Zinc 43.5%, Silicon 1.5%)
- Yield strength: 350 MPa
- Paint coating: Regular modified polyester
- Top coat of painting: 25 micron minimum (colour 20 micron and primer 5 micron)
- Bottom coat of painting: 12 micron minimum (colour 7 micron and primer 5 micron)

(b) Make of Galvalume Steel Sheets:

Any of the following from the International Market.

- ThyssenKrupps, Germany
- Dongbu Steel Co. Limited, Korea
- Corus Steels, U.K.
- Dofasco Steels, Canada.
- Bethlehem Steels, U.S.A.
- Tata Blue Scope, Australia
- Any other licensed manufacturer/producer, who is the member of Zinc
- Aluminium coaters (ZAC) Association.

The manufacturer shall be ISO certified and follow international standards for Galvalume sheet roofing.

(c) Inspection & Testing:

Once the material reaches at work site samples shall be drawn from the same for testing, before the sheet is used for roofing at site, these samples can be tested at a reputed laboratory for the following:-

- Base metal thickness
- Coating mass (AZ150)
- Yield/tensile strength
- Top & bottom coat thickness

Charges for the same, if any, shall be borne by the contractor. Besides this, the contractor also needs to submit the material test report from the steel mill supplier for each steel coil.

Additional conditions

a) Contractor shall be responsible for any leakage across laps, from roof, through fasteners etc. complete for a period of two years from the date of completion of work. He shall rectify all the leakage points at his own cost during this period. Security deposit to be deducted at the rate mentioned in the clause 1 of Contract Conditions, for the item of Galvalume sheet roofing, shall be released after two years of completion of the work.

b) Contractor needs to submit warranty for a minimum period of 10 years from the date of supply of Galvalume sheets at site from the principal Galvalume steel manufacturer. The steel mill should have an experience of minimum 5 years in manufacturing this type of Galvalume Steel and document substantiating the same should be submitted with the warranty at the time of supply of sheets at site.

c) The Contractor needs to submit a self-certification that the Galvalume Coils to be used by them would be suitable for Self Supported Roofings.

d) If any defect in Galvalume sheets is noticed during warranty period, same would be set right by the contractor within 10 (Ten) days after its reporting to the contractor, failing which Competent Authority in reserves the right to get the work executed and amount so incurred would be recovered from the contractor from this contract as well as from any of the amount available from any other contract of the contractor and no claim on this account shall be entertained.

e) Contractor shall make his own arrangement of generator / electric supply for the machinery to be used in fabrication and installation of roofing etc. at site. If electric supply is available complex than contractor can use this electricity and he has to make the payment to on market rates for the actual electric units consumed by him/them as decided by , exclusively for the work of roofing.

f) All safety precautions should be taken by the contractor during the execution of work for ensuring the safety to the laborers/workers.

Mode of Measurement & Payment:

The payment will be made on **square meter** basis of the finished work.

All necessary labour materials Equipment tools and plant, conveyance including loading and unloading etc shall be provided by the Contractor as directed by the Engineer in charge

The item shall be measured for its **length & width** limiting dimensions to those specified on plan or as directed.

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

Item N0:- 48

Providing and fixing Turbo ventilators on the top of the self supported steel roof at the prescribed location as per the design and drawing, made out of high grade aluminium of brand everflow and equivalent. The turbo ventilators are to be fixed by using the housing made of polycarbonate of reputed brand and sealants of GE , Wreckers so there entire joinery with the roof . The rate is water proof. The rate is inclusive of all tools, tackles, fabrication, wastage and necessary civil work and everything to complete the work in perfect manner.

General

Providing and fixing Turbo ventilators on the top of the self-supported steel roof at the prescribed location as per the design and drawing, made out of high grade aluminum of brand ever flow and equivalent. The turbo ventilators are to be fixed by using the housing made of polycarbonate of reputed brand and sealants of GE , Wreckers so there entire joinery with the roof . The rate is water proof. The rate is inclusive of all tools, tackles, fabrication, wastage and necessary civil work and everything to complete the work in perfect manner.

Before purchasing Turbo ventilators it should confirm with engineer in charge including following features and specification

Turbine Dia : 28 Inch (760mm)

Neck/Throat : 24 Inch (610mm)

Height : 18 Inch (460mm)

Vanes(Blades) : 42 Vanes , Aluminum 0.5 mm thickness Alloy 8011

Base Ring MOC : Stainless steel

(Mounting ring)

Top Plate MOC : Stainless Steel 0.8 mm thickness

Rotation : Twin Sealed 6203ZZ bearings with self-lubricating Dupont Zytel 101L Polyamide 66 resin to ensure frictionless rotation even at lowest wind velocity Twin Sealed 6201ZZ bearings with self-lubricating Dupont Zytel 101L Polyamide 66 resin to ensure frictionless rotation even at lowest wind velocity

Centre shaft : 18mm high carbon steel zinc plated.

Inner Arms : M.S. with electro zinc plating

Outer Arms : M.S. with electro zinc plating

Frp base plate : 2 mm thick clear 1.020 mtr wide and 1.65 mtr long matching your sheet profile. Weight 8 kg(Approx.)

Weight : 6.5 Kg approx.

Center Width : 800mm \pm 5 mm

Dia of Bottom Ring : 600mm \pm 15 mm

Nos of Bearing : 02 Nos

Bearing Type : SKF – 6001 ZZ & 6003 ZZ Permanently Lubricated & Sealed

Rivets : Aluminum Alloy with Washer

Mode of Measurement

Consolidated item shall be measured and paid for actual size of RCC member casted on **meter** basis

Item NO:- 49

Extra for additional height of propping and centering where the height of propping and centering exceeds 4 .0 M between supporting floor to ceiling including temporary brick or stone pillars for supporting as required. (ii) Height more than 5.0 M.and upto 6.0 M.

The relevant specification shall be followed as per General Technical specification for Building work booklet It. No. 9.1. (A) (I) P.No.64 except using of additional height of propping and centering where the height of propping and centering exceeds 4 .0 M between supporting floor to ceiling including temporary brick or stone pillars for supporting as required. (ii) Height more than 5.0 M.and upto 6.0 M.

The rate shall be for a unit of **one Sq.mt.**

Item NO:- 50

Providing, laying and jointing in true line and level 110 diameter U.P.V.C (Type B) conforming to IS 13592-1992 with one end plain and other end socketed with rubber ring, & fittings conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 110 mm diameter x 149 mm length x 145 mm height at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.

The relevant specifications of Building Booklet It. No.23.8. Page No.162 shall be followed expect use 110 diameter U.P.V.C (Type B) conforming to IS 13592-1992 with one end plain and other end socketed with rubber ring, and fittings conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160 mm diameter x 210 mm length x 196 mm height at every 2000 mm center to center or shall be concealed instead of 6 kgs sq.cm. working pressure polythene pipes.

Item NO:- 51

Providing and fixing the approved quality prefabricated 0.80 mm thick colour coated GALVALUME self-supporting 100% leak proof roof of proflex, steel craft or equivalent quality approved by GSCSC LTD at the height up to 10 MT base level with proper perfect curve geometry in line and level and placing and fixing. The prefabricated self-supporting roofing includes on site manufacturing & simultaneous installation facility, necessary roll farming, fabrication , seaming civil work, steel work, fabrication , erection , hangers , clamps, the contractor has to fix turbo ventilators at desired location having perfect cut outs on the roof with all necessary sealants of GE OR wrecker for complete water proofing. the contractor must provide all the detail specification , structural data, test certificate & drawing of the roofing system prior to commencement of work. the roofing shall be fabricate, corrugated , lifted, placed , erected, fixed at specific location up to any height at site and work shall be completed in excellent workmanship up to satisfaction of engineer in charge . The colour should be as per approved shed by architect. The contractor shall provide minimum 3 metallurgical test before commencement of work. The contractor has to give 3 years guaranty performance bond and maintenance for prefabricated roofing system without any extra cost. Including IMPORTED GALVALUME Material having BMT: 0.8mm, APT: 0.85 mm, Tolerance : +/- 0.02 MM, Coil Width: 912 mm, Tolerance: +/- 4 mm.

Technical specifications & Additional conditions for galvalume steel sheets:

3. (a) Technical specifications for galvalume steel sheets:

- Steel grade: D
- Standard: Colour coated galvalume steel sheets complying to ASTM A792
- Coil width: 610 mm, tolerance $\pm 4.00\text{mm}$ Profiled width : 305 mm, tolerance $\pm 10.00\text{mm}$
- Base metal thickness (BMT): 0.90 mm (tolerance as $\pm 0.04\text{mm}$) for 17 m span
- Total coated thickness (TCT): 0.95 mm (tolerance as $\pm 0.04\text{mm}$) for 17 m span
- Base metal thickness (BMT): 1.00 mm (tolerance as $\pm 0.04\text{mm}$) for 20 m span
- Total coated thickness (TCT): 1.05 mm (tolerance as $\pm 0.04\text{mm}$) for 20 m span
- Base metal thickness (BMT): 1.20 mm (tolerance as $\pm 0.04\text{mm}$) for 30 m span
- Total coated thickness (TCT): 1.25 mm (tolerance as $\pm 0.04\text{mm}$) for 30 m span
- Base metal thickness (BMT): 1.60 mm (tolerance as $\pm 0.04\text{mm}$) for 35 m span
- Total coated thickness (TCT): 1.65 mm (tolerance as $\pm 0.04\text{mm}$) for 35 m span
- Alloy coating: AZ150 (150 gram/Sqm) minimum (Aluminium 55%, Zinc 43.5%, Silicon 1.5%)
- Yield strength: 350 MPa
- Paint coating: Regular modified polyester
- Top coat of painting: 25 micron minimum (colour 20 micron and primer 5 micron)
- Bottom coat of painting: 12 micron minimum (colour 7 micron and primer 5 micron)

(b) Make of Galvalume Steel Sheets:

Any of the following from the International Market.

- ThyssenKrupps, Germany
- Dongbu Steel Co. Limited, Korea
- Corus Steels, U.K.
- Dofasco Steels, Canada.
- Bethlehem Steels, U.S.A.
- Tata Blue Scope, Australia
- Any other licensed manufacturer/producer, who is the member of Zinc
- Aluminium coaters (ZAC) Association.

The manufacturer shall be ISO certified and follow international standards for Galvalume sheet roofing.

(c) Inspection & Testing:

Once the material reaches at work site samples shall be drawn from the same for testing, before the sheet is used for roofing at site, these samples can be tested at a reputed laboratory for the following:-

- Base metal thickness
- Coating mass (AZ150)

- Yield/tensile strength
- Top & bottom coat thickness

Charges for the same, if any, shall be borne by the contractor. Besides this, the contractor also needs to submit the material test report from the steel mill supplier for each steel coil.

Additional conditions

- Contractor shall be responsible for any leakage across laps, from roof, through fasteners etc. complete for a period of two years from the date of completion of work. He shall rectify all the leakage points at his own cost during this period. Security deposit to be deducted at the rate mentioned in the clause 1 of Contract Conditions, for the item of Galvalume sheet roofing, shall be released after two years of completion of the work.
- Contractor needs to submit warranty for a minimum period of 10 years from the date of supply of Galvalume sheets at site from the principal Galvalume steel manufacturer. The steel mill should have an experience of minimum 5 years in manufacturing this type of Galvalume Steel and document substantiating the same should be submitted with the warranty at the time of supply of sheets at site.
- The Contractor needs to submit a self-certification that the Galvalume Coils to be used by them would be suitable for Self Supported Roofings.
- If any defect in Galvalume sheets is noticed during warranty period, same would be set right by the contractor within 10 (Ten) days after its reporting to the contractor, failing which Competent Authority in reserves the right to get the work executed and amount so incurred would be recovered from the contractor from this contract as well as from any of the amount available from any other contract of the contractor and no claim on this account shall be entertained.
- Contractor shall make his own arrangement of generator / electric supply for the machinery to be used in fabrication and installation of roofing etc. at site. If electric supply is available complex than contractor can use this electricity and he has to make the payment to on market rates for the actual electric units consumed by him/them as decided by , exclusively for the work of roofing.
- All safety precautions should be taken by the contractor during the execution of work for ensuring the safety to the laborers/workers.

Mode of Measurement & Payment:

The payment will be made on **square meter** basis of the finished work.

All necessary labour materials Equipment tools and plant, conveyance including loading and unloading etc shall be provided by the Contractor as directed by the Engineer in charge

The item shall be measured for its **length & width** limiting dimensions to those specified on plan or as directed.

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

Item NO:- 52

Box cutting the road surface to proper slope and camber for making a base for road work including removing the excavated stuff and depositing on the road side slope as directed upto 50Mt.lead.

1. This work shall consist of excavation, removal and satisfactory disposal of all materials necessary for the construction of widening carriageway in accordance with requirements of these specifications and the lines, grades and cross sections shown in the drawings or as indicated by the Engineer.

2. After the site has been cleared the limits of excavation box cutting the road surface shall be set out true to lines, curves, slopes, grades and sections as shown on the drawings or as directed by the Engineer.
3. Box cutting shall be carried out in conformity with the directions laid here in under and in a manner approved by the Engineer. The work shall be so done that the suitable materials available from box cutting excavation are satisfactorily utilized as directed.
4. The contractor shall not excavate outside the limits of box cutting. Subject to the permitted tolerances, any excess depth width excavated beyond the specified levels dimensions on the drawings shall be made good at the cost of the contractor with suitable material of characteristics similar to that removed and compacted as directed.
5. Cutting shall be done in proper grade and camber as per measurements given. Care must be taken that all slopes are evenly and truly dressed. Cutting shall be done to the exact depth required and shall be as per formation level in proper grade and the camber. If extra depth of cutting is done due to negligence of contractor the same shall be refilled with approved quality of materials duly consolidated to the satisfaction of the Engineer-in-charge (without extra cost).
6. The bottom level of box cutting i.e. sub grade shall be watered and well compacted with vibratory roller at OMC to the desired density as directed by the Engineer in charge. Rolling and compaction shall be deemed to be incidental to the work and no extra cost shall be paid for compaction of box cutting base surface.
7. The stuff received from the cutting shall be used for filling and correcting side slopes of bank and earthwork for embankment as directed by the Engineer in charge with all lead and lift.
8. The measurement of box cutting shall be taken on level basis and level shall be taken at 30 mt. interval. Volume shall be computed in cubic meters by average area method.
9. The payment shall be made on Cmt. basis.
10. The rate includes cost of all labour, machineries required, cost of carting and spreading the cutting stuff with all lead and lift and leveling the dumping ground embankment, rolling and consolidation of subgrade level etc. complete.

Item NO:- 53

Filling in plinth with sand under floors including watering ramming, consolidating and dressing complete for road work

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.4.004. P.No.35. except using of sand under floors including watering ramming, consolidating and dressing complete for road work

Item NO:- 54

Construction of granular sub-base 150 mm thick by providing coarse graded machine crushed B.T. material satisfying MOST specification of grading I (B.T. stone aggregate 53 mm to 26.5 mm 35 %, 26.5 to 4.75 mm - 45 % and 2.36 mm below - 20 %)including spreading in uniform layer with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC and compacting with vibratory roller to achieve the desired density etc. complete.

401.1 Scope:

This work shall consist of laying and compacting well graded material on prepared sub grade in accordance with the requirements of these specifications. The material shall be laid in one or more layers sub base and upper sub base (termed as sub base herein after) as necessary according to lines, grades and cross sections shown on the drawings or as directed by the Engineer.

401.2 Materials:

401.2.1 The materials to be used for the work shall be crushed stone of required grading. The material shall be free from organic or other deleterious constituents and conform to the grading I as mentioned below.

TABLE 400-2.
GRADING FOR COARSE GRADED GRANULAR SUB-BASE
MATERIALS.

IS sieve Designation	Percent by weight passing the IS sieve. Grading I
75.0 mm	100
53.0 mm	—
26.5 mm	55 – 75
9.5 mm	—
4.75 mm	10 – 30
2.365 mm	
0.425 mm	
0.075 mm	< 10
CBR Value (Minimum)	30

Material passing 425 micron (0.425 mm) sieve for all the three grading when tested according to IS : 2720 (Part 5) shall have liquid limit and plasticity index not more than 25 and 6 percent respectively.

401.2.2 Physical requirements:

The materials shall have a 10 percent fines value of 50 KN or more (for sample in soaked condition) when tested in compliance with B.S.: 812 (Part 111). The water absorption value of the coarse aggregate shall be determined as per IS : 2386 (Part 3) : if this value is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS : 383. For grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 percent.

401.3 Strength of sub-base.

It shall be ensured prior to actual execution that the material to be used in the sub base satisfies the requirements of CBR and other physical requirements when compacted and finished.

When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remolded at field dry density and moisture content and any other tests for the "Quality" of materials, as may be necessary.

401.4 Construction Operations:

401.4.1 Preparation of Sub grade:

Immediately prior to the laying of sub-base, the sub grade already finished to Clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water, if necessary and rolled with two passes of 80-100 KN smooth wheeled roller.

401.4.2 Spreading and compacting:

The sub-base material of grading specified in the Contract shall be spread on the prepared sub grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned in Clause 401.2.1, of this item mixing shall be done mechanically by the mix in place method.

Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations, as in small-sized jobs. The equipment used for mix-in-place construction shall be a rotavator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out to establish its suitability for the work.

Moisture content of the loose material shall be checked in accordance with IS:2720 (Part 2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 percent above to 2 percent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc barrows, rotators until the layer is uniformly wet.

Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 KN weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with help of a vibratory roller of minimum 80 to 100 KN static weight with plain drum or pad foot drum or heavy pneumatic tyred roller of minimum 200 to 300 KN weight having a minimum tyre pressure of 0.7 MN/ M² or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional cross fall and super elevation and shall commence at the edges and progress towards the centre for portions having cross fall on both sides each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and cross fall (camber) shall be checked and any high spots or depressions, which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 Km per hour. Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS:2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

Surface Finish and Quality Control of work:

The surface finish of construction shall conform to the requirements of Clause 902 of MORT & H specifications. Control on the quality of materials and works shall be exercised by the Engineer in accordance with Section 900 of MORT & H specifications.

401.6 Arrangements for Traffic:

During the period of construction, arrangement of traffic shall be maintained in accordance with Clause 112 of MORT & H specifications.

401.7 Measurements for Payment: Granular sub base shall be paid as finished work in position on cross sectional measurements and computing the volume of GSB work in cubic meters by average area method.

The protection of edges of granular sub base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

401.8 Rate:

The Contract unit rate for granular sub base shall be payment in full for carrying out the required operations including full compensation for:

- [i] Making arrangements for traffic to Clause 112 as above except for initial treatment to verges, shoulders and construction of diversions.
- [ii] Furnishing all materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lift.
- [iii] All labour, tools, equipment and incidentals to complete the work to the specifications.
- [iv] Carrying out the work in part widths of road where directed, and
- [v] Carrying out the required tests for quality control.

Item NO:- 55

Providing and laying wet mix macadam base course 250 mm thick using machine crushed B.T. chips as per required gradation mixing with required optimum quantity of water, conveying the mix to site of work, spreading in to grade and camber with mechanical paver and consolidation each layer with vibratory roller including cost of material labour plant and equipment etc. complete.

406.1 SCOPE

This work shall consist of laying and compacting clean, crushed, graded aggregate and granular material, premixed with water, to a dense mass on a prepared subgrade sub base/ base or existing pavement as the case may be in accordance with the requirements of these specifications. The material shall be laid in two layers to lines, grades and cross-sections shown on the approved drawings or as directed by the Engineer.

The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75mm. When vibrating or other approved types of compacting equipment are used, the compacted depth of a single layer of the sub-base course may be increased to 20cm upon approval of the Engineer.

406.2 MATERIALS

406.2.1 AGGREGATES

406.2.1.1 PHYSICAL REQUIREMENTS: Course aggregates shall be crushed stone. If crushed gravel / shingle is used, not less than 90 percent by weight of the gravel / shingle pieces retained on 4.75 mm sieve shall have at least two fractured faces. The aggregates shall conform to the physical requirements set forth in Table 400-10 below.

TABLE 40-10 PHYSICAL REQUIREMENT OF COARSE AGGREGATES FOR WET MIX MACADAM FOR SUB-BASE / BASE COURSES

Test	Test Method	Requirements
1.*Los Angeles Abrasion value	IS : 2386 (Part-4)	40 percent (Max)
Aggregate impact value	IS : 2386 (Part-4) or IS : 5640	30 percent (Max)
2. Combined Flakiness and Elongation indices (Total)**	IS : 2386(PART-1)	30 percent (Max)

* Aggregates may satisfy requirements of either of the two tests.

** To determine this combined proportion, the flaky stone from a representative sample should first be separated out. Flakiness index is weight of flaky stone metal divided by weight of stone sample only the elongated particles be separated out from the remaining (non flaky stone metal. Elongation index is weight of elongated particles divided by total non flaky particles. The value of flakiness index and elongation index so found are added up.

If the water absorption value of the coarse aggregate greater than 2 percent, the soundness test shall carried out on the material delivered to site as per 2386 (Part – 5).

406.2.1.2 Grading requirements:

The aggregates shall conform to the grading given in Table 400-11

TABLE 400-11. GRADING REQUIREMENTS OF AGGREGATES FOR WET MIX MACADAM.

Is Sieve Designation	Percent by weight Passing the IS sieve
53.00 mm	100
45.00 mm	95-100
26.50 mm	-
22.40 mm	60-80
11.20 mm	40-60
4.75 mm	25-40
2.36 mm	15-30
600.00 micron	8-12
75.00 micron	0-8

Materials finer than 425 micron shall have plasticity index (P.I.) not exceeding 6.

The final gradation approved within these limits shall be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice-versa.

406.3 Construction Operation :

406.3.1 Preparation of base : Clause 404.3.1 as below shall apply.

404.3.1 Preparation of base: The surface of the subgrade/sub-base/base to receive the water bound macadam course shall be prepared to the specification lines and cross fall (camber) and made free of dust and other extraneous material. Any ruts or soft yielding places shall be corrected in an approved manner and rolled unit firm surface is obtained if necessary by sprinkling water. Any sub-base/base/surface irregularities, where predominant, shall be made good by providing appropriate type of profile corrective course (levelling course) to clause 501 of these specifications.

As far as possible, laying water bound macadam course over an existing thick bituminous layer may be avoided since it will cause problems of internal drainage of the pavement at the interface of two courses. It is desirable to completely pick out the existing thin bituminous wearing course where water bound macadam is proposed to be laid over it. However, where the intensity of rain is low and the interface drainage facility is efficient, water bound macadam can be laid over the existing thin bituminous surface by cutting 50 mm x 50 mm furrows at an angle of 45 degrees to the centre line of the pavement at one metre intervals in the existing road. The directions and depth of furrows shall be such that they provide adequate bondage and also serve to drain water to the existing granular base course beneath the existing thin bituminous surface.

406.3.2 Provision of lateral confinement of aggregates :

While constructing wet mix macadam arrangement shall be made for the lateral confinement of wet mix. This shall be done by laying materials in adjoining shoulders along with that of wet mix macadam layer and following the sequence of operations described in Clause 407.4.1 as below.

407.4 Construction Operations:

407.4.1 Shoulder: The sequence of operations shall be such that the construction of paved shoulder is done in layers each matching the thickness of adjoining pavement layer. Only after a layer of pavement and corresponding layers in paved and earth shoulder portion have been laid and compacted, the construction of next layer of pavement and shoulder shall be taken up.

Where the materials in adjacent layers are different, these shall be laid together and the pavement layer shall be compacted first. The corresponding layer in paved shoulder portion shall be compacted thereafter, which shall be followed by compaction of earth shoulder layer. The adjacent layers having same material shall be laid and compacted together.

In all cases where paved shoulders have to be provided along side of existing carriageway, the existing shoulders shall be excavated in full width and to the required depth as per clause 301.3.7 under no circumstances, box cutting shall be done for construction of shoulders.

Compaction requirement of earthen shoulder shall be as per table 300-2 in the case of bituminous courses, work on shoulder (earthen/hard/paved), shall start only after the pavement course has been laid and compacted.

During all stages of shoulder (earth/hard/paved) construction, the required cross fall shall be maintained to drain off surface water

Regardless of the method of laying, all shoulder construction material shall be placed directly on the shoulder. Any spilled material dragged on to the pavement surface shall be immediately removed, without damage to the pavement, and the area so affected thoroughly cleaned.

406.3.4 Preparation of mix :

Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced / positive mixing arrangement like pug-mil or pan type mixer or concrete batching plant.

Optimum moisture for mixing shall be determined in accordance with IS : 2720 (Part – 8) after replacing the aggregate fraction retained on 22.4 mm sieve with material of 4.75 micron to 22.4 mm size. While adding water, due allowance should be made for evaporation losses. However, at the time of compaction, water in the wet mix should not vary from the optimum value by more than agreed limits. The mixed material should be uniformly wet and so segregation should be permitted.

406.3.4 Spreading of mix :

Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared sub grade / sub-base / base in required quantities. In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed stretch be permitted.

The mix may be spread either by a paver finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading the material uniformly all over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade.

The paver finisher shall be self – propelled, having the following features :

- (i) Loading hoppers and suitable distribution mechanism
- (ii) The screed shall have tamping and vibrating arrangement for initial compaction to the layer as it is spread without rutting or otherwise marring the surface profile.
- (iii) The paver shall be equipped with necessary control mechanism so as to ensure that the finished surface is free from surface blemishes.

The surface of the aggregate shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregate as may be tested by depth blocks during construction.

No segregation of larger and fine particles should be allowed. The aggregates as spread should be allowed. The aggregates as spread should be of uniform gradation with pockets of fine materials.

406.3.5 Compaction :-

After the mix has been laid to the required thickness, grade and camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100mm, a smooth wheel roller of 80 to 100 KN weight may be used. For a compacted single layer up to 200mm, the compaction shall be done with the help of vibratory roller of minimum static weight of 80 to 100 KN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h. In portions having unidirectional cross fall / super elevation rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the center line of the road. Uniformly over-lapping each preceding track by at least one fourth width until the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 1 m away from any preceding stop.

In portions in camber, rolling should at the edge with the roller running forward and backward until the edges have been firmly compacted. The roller shall the progress gradually towards the center parallel to the center line of the road uniformly overlapping each of the preceding track by at least one – Fourth width until the entire surface has been rolled.

Any displacement occurring as a result of reversing of the direction of a roller or from any other caused shall be corrected at once as specified and / or removed and made good.

Along forms, Kerbs, walls or other places not accessible to the roller, the mixture shall be thoroughly compacted with mechanical tampers or a plate compactor. Skin patching of an area without scarifying the surface to permit proper bonding of the added material shall not be permitted.

Rolling should not be done when the sub grade is soft or yielding or when it caused a wave-like motion in the sub – base/ base course or sub grade. If irregularities develop during rolling which exceed 12mm when tested with a 3 meter straight edge, the surface should be loosened and premixed material added or removed as required before rolling again so as to achieve a conforming to the desired grade and cross fall. In no case should the use of unmixed material be permitted to make up the depressions.

Rolling shall be continued till the density achieved is at least 98 per cent of the maximum dry the material as determined by the method outlined in IS : 2720 (Part-8)

After completion, the surface of any finished layer shall be well-close, free from movement under compaction equipment or any compaction planes, ridges, cracks and loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of the layer and re-compacted.

406.3.6 Setting and drying:

After final compaction of wet mix macadam course, the road shall be allowed to dry for 24 hours.

406.4 Opening to Traffic :

Preferably no vehicular traffic of any kind should be allowed on the finished wet mix macadam surface till it has dried and the wearing course laid.

406.5 Surface Finish and Quality control of work

406.5.1 Surface evenness :

The surface finish of construction shall conform to the requirements of Clause 902 of MORT & H specifications.

406.5.2 Quality Control :

Control on the quality of materials and works shall be exercised by the Engineer in accordance with section 901 of MORT & H specifications

406.6 Rectification of Surface Irregularity :

Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances or where the course is otherwise defective due to subgrade soil getting mixed with the aggregates, the full thickness of the layer shall scarified over the affected area. Reshaped with added premixed material or removed and replaced with fresh premixed material as applicable and recomputed in accordance with Clause 406.3 of this item . The area treated in the aforesaid manner shall not be less than 5m long and 2m wide. In no case shall depressions be filled up with unmixed and ungraded material or fines.

406.6.7 Arrangement for Traffic :

During the period of construction, arrangement of traffic shall be done as per Clause 112 of MORT & H specifications

406.8 Measurements for Payment :

Wet mix macadam shall be paid as finished work in position on cross sectional measurements and computing the volume of WMM work in cubic meters by average area method.

406.9 Rate: The Contract unit rate for wet mix macadam shall be payment in full for carrying out the required operations including full compensation for all components listed below.

- i) Making arrangement for traffic to Clause 112 as above Except for initial treatment to verges, shoulders and Construction of diversions ;
- ii) Furnishing wet materials to be incorporated in the work including all royalties, fees, rents where necessary and all leads and lifts ;
- iii) All labour, tools, equipment and incidentals to complete the work to the specifications ;
- iv) Carrying out the work in part widths of road where directed ; and
- v) Carrying out the required tests for quality control.

Item NO:- 56

Compaction and finishing of cement concrete road by trimix M.250 process providing extra Labour charges for the trimix vacuum dewatering service process on cement concrete road surface by using vacuum dewatering pump floater surface vibrator including making groves and rough finish to surface including leveling etc complete.

Specification No. 5.8.2 Page No.47 of Specification Booklet for Building work shall be applied for this work.

2.1 Proportioning of materials for the mix

The mix shall be proportioned with a maximum aggregate cement ratio of 15 : 1. The water content shall be adjusted to the optimum as per Clause 600.1.3.3 for facilitating compaction by Surface floater.

2.2 Moisture content

The right amount of water for the lean concrete in the main work shall be decided so as to ensure full compaction under rolling and shall be assessed at the time of rolling the trial strength. Too much water will cause the lean concrete to be heaving up before the wheels and picked up on the wheels of the roller and too little will lead inadequate compaction, a low in-situ and an open-textured surface.

2.3 The optimum water content shall be determined and demonstrated by floating the surface during trial length construction. While laying the mix in the main work, the lean concrete shall have a moisture content between the optimum and optimum +2 per cent, keeping in view the effectiveness of compaction achieved and to compensate for evaporation losses.

2.4 Cement content

The minimum cement content in the concrete shall not be less than 150 kg cum of concrete. If this minimum cement content is not sufficient to produce concrete of the specified strength, it shall be increased as necessary without additional cost compensation to the Contractor.

2.5 Concrete strength

The average compressive strength of each consecutive group of 5 cubes made in accordance with Clause 903.5.1.1 shall not be less than 10 MPa at 7 days. In addition, the minimum compressive strength of any individual cube shall not be less than 7.5 MPa at 7 days. The design mix complying with the above Clauses shall be got approved from the Engineer and demonstrated in the trial length construction.

3.0 Construction

3.1 General

The pace and programme of the lean concrete sub-base construction shall be matching suitable with the programme of construction of the cement concrete pavement only after 7 days after sub-base construction.

3.2 Plasticizer Conplast p 211 @ 100ml per bag of cement water reducing concrete admixture at 100ml per bag of cement and Recron 3 S fiber (reliance product) shall be mixed at the rate of 125 gram per bag of cement including making channel 100mm X 50mm required to level and slope and thickness of the concrete road levelling of placed concrete with surface vibrator and finishing with power floater shall be done floater and trowel light booming the surface shall be done expansion joints shall be cut as directed

4. MIXING

4.1 Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour.

4.2 Enough water shall then be added gradually and the mass turned over till a mix of required consistency is obtained. In case of hand mixing quantity of cement shall be increased by 10 per cent above the specified. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

4.3 The concrete shall be mixed in a mechanical mixer. At the site of work hand mixing may however be allowed for smaller quantity of work if approved by Engineer in charge. When hand mixing is permitted by the engineer in charge in case of breakdown of machineries and in the interest of the work. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting a 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 aggregate. Mixing paint shall be thoroughly cleaned before changing from one type of cement to another.

4.4 The method of transporting and placing concrete shall be approved by the Engineer in charge. Concrete shall be so transported and placed so that contamination segregations 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.

4.5 Mixing shall be done on a smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged so that no foreign material shall get mixed with concrete nor does the mixing water flow out.

4.6 Cement in required number of bags be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate which shall also be spread in a layer of uniform thickness on the mixing platform.

4.7 Unless otherwise agreed to by the engineer in charge concrete shall be dropped into place from a height exceeding 2 meters. When chutes are used they shall be kept clean and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened it shall be roughened, kept clean, thoroughly wetted and covered with a 13mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13mm layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and 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.

4.8 If concreting is not started within 24 hours of the approval being given, it shall have to be obtained from the engineer in charge. Concreting being given it shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer unless carried in properly design 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 agreed to be the engineer in charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.3 meter in all other cases

4.9 In the case of reinforced concrete 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 slump tests. Following slump shall be adopted for different types of works.

Type of work	slumps	
	Where vibrators are used	Where are not
Mass concrete in RCC foundation s footings and retaining walls	10 25 mm	80mm
Beams slabs and columns simply reinforced	25 40mm	100 120mm
Thin RCC section or section with mm congested steel	40 50mm	120 150mm

5.1. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept, clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, with neat cement grout. The first layer of concrete to be placed on the surface shall not exceed 150mm. in thickness, and shall be well rammed against old work, particular attention being given to corners and close spots.

6.0 Transporting and Placing the Concrete

6.1 The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

6.2 The concrete shall be laid in layers of 15 cms to 20 cms.

6.3 All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrations, unless otherwise permitted by the Engineer in charge for exceptional cases, such as concreting 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 break downs.

6.4 Placing Lean concrete shall be laid or placed by a paver with electronic sensor. The equipment shall be capable of laying the material in one layer in an even manner without segregation, so paving machine shall have high amplitude ramping bars to give good initial compaction to the sub-base.

At longitudinal or transverse construction joints, unless vertical forms are used, the edge of compacted material shall be cut back to a vertical face where the correct thickness of the properly compacted material has been obtained.

7.0 Curing

7.1 Immediately after compaction, concrete shall be protected against harmful effects of weather, including rain, running water, shocks vibrations traffic rapid temperature charges frost and driving out process shall be covered with wet jute bags or the similar absorbent material approved by the Engineer in charge soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over 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.

7.2 After the final set, the concrete shall be kept continuously wet if required by pounding for a period of not less than 7 days from the date of placement. Hard and bitter water shall not be used for curing.

7.3 Traffic

No heavy commercial vehicles like trucks and buses shall be permitted on the lean concrete sub base after its construction. Light vehicles if unavoidable may however be allowed after 7 days of its construction with prior approval of the engineer.

8.0 Contraction joints

8.1 Contraction joints shall consist of a mechanical sawn joint groove 3x20 mm and $\frac{1}{4}$ to $\frac{1}{3}$ depth of the slab + 5 mm or -5 mm or as stipulated in the drawings and shall be cut by concrete cutter machine.

8.2 The contraction joint shall be cut as soon as the concrete has undergone initial hardening and is hard enough to take the load of joint sawing machine without causing damage to the slab.

8.3 The line of the joint within the tolerances given in clause 600.2.6.2.1 and at such depth below the surface as will not impede the passage of the finishing straight edges or oscillating beams of the paving machines. The adjacent slabs shall be completely separated from each other by providing joint filler board. Space around the dowel bars, between the sub base and the filler board shall be packed with a suitable compressible material to block the flow of cement slurry.

9.1 Longitudinal joint

The longitudinal joints shall be machine cut as per details of the joints shown in the drawing. The groove may be cut after the final set of the concrete. Joints should be sawn to at least 1/3 the depth of the table +5mm or – 5 mm as indicated in the drawing.

10.0 Mode of Measurement and Payment

10.1 The payment shall be made on **SQMT** basis of the finished work

10.2 The necessities labour material Equipments tools and plant conveyance including loading And unloading etc shall be provided by the contractor as directed by engineer in charge.

10.3 The item shall be measured for its **length and width** limiting dimension in this specified on this plan or as directed .

10.4 The rate shall be for a unit of one **SQ.MT.**

Item NO:- 57

Providing and fixing pre-cast Rubber Dye inter locking concrete block 60mm thick with grade of concrete M30 pneumatic compressed by mechanically pressed and as per approved design confirming to IS 15658: 2006 including 35mm 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.

Materials

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

1.2 If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

1.3 Water for curing mortar concrete or masonry should not be too acidic or too alkaline

1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

1.5 Hard and bitter water shall not be used for curing

1.6 Potable water will generally found suitable for curing mortar or concrete

2.0 CEMENT

2.1 Cement shall be ordinary Portland slag cement as per IS 1624 -1974 or Portland slag cement as per IS 455-1976

2.2 Cement shall be stored above the ground level in perfectly dry and water tight sheds. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a

way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock-piles sufficiently away from the each other to prevent intermixing the materials.

3.0 SAND

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

Coarse Sand

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

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

3.2 FINE SAND

The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under

IS. Sieve Designation	% by wt. passing
4.75 mm	100
2.3 6mm	100
1.18 mm	75 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

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

4.0 CEMENT CONCRETE INTERLOCKING BLOCKS

4.1 Ruber dye Interlocking cement concrete reberous reflective blocks (M-200) shall be hard even sound, and regular in shape and generally uniform in colour. The colour of the interlocking BLOCKS

shall generally be uniform colour. Bracken BLOCKS or damaged blocks with cracks shall not be allowed for use. They shall be without any soft veins cracks of flaws

4.2 The size of the Interlocking cement concrete blocks to be used for flooring shall be of required size or as directed. However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be 60 mm.

4.3 The edges of Interlocking cement concrete blocks shall in true shape of casting. All angles and edges of the Interlocking cement concrete blocks shall be true, square and free chipping and surface shall be true and plain.

4.4 The Interlocking cement concrete blocks shall have flat plain surface with rubourous reflective top finish in required pattern and colour. When brought on site, the Interlocking cement concrete blocks shall be in good condition. The Interlocking cement concrete blocks for paving shall generally be used in good condition

5.0 WORKMANSHIP

5.1 Interlocking cement concrete blocks of approved quality shall be laid evenly to level and slope as directed by Engineer in charge over a bed of a base layer consisting of 50mm to 60mm thick average sand bedding to maintain slope.

5.2 Joints shall be filled with a clean sharp sand by brooming.

5.3 The flooring work shall be finished by rubbing of flooring is set properly

5.4 The rate of flooring is inclusive of providing and laying in true line and level including filling the joints with finishing as directed by Engineer in charge

5.5 Protecting the open edges of paving with cement concrete as directed.

6.0 MODE OF MEASUREMENT and PAYMENT

6.1 The unit rate flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing stones in position, compacting, finishing and all other incidental expenses for producing flooring work to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

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

6.2 The work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one square meter.

6.3 The payment shall be made on **square Meter** basis of the finished work.

Item NO:- 58

Providing and Laying homoginious Grey cement based concrete kerbing of size 30 cm x 30 cm x 10 cm size as per detailed drawing having grade of concrete M25 grade, including necessary excavation, BBCC 1:5:10 7.5 cm as per ddetailed drawing fixing in line and level, filling joints in CM 1:3 with smooth finished, white washing three coats etc. complete as directed by Engineer in charge.

Precast Concrete Kerb Stone

Precast concrete kerb stone shall be hard even sound, and regular in shape. Broken kerb stone or damaged one with cracks shall not be allowed for use.

The precast kerb stone shall be of size as specified or as approved by the Engineer. It shall be 30 cm x 30 cm x 10 cm size made from cement concrete M 250 grade. The precast kerb stone shall have flat plain surface. When brought on site, the precast kerb stone shall be in good condition.

WORKMANSHIP

Excavation for kerb block as required and as directed by the Engineer shall be carried out as per detailed relevant specifications of It. No. 1 of this contract. Bick bat cement concrete in proportion of 1:4:8 and 10 cm thick bedding shall be carried out as per the relevant specifications of general technical specification for building work booklet Item No.5.3.3/ page No. 39.

The kerb stone shall be erected in position in true line and level. The Joints between two blocks shall be filled with cement slurry and joint shall be flushed.

MODE OF MEASUREMENT & PAYMENT:

The unit rate shall include the cost of all material, labour charges for excavation & fixing, cost of BBCC, tools and plant required, placing blocks in position and all other incidental expenses required to complete the work.

The work shall be measured in running meter

The payment will be made on **running meter** basis.

Item NO:- 59

Providing laying (to level or slopes) and jointing reinforced concrete Light duty non-pressure pipes I.S. class NP2 of the following internal diameter with collars and butt ends prepared for collar joints including testing of joints complete.(D) 300

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.24.22.(D) P.No.177

Item NO:- 60

Drilling of min. 250 mm dia. bore hole in all strata including dualover burden strata by combination DR/DTH rig including lowering 200 mm dia MS ERW pipes in bore hole and testing etc.all work as per directed engineer incharge.

GENERAL

The work shall consist of Drilling of 250 mm diameter bore hole for 200 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth and further drilling of 165 mm diameter bore hole in remaining rocky or sandstone strata up to 100 mtr. Depth or as suggested by Geologist / Hydrologist

Only trained personnel shall be employed for construction and supervision

1.0 DRILLING

1.1

shall be of 250 mm diameter bore hole for 200 mm diameter ERW/UPVC pipe up to required depth in over burden strata (maximum up to 30 meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist) and further drilling of 165 mm diameter bore hole in remaining rocky or sandstone strata up to 100 meter Depth or suggested by Geologist / Hydrologist. The drilling shall be done by the **down the hole hammer** type drilling Rig & lowering 165/200 mm diameter ERW/UPVC Pipes, Bore cap shall have to be provided by the Contractor Free of Cost. The carting of pipes and other materials etc. shall be carried out by contractor with all lead and lift to the site of work at his own cost.

1.2. Drilling work shall be carried out at the sites directed by the Engineer in Charge. The diameter of the hole shall be 200 mm/215 mm in over burden strata and 165mm diameter in Rocky & Sandstone strata up to over all specified depth of 100 meters or as per suggested by Engineer in Charge or Geologist / Hydrologist. The Drilling shall be carried out in over burden strata up to maximum 30 Meters or up to the depth as suggested by Engineer in Charge or Geologist / Hydrologist. If further drilling can not be done due to overburden up to 30 meters, or in rocky & Hard or Sandstone strata due to Mechanical failure up to specified depth the drilling shall have to be stopped in consultation with Engineer-in- charge and no payment shall be made for such drilling carried out by the Contractor.

1.3. The 175/200mm diameter ERW / UPVC pipes should be lowered by the contractor in over burden strata. Contractor as desired by the Engineer in charge will carry out the jointing of pipes. Necessary jointing materials, steel bended plates etc. should be provided by the Contractor at his own cost.

2.0 DRILLING OPERATION

2.1. The Drilling operation for drilling of Bores should be carried out by suitable rig to satisfy following.

2.2. For Drilling Through overburden:

1. The diameter of the bore in the over burden shall be sufficient for insertion of 200mm diameter ERW/UPVC casing pipes with the joints and leaving sufficient annular space for grouting the casing pipe with sticky clay or local soil etc. Annular space between bore hole and casing pipe should be filled up with sticky clay on local materials etc
2. After completion of overburden strata, the bore should drilled up to 0.15 meters. In rocky Hard/Sandstone strata So that casing pipes can be properly embedded in the Rocky Hard/Sandstone formation.
3. After the casing pipe is embedded in the rock, the same is to be ground with materials like sticky clay or local materials etc. so, as to avoid leaking of drain water in the bore.

4. Drilling of 200 mm diameter bore in over burden strata is compulsory up to 30 mtrs. Or as directed by Engineer in Charge or as suggested by geologist Hydrologist.

(A) For Drilling Through Rock :

2.3. Bore through rocks shall be of 165mm diameter and the total depth from the ground level of the bore shall up to 100 meters. or as per the recommendation of the Hydrologist /Jr. Geologist.

3.0. LOWERING OF CASING PIPES

3.1. Casing pipes shall be properly socketed welded & forewed so as to ensure a continuous length lowered through the over burden, so as to reach at least 0.15 meter. Inside the hard rock. The length of casing pipes should be kept such that at least 0.30 meters. remains projected above the Ground Level After completion of the work at site the top of the casing pipes shall have to be closed either by a screwed or by welded cap plug (if required for HP Installation) unless pump is fitted immediately after completion of the bore.

3.2. The casing pipe shall be lowered in such a manner so that it remains vertical so as to ensure installation of pump.

1. After completion of the bore the Contractor shall have to arrange for testing the yield of the bore by " V" notch at his own cost in presence of the Engineer in charge or his authorized representative. No extra payment shall be made for such testing.

2. The depth of bore to be drilled as per the recommendation of Jr. Geologist Hydrologist shall be less or more depth. If the bore required to be drilled beyond the specific depth 100 meters. The contractor shall be bound to carry out such work at the rate mentioned in "Schedule : B ".

3. All the tools and tackles or plants and other suitable machinery required for work for drilling developing gauging etc. for the Tube well shall be provided by the Contractor at his own cost at the site of work.

4. In case of any item not covered by the specifications stated herein the Contractor shall carry out such work strictly, according to written instructions of Engineer in charge, which will be binding to the contractor and shall have to carry out such work at Departmental Schedule. The rate shall be mutually agreed up on, however the decision of the Engineer in charge will be final.

5. During the Drilling Operation, if the water bearing strata found at a depth lesser than estimated depth the Executive Engineer or his representative shall have authority to instruct the Contractor to stop the work for reduction in the quantity of the work, the Contractor shall not be eligible for any compensation.

6. If the bore is required to be drilled above the specified depth the Contractor shall be bound to carry out such additional work including drilling providing and lowering of casing pipes as may be necessary. The relevant specification regarding drilling providing and lowering pipe, taking yield test and strata sample etc. shall also apply in case of such additional work. The rates for a additional work be paid as per the rate fixed.
7. Lowering and fixing of housing and casing shall be carried out in workman like manner. The contractor shall be responsible for workman compensation in case of any accident. In case of dispute or overlooked items the decision of the concerned Executive Engineer shall be final and binding to the Contractor.
8. No further drilling of bore wells is allowed, if more than two bores will remain untested at a time. This clause will be applicable without any prejudice (i.e. compensation for delay)
9. The contractor shall clear the site before of the work and after completion of the work and shall hand over the bore with final finishing of the work. As directed by the Engineer in charge which shall have to be done by the Contractor at his own cost.
10. The approach roads to site of work may be Kachha roads and contractor shall have to make his own arrangements for repairing of the road and maintain the same for transporting his materials and equipment at his cost which shall be utilized by the department for inspection etc. purpose.
11. The list of the locations, where bore well are to be drilled will be provided on finalization of Tender and Similarly, the actual site of work will be given to the contractor by the Geologist or Engineer-in – charge from the respective Mechanical division Sub Division.
12. If a well is rejected on account of faulty workmanship or negligence on the part of the Contractor as well as if the verticality is not within the permissible limit the bore shall be rejected and the Contractor shall have to drill a new bore including lowering pipes etc. at his own cost.
13. If, further drilling can not be carried out due to encountering the sticky clay or over burden beyond limits (i.e. beyond 30 meters.) or in rocky / sandstone up to specified / suggested depth in a such a case the decision of the Engineer in Charge or recommendation of Hydrologist will be binding to the Contractor as finalized by Engineer in Charge and or Geologist / Hydrologist.
14. The Contractor will have to make arrangement at his own cost for cleaning of bore hole, if filled up by clay, sand, dust & boulders etc.
15. If bore is not completed up to design/ recommended depth due to Mechanical failure or any other reason, no payment shall be made for such abandoned bore.

16. On completion of drilling work up to the required depth, the bore is to be developed and cleaned by suitable capacity air compressor up to the sand free discharge or for minimum one hour.
17. The Contractor will have to make arrangement at his own cost for
- (A) Rig Vehicles, Machineries etc.
 - (B) Facilities for moving bulky materials.
 - (C) Realizing the Transporting Materials.
 - (D) Keeping in custody Department Materials until finally taken over by the office –in-charge of the work.
 - (E) Repairing to the damages caused in the process of the executing works.
 - (F) Approach road to the site.

4.0. MODE OF MEASUREMENT & PAYMENT:

- 4.1. Drilling work shall be measured in its depth for each class of strata, limited to the dimensions shown on the drawing or as directed by the Engineer-in-charge. Drilling over increased diameter or depth shall be deemed as convenience for the contractor in executing the work and shall not be measured and paid for separately.
- 4.2. The contract unit rate for the item shall be paid in full for carrying out the required operations including:
- 4.3. Setting out and fixing bench marks and centre lines stones.
- 4.4. Removal of all logs, stumps, grubs and other deleterious matter and obstructions for placing the foundations including trimming of bottoms of excavations
- 4.5. Foundation sealing, dewatering including pumping;
- 4.6. All labour, materials, tools equipment, safeguards and incidentals necessary to complete the work to the specification.
- 4.7. The drilling work shall be measured for its depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one meter.

Item NO:- 61

Manufacture, supply and delivery of cage type Trapezoidal shape (' V ') wire wound low carbon, Galvanized screen pipe and Stainless Steel Screen pipes, confirming IS: 8110 For (B) 200mm dia 1) 1.00mm Slot size

The manufacture, supply, and delivery of two types of screen pipes:

Cage type Trapezoidal shape ('V') wire wound low carbon, galvanized screen pipe with a length of 2000MM. This pipe is used for screening and filtration purposes, and is made of low carbon steel wire wound in a trapezoidal shape, with a galvanized coating for corrosion resistance.

Stainless steel screen pipes with a slot size of 1.00mm, confirming IS: 8110. These pipes are also used for screening and filtration purposes and are made of stainless steel, with a slot size of 1.00mm as per IS: 8110 specifications.

The tender specification requires the successful bidder to manufacture, supply, and deliver both types of screen pipes as per the specifications mentioned above.

The rate shall be for a unit of **one Rmt**

Item NO:- 62

Bore plug having 100 mm height made from M.S. plate with 3 holes at equal distance on circumference for nut-bolts type, locking arrangement with nuts-bolts & lock nuts of std. Make complete. For 250mm dia

The manufacture and delivery of a bore plug with specific dimensions and features. The bore plug must have a height of 100mm and be made from M.S. (mild steel) plate material. It must have three holes on the circumference at equal distances for nut-bolt type locking arrangement. The locking mechanism should include nuts-bolts and lock nuts of standard make to ensure secure fastening.

The bore plug is intended for use with a 250mm diameter opening and must be constructed in accordance with the direction provided by the Engineer in charge. The plug must be complete and fully functional upon delivery.

The rate shall be for a unit of one number.

Item NO:- 63

Providing PVC insulated flat submersible cable as per detailed technical specifications of R/C of GWSSB conforming to IS 694, IEC 60227 / 60228.d)1 R x 3 C x 6.0 mm²

Item including Providing PVC insulated flat submersible cable as per detailed technical specifications of R/C of GWSSB conforming to IS 694, IEC 60227 / 60228.d)1 R x 3 C x 6.0 mm² as directed by the Engineer in charge

The relevant specification shall be confirm with Electric specification booklet.

The rate shall be for a unit of one **RMT**

Item NO:- 64

Suppling and installing 3 Phase Borewell 3.0 HP Submersible Pump Sets Electric motor driven conforming to I.S. 8034 and motor conforms to IS-9283 working at 3 phase 400/440 volt 50 C/S A.C. supply & 2900 R.P.M. cat 2.5

General

This work shall consist of furnishing and placing Supplying and installing 3 Phase Borewell 15.00 HP Submersible Pump Sets Electric motor driven conforming to I.S. 8034 and motor conforms to IS-9283 working at 3 phase 400/440 volt 50 C/S A.C. supply & 2900 R.P.M. cat 2.5. delivery pipe these Specifications of an approved brand and make as approved by the Engineer in charge.

Submersible pump set

- 1.1. **Submersible pump set** of specified capacity and of I.S.I. mark of approved brand and make and quality shall be supplied
- 1.2. Specification of item no 9.4.1 of Electrical S O R Item form specification booklet of Electrical work shall be followed for this item

2.0 WORKMAN SHIP

2.1. Submersible pump set shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code

2.2. The **Submersible pump set** shall be fitted and installed properly in a desired position and making all required necessary connection as specified and as directed by the Engineer in charge

3.0 MODE OF MEASUREMENT and PAYMENT

3.1. The unit rate of **Submersible pump set** shall include the cost of all materials, tools and plant required for fitting the same to specified position as per drawings, and as directed by Engineer in charge. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

3.2. The **Submersible pump set** shall be measured in **Number**,

The rate shall be for a unit of one Number.

Item NO:- 65

Providing and fixing check or non return pulley wheel valve of 50 mm diameter.

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.23.99 (E) P.No.171

The rate shall be for a unit of one Number.

Item NO:- 66

Manufacture, supply and delivery of following ISI marked HDPE pipes (IS:4984/1985 with latest amendment) having material Grade PE-80 in approximate 100 meter coil length or as per GWSSB requirement with SS316 nipple at both ends having 11 TPI threads as per specifications, press fitted and bolted having nominal diameter as under as per detailed technical specifications.

v) DN 63 PN-12.5

The relevant specification shall be followed as per General Technical specification for Building work booklet It.No.23.2 (F) P.No.160 except that using of following ISI marked HDPE pipes (IS:4984/1985 with latest amendment) having material Grade PE-80 in approximate 100 meter coil length or as per

GWSSB requirement with SS316 nipple at both ends having 11 TPI threads as per specifications, press fitted and bolted having nominal diameter as under as per detailed technical specifications.

v) DN 63 PN-12.5

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

Electric Work Specifications

For All Item specifications shall be followed as per attached Specifications of Electrical work.

Sign of Contractor

**Executive Engineer
Tapi (R & B) Division
Vyara**