

ITEM WISE TECHNICAL SPECIFICATIONS

(SCHEDULE – “B-”)

(Bid Documents for Constructing Paver Block at Janatanagar Co. Op. Housing Society, Krishna Association Dharati City Society, Ashadeep Co. Op. Society, Suvarn City Co. Op. Housing Society And Bhagirath Co. Op. Housing Society At Kadi Nagarpalika area Under SJMMSVY Janbhagidari Scheme. Dist-Mehsana)

ITEM NO. 1

Demolition and disposal of Un serviceable material with all lead and lift. (ii) Unreignfor cement concrete.

Workmanship:

Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.

All materials obtained from demolition shall be properly of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.

Any serviceable materials, obtained during dismantling or demolition shall be speeded out and stacked properly as directed, with all lead and lift. All unserviceable materials, rubbish etc. shall be stacked as directed by the Engineer-in-charge.

On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.

Mode of measurement & payment:

The rate shall include cost of all labour involved and tools used in dismantling. The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary storing for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or partitions where considered necessary.

The rate shall including stacking the unserviceable materials as directed will lead and lift.

The rate shall be for a unit of one Sq. m.

ITEM NO. 2

Box cutting the road surface to proper slop and camber for making base of road work including removing the road work including removing the excavated stuff and depositing on the road side slop as directed up to 50 mts. Lead

- Cutting shall be done in proper grade & camber as per measurement 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 cuttings 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) Box cutting for soling and metal ling in required width the depth shall be done.
- The stuff received from the cutting shall be utilized for filling cuts and correcting side slopes of bank with all lead and lifts as directed. Useful stuff shall be carefully stacked separately as directed.
- The measurement shall be taken as per cross section measurement of the cutting based on length, breadth, depth measured with tape at every 25m interval.
The payment shall be made on cubic meter basis.

ITEM NO. 3

Providing and laying cement concrete in 1:4:8 (1cement:4 fine sand:8 graded stone agg. of 40mm nominal size) and curing etc. completed.

Material

Water, cement, fine aggregate or sand and coarse aggregate shall be as specified.

Cement:

Cement shall be ordinary Portland slag cement as per IS 269-1976 or IS 455-1976

Sand:

Sand shall be natural sand, clean, well graded free from dust, clay, kanker etc. If necessary the sand shall be washed to make it clean.

Coarse Aggregate

General: Aggregate most of which is retained on 4.75 mm IS Sieve and contains only as much fine material as is permitted in IS: 383 for various sizes and grading is known as coarse aggregate. Coarse aggregate shall be specified as stone aggregate, gravel or and it shall be obtained from authorized sources.

Water:

Water shall not be salty or brackish and shall be clean.

Workmanship:

Before starting concrete bed of foundation trenches shall be cleaned of all loose materials, leveled, watered and rammed as directed.

Proportion of Mix:

The proportion of cement, sand and coarse aggregate shall be one part of cement, 4 parts of sand and 8 parts of stone aggregate and shall so measured by volume.

Mixing:

All components of controlled concrete shall be proportioned by weight using weight batchers for each grade. Mixing shall be carried out in mechanical mixers and preferably a batch mixing plant shall be used. Volumetric mixing shall not be adopted unless specifically permitted by the Consultant. The mechanical mixer shall be equipped with automatic devices for control of speed, gauging of water and timing the mixing period. Clean potable water only will be added. Batches shall not exceed the capacity which can be mixed efficiently as determined by the mixer efficiency test and peripheral speed shall conform to manufacturer's recommended rate but shall not vary more than + 10% nor exceed 30m/minute. Net minimum mixing time shall begin when all water is in the mixer and shall be approximately 2 (two) minutes for a 3 cum mixer and 3 (three) minutes for larger mixers. Excessive mixing shall be avoided. Weigh batchers shall be placed level during use and the hoppers shall be loaded evenly. The equipment shall be checked frequently to verify their accuracy.

When hand mixing is permitted it shall be carried out on a clean hard and water-tight platform. The proportion of the cement in case of hand mixing shall always be increased by ten percent. The cement, sand and coarse aggregates shall be carefully measured in their correct proportion and shall be thoroughly mixed till the mass is uniform in colour before water is added. Only sufficient water to make the mix workable shall be used and the water shall be sprayed from a watering can fitted with a rose and mixing shall be continued till the mass is uniform in consistency.

MEASUREMENT:

The contractor shall be measured for its length, breadth and depth, limiting dimension to those specification on plan or as directed.

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

ITEM NO. 4

Providing laying controlled cement concrete M 200 and curing complete excluding the cost of formwork and reinforcement for reinforced concrete work in (A) Foundations footing base of columns and mass concrete.

In case of ordinary concrete, mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in table below for different four grade designated as ordinary M: 100, M:150, M:200 and M: 250.

In the designation of a concrete mix letter 'M' refers to the mix and the number to the specified 28 days work cube compressive strength of that mix on 150mm cube, expressed in kg/cm².

The ordinary concrete mix shall generally be specified by volume. For cement, which normally comes in bags and is used by weight, volume shall be worked out taking 50kg of cement as 0.035 cubic meter in volume. Whole measuring aggregate by volume, shaking, ramming or hammering shall not be done, proportioning of sand shall be as per its dry volume. In case it is damp allowance for bulking shall be made as per IS 2386 (part-III). In ingredients required for ordinary concrete containing one 50 kg bag of cement for different proportion of mix shall be as given in table below.

Grade of Concrete	Mix by Volume	Total Qty. of dry agg. Volume per 50kg cement to be taken as sum of individual volume of fine % coarse agg. Max.(1cu.m=1000 liters)	Proportion of fine agg. To coarse agg.	Qty. of water per 50kg of cement max.
M100	1:3:6	300	Generally 1:2 for fine agg. To coarse agg. By volume but to a upper limit of 1:1.5 and lower limit of 1:3	34
M150	1:2:4	220		32
M200	1:1.5:3	160		30
M250	1:1:2	100		27

Note: The proportions of the aggregates shall be adjusted from upper limit to lower limit progressively as the grading of the final aggregate becomes finer and the maximum size of coarse aggregate becomes larger.

A mix leaner than M 100(1:3:6) may be used for non-structural part, if provided in the contract. In such cases grading of aggregates shall be by volume. Other requirements for mixing, placing and curing shall be the same.

Following shall be the maximum size of coarse aggregate for the different items of work.

Items	Size in mm
Plain R.C.C	63
Solid type piers, abutment and wing walls	40
R.C.C wearing coat M150	20

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

All materials shall be stored as to prevent their deterioration or intrusion 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.

Cement shall be stored above ground level in perfectly dry and watertight sheds shall be stocked not more than eight bags high. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirement at the site and should be cleaned at once every 3 to 4 months. Cement more than 3 to 4 months old shall invariably be tested to ascertain that it satisfies the acceptability requirements. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different sizes of fine or coarse aggregate shall be stored in separate stockpiles sufficiently removed from each other to prevent inter mixing the materials at edges of the piles.

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

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

The method of transporting and placing concrete shall be approved by the Engineer-in-charge concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work 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.

If concreting is not started with 24 hours of the approval being given, it shall have to be obtained again from Engineer-in-charge. Concreting then 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 designed agitators, operating continuously, when this time shall be within 2 hours of the addition of cement to the mix and within 30 minutes of its discharge from the agitator. Except where otherwise agreed to by the Engineer-in-charge, concrete shall be disposed in horizontal layer to a compacted depth of not more than 0.45 m when internal vibrators are used and not exceeding 0.30 m in all other cases.

Unless otherwise agreed by the Engineer-in-charge, concrete shall not be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept clean and used in such way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and cleaned 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 new surface with wire or bristle brushed. Care being taken to avoid dislodgment of particulars of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness, and shall be well rammed against old work particular attention being given to corner and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional case, such as concreting under water, where vibrator cannot be used. Sufficient vibrator in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Immediately after compaction, concrete shall be protected against harmful effect of weather, including rain, running water, shocks, vibrations due to traffic, rapid temperature changes, fast drying put process. It shall be covered with wet sacking hessian or other similar absorbent material approved by Engineer-in-charge soon after the initial set. It shall be kept continuously wet for a period of not less than 14 days from the date of placement.

Form work shall include all temporary or permanent forms required for forming the concrete, to gather with all temporary construction required for their support. Forms for concrete shall be constructed of metal or timber suitably lined and be of substantial and rigid construction true to shape and dimension shown on the drawing. Where metal forms are used, all bolts and rivets shall be counter sunk and well ground to provided a smooth, plain surface where timber is used it shall be well seasoned, free from loose knots, projecting nails, splits or other defect that may mark the cement surface of concrete. For exposed concrete faces, timber for shuttering shall be wrought on all faces in contact with concrete.

Forms shall be mortar tight and shall be made sufficient rigid by the use of ties and bracing to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration, without deflection from the prescribed lines occurring during and after placing the concrete. Screw jacks or hardwood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete. Suitable camber shall be provided in horizontal members of surface especially in long span to counteract the effect of any deflection. The framework shall be so fixed as to provide for such camber. Forms shall be so constructed as to be removed in section in the

desired sequence, without damaging the surface of concrete or disturbing other sections. Unless otherwise specified or directed chamfers or fillets of size 25mmx25mm shall be provided at all angles of framework to avoid sharp corners.

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 must depend upon the nature of work and methods of vibration of concrete, shall be determined by regular slumps test.

In reinforced concrete, the volume occupied by reinforcement shall not be deducted.

The unit rate for concrete shall include the cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing as per directed of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown in the drawing and according to these specification. The rates shall also include the cost or making, fixing and removing of all centering and forms required for the work centering.

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

ITEM NO. 5

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

Trimix :-

Tre-mix process in cement concrete Road done after laying of cement concrete in Road surface Tre-mix process start by surface Vibrator using on concrete surface for compaction of cement concrete including process of C.C Road surface by sucking vacuum dewatering pump floor surface vibrator and there after Tre-mix machine is used up to 2 to 3 hours in concrete for smooth surface on concrete road & cement slurry layer show on concrete Road and after completion of Tre-mix Process make making grooves and rough finished to surface in Road by using of wire brush.

Mode of Measurement and Payment:

The payment shall be made on Smt basis.

ITEM NO. 6

Providing and fixing precast-Concreate Kerb stone of gray cement based concrete block 30 cm length, 30cm height and 15cm thick of M-250 Grade concrete as per approved desuign and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1 Cement:3 Finae Sand) etc. complete. CH- 14 Item Code 14023 Pg. No. 136

In case of ordinary concrete, mix is not required to be designed by preliminary tests and proportions of cement, fine aggregates and coarse aggregates are specified by volume as given in table below for different four grade designated as ordinary M: 100, M:150, M:200 and M: 250.

In the designation of a concrete min letter 'M' refers to the mix and the number to the specified 28 days works cube compressive strength of that min on 150m cube, expressed in kg/cm.

The ordinary concrete mix shall generally be specified by volume. For cement, which normally comes in bags and is used by weight, volume shall be worked out taking 50kg of cement as 0.035 cubic meter in volume. Whole measuring aggregate by volume, shaking, ramming or hammering shall not be done, proportioning of sand be as per its dry volume. In case it is damp allowance for bulking shall be made as per IS 2386 (part-III). In gredients required for ordinary concrete containing one 50 kg bag of cement for different proportion of mix shall be as given in table below.

Grade of Concrete	Mix by Volume	Total Qty. of dry agg. Volume per 50kg cement to be taken as sum of individual volume of fine % course agg. Max.(1cu.m=1000 liters)	Proportion of fine agg. To coarse agg.	Qty. of water per 50kg of cement max.
M100	1:3:6	300	Generally 1:2 for fine agg. To course agg. By volume but to a upper limit of 1:1.5 and lower limit of 1:3	34
M150	1:2:4	220		32
M200	1:1.5:3	160		30
M250	1:1:2	100		27

Note: The proportions of the aggregates shall be adjusted from upper limit to lower limit progressively as the grading of the final aggregate becomes finer and the maximum size of coarse aggregate becomes larger.

A mix leaner than M 100(1:3:6) may be used for non-structural part, if provided in the contract. In such cases grading of aggregates shall be by volume. Other requirements for mixing, placing and curing shall be the same.

Following shall be the maximum size of coarse aggregate for the different items of work.

Items	Size in mm
Plain C.C	63
Solid type piers, abutment and wing walls	40
C.C wearing coat M150	20

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

All materials shall be stored as to prevent their deterioration or intrusion 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.

Cement shall be stored above ground level in perfectly dry and watertight sheds shall be stocked not more than eight bags high. Wherever bulk storage containers are used, their capacity should be sufficient to cater to the requirement at the site and should be cleaned at once every 3 to 4 months. Cement more than 3 to 4 months old shall invariably be tested to ascertain that it satisfies the acceptability requirements. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different sizes of fine or coarse aggregate shall be stored in separate stockpiles sufficiently removed from each other to prevent inter mixing the materials at edges of the pipes.

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

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

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Unless otherwise agreed by the Engineer-in-charge, concrete shall not be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept clean and used in such way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and cleaned 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 new surface with wire or bristle brushed. Care being taken to avoid dislodgment of particulars of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness, and shall be well rammed against old work particular attention being given to corner and close spots.

All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional case, such as concreting under water, where vibrator cannot be used. Sufficient vibrator in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Immediately after compaction, concrete shall be protected against harmful effect of weather, including rain, running water, shocks, vibrations due to traffic, rapid temperature changes, fast drying put process. It shall be covered with wet sacking hessian or other similar absorbent material approved by Engineer-in-charge soon after the initial set. It shall be kept continuously wet for a period of not less than 14 days from the date of placement.

Form work shall include all temporary or permanent forms required for forming the concrete, to gather with all temporary construction required for their support. Forms for concrete shall be constructed of metal or timber suitably lined and be of substantial and rigid construction true to shape and dimension shown on the drawing. Where metal forms are used, all bolts and rivets shall be counter sunk and well ground to provided a smooth, plain surface where timber is used it shall be well seasoned, free from loose knots, projecting nails, splits or other defect that may mark the cement surface of concrete. For exposed concrete faces, timber for shuttering shall be wrought on all faces in contact with concrete.

Forms shall be mortar tight and shall be made sufficient rigid by the use of ties and bracing to prevent any displacement or sagging between supports. They shall be strong enough to withstand all pressure, ramming and vibration, without deflection from the prescribed lines occurring during and after placing the concrete. Screw jacks or hardwood wedges where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete. Suitable camber shall be provided in horizontal members of surface especially in long span to counteract the effect of any deflection. The framework shall be so fixed as to provide for such camber. Forms shall be so constructed as to be removed in section in the

desired sequence, without damaging the surface of concrete or disturbing other sections. Unless otherwise specified or directed chamfers or fillets of size 25mmx25mm shall be provided at all angles of framework to avoid sharp corners.

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 must depend upon the nature of work and methods of vibration of concrete, shall be determined by regular slumps test.

In reinforced concrete, the volume occupied by reinforcement shall not be deducted.

The unit rate for concrete shall include the cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing as per directed of the Engineer-in-charge, curing and all other incidental expenses for producing concrete of specified strength to complete the structure or its components as shown in the drawing and according to these specification. The rates shall also include the cost of making, fixing and removing of all centering and forms required for the work centering.

After fixing of kerbing oil paint/plastic paint on kerbing with black & yellow colour in two coats.

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

ITEM NO. 7

Providing and fixing pre-cast rubber dye inter locking concrete block 60mm thick with grade of concrete m200 pneumatic compressed by mechanically pressed and as per approved design including 75mm sand layer for leveling and filling the joint with sand in proper line and level etc complete.

1.0 The scope of work :

It includes manufacturing, supplying and fixing of Precast C.C Interlocked paver blocks at roads.

The work includes:

- 1.1 Verification of the existing site condition and advising our project in charge to lay quality of sub grade, sub-base course before the paver blocks are laid and suggest strengthening if required.
- 1.2 Clearing the site by removing all obstacles such as stones, debris etc. for laying of paver blocks.
- 1.3 Manufacturing of paver blocks by one of the above-approved suppliers as per requirements in technical specification enclosed.
- 1.4 Supplying of paver blocks at site, including handling at both ends. The type of paver block may be interlocking or non-interlocking.
- 1.5 Laying of paver blocks at site as per requirement in technical specification, within shortest possible time.
- 1.6 Testing of paver blocks through reputed Govt./Non Govt. Test house and submission of test results as per requirements in Technical Specifications. R&B DIVISION reserves the right to carryout test at random. Cost for such tests to be borne by party.
- 1.7 The contractor shall guarantee that all material and components designed, fabricated, supplied and laid by him shall be free from any type of defect due to faulty material and/or workmanship.

2.0 Technical Specifications:

2.1 Paver Block Manufacturing Facilities:

The Paver Block shall be made in factory with following minimum facilities:

Concrete Block making Machines:

The machine should be capable of producing high quality Paver Blocks by obtaining high level of compaction by application of hydraulic compaction and also by high intensity vibration to the moulds. The machine should have automatic control panel for uniformity in strength.

Concrete Batching & Mixing Plant: (Not essential)

The concrete Mix Design should be followed for each batch of materials. The concrete ingredient should be mixed in concrete Batching & Mixing plant with minimum capacity of 30 cum/hour. The plant should equipped with automatic control panel for maintaining water cement ratio from batch to batch to obtain concrete of uniform quality and strength. The plant should be equipped with adequate mechanism for mechanized loading of raw materials into mixer and conveyor belt for transportation of concrete from mixer to concrete block making machine to maintain quality of wet cement.

Curing:

The factory should have well designed curing area to ensure adequate curing of paver blocks. Steam curing facility of the paver blocks is preferable.

Laboratory (Desirable but not essential):

The factory should have the following:

Compression testing machine of adequate capacity.

Other tools and equipment for testing raw materials and paver blocks.

(1) Systematic record of test results of various paver blocks manufactured in the factory.

(2) Concrete Mix Design for various grade of concrete used for making of paver blocks.

2.2 Specifications for Colored Paver Blocks:

Color concrete paver blocks shall be manufactured as per attached specifications using approved color Pigment of iron oxide of approved brand like Bayer, Tata etc. with minimum colour pigment of 3% by weight of cement. The color shade shall be as selected by R&B DIVISION before commencement of the work. The job also includes providing 100 mm thick sand bedding to match the shade of the paver block. The colour of the paver block shall be guaranteed against fading of colour for period of 12 months from the date of laying of the same at site.

All other technical specifications & Procedure for testing, laying & sampling of Colour pavers will be as per attachment.

2.3 Paver Block Characteristics:

The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be reasonably smooth and of anti skid and anti glare type.

The paver should have uniform chamfers to facilitate easy drainage surface run off.

The pavers should have uniform interlocking space of 2mm to 3mm to ensure compacted sand filling after vibration on the paver Surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in Double layer only.

Skilled labour should be employed for laying blocks to ensure line and level of laying, desired shape of the surface and adequate compaction of the sand in the joints.

2.4 Paver Block Dimensions:

Thickness	80mm
Layers	Double layered, top layer minimum 8 to 10 mm
Shape	Irregular (Uniform Shape with no Hollow Or Cracks) / as per
Chamfer	4mm to 6mm along top edges
Colour	Natural cement grey Colour without use of any pigment. For
	Colour pavers refer "specifications for Colour pavers"
Dimensional	(+/-) 2mm for length & width,
Tolerance	(+/-) 3mm for Height (Thickness)

2.5 Testing of Paver Blocks:

		SPECIFICATION
Sr. No		Average Values
		(Average of Minimum Five Samples/Site)
1.	Compressive Strength	Min. 50 N/Sq.mm for 80mm thick OR Min. 40 N/Sq.mm for 60mm thick
2.	Flexural Strength	Minimum 4.5 N/Sq.mm
3.	Abrasion Resistance	Maximum 1.5
4.	Water Absorption	Maximum 5.80%
5.	Minimum Cement Content	300 Kg/Cum (Not Essential)

* Sampling and testing procedure as per enclosed specifications

3.0 Sampling & Testing Procedures for Paver Blocks:

3.1 Sample Size:

INTERNAL – Average of minimum 3 samples per 5000 Blocks.

EXTERNAL – Minimum 2 Blocks per 10000 blocks. Average of minimum 8 blocks per site.

3.2 Sampling For Testing:

Sampling for testing of paver blocks shall be done in accordance with Appendix-A.

Compressive Strength:

Testing for compressive strength shall be undertaken in accordance with

Abrasion Resistance:

Testing for abrasion shall be in accordance with IS 1237
(Specifications for Cement Concrete Floor Tiles).

Flexural Strength:

Testing for flexural shall be in accordance with IS 1237 (Specifications for Cement Concrete Floor Tiles).

Water Absorption:

Testing for water absorption shall be in accordance with IS
2185:1979: Part I (Specifications for Concrete Masonry Units).

APPENDIX A

Method of sampling:

Before laying paver blocks, each designated section comprising not more than 50000 blocks, shall be divided into ten approximately equal groups. Three blocks shall be drawn from each group.

Marking and identification:

All samples shall be clearly marked at the time of sampling in such a way that the designated sections of part thereof, and the consignment represented by the sample, are clearly defined. The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The testing shall be carried as soon as possible, after the sample has been taken. As soon as practicable after sampling. The samples shall be stored in water at 20 degree C \pm 5 degree C for 24 hours prior to testing.

APPENDIX B

Test for Compressive Strength:

Testing Machine:

The testing machine shall be of suitable capacity for the test and capable of applying the load of the rate specified. It shall comply, as regards repeatability and accuracy, with the requirements of clause 2.1 of BS: 1881-Part 4.

Procedure:

The sample specimen shall be tested in a wet condition after being stored for at least 24 hours in water maintained at a temperature of 20 °C + or – 5 °C. Before the specimens are submerged in water, the necessary area shall be determined.

The plates for testing machines shall be wiped clean and any loose grit or other material removed from the contact faces of the specimen. Plywood, nominally 4 mm thick shall be used as packing between the upper and lower faces of the specimen and the machine plates and these boards shall be larger than the specimen by the margin of at least 5 mm at all points. Fresh Packing shall be used for every specimen tested.

The specimen shall be placed in the machine with the wearing surface in the horizontal plane and in such a way that the axes of the specimen are aligned with those of the machine plates.

The load shall be applied without shock and increased continuously at the rate of approximately 15 N/ Sq.mm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

Calculation of corrected strength for individual Blocks:

The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area of the block and multiplying with an appropriate factor of:-

- a) For 100 mm thick blocks – 1.24
- b) For 80 mm thick blocks – 1.18
- c) For 60 mm thick blocks – 1.06

Compressive Strength Calculation:

The average corrected compressive strength for the designed block section shall be calculated.

4.0 Method of laying:

Blocks shall be placed on the bed prepared of sand bedding, PCC or sub base etc. which were well rammed so as to act as firm bed. Blocks shall be laid in such manner that no gap shall be left in between. Blocks so laid shall be compacted by means of mechanical compactor or equivalent compacting method so as to obtain required finished surface. All the joints shall be matched and if any manufacturing defect is detected the lot shall be replaced and relaying shall be done without any extra cost up to satisfaction of Engineer in charge.

Measurement and payment shall be on Square meter basis.

100mm thick coarse sand shall be laid as cushioning layer for arranging the paver blocks. Joints of the paver blocks shall be filled with the sand the paver blocks shall be laid properly on the prepared sub-base as per manufacturer's specification and as per Architect and Engineer-in-charge's instruction.

Paver block shall be laid by the approved agency only. If manufacturer of the paver block providing the laying services, then it shall be laid through the supplying agency only. The laborers for paver block fixing shall be skilled flooring mason only. Only cutting tool shall be used for cutting the paver block. Full depth cutting toll shall be used for proper finished surface after cutting. Manual cutting or breaking of the paver block is not permitted.

After laying of the paver block fine sand shall be spread over it and paver block shall be compacted with mechanical compactor. Any settlement or undulation in the laid area to be repaired immediately.

5.0 Mode of Measurement and payment:

Measurement will be done in **sq m** of the actual area laid

TEM NO. 8

Conveyance of excavated earth up to 1.50km lead from the site. Conveyance of material.

Disposal of Excavated materials:

No materials excavated from foundation trenches of whatever kind they may be, are to be placed even temporarily nearer than 1.5 m. of distance prescribed by the Engineer from the outer edge of excavation. All materials excavated shall remain property of government. Rate for excavation includes sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purpose. The site shall be left clean of all debris on completion.

Disposal of excavated materials is subject to the following:

Unsuitable materials obtained from clearing site and excavation shall be disposed off within lead of 50 metres as directed. Useful materials obtained from clearing site and excavation shall be stacked within a lead of 50 M. beyond the building area as directed. Materials suitable for back filling shall be stacked at convenient places within a lead of 50 M. from the structure for reuse. Useful stones from rock excavation shall be stacked neatly within a lead of 50 M. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at schedule of rates of the division or at a mutually agreed rates if there are no such rates in the Schedule of rates.

If surplus materials are required to be conveyed beyond 50 M. conveyance will be paid for under a separate item.

Mode of Measurement and Payment:

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

ITEM NO. 9

Leveling and rising of M.H. and I.C. frame and cover up to proposed road level as directed of Engineer-IN-Charge.

Materials: Water shall conform to M-1. Cement shall conform to M- 6. Burnt brick shall conform to M- 15. Brick bats of 40 to 50 mm. size shall conform to M- 14. Stone coarse aggregate of 20 mm. nominal size shall conform to M- 12. Grit shall conform to M- 8. cement mortar of specified proportion shall conform to M- 11. The cast iron manhole cover of 560 mm. dia. with frame shall conform to I.S. 1726 – 1966.

2.0 Workmanship:

2.1 The manhole of different type and sizes as specified shall be constructed in sewer line at such places and to such levels and dimension as shown in drawings or as directed.

2.2 Bed concrete:

2.2.1 The manhole shall be built on a head of cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 brick bats) (40 to 50 mm. nominal size) to the thickness of the bed concrete shall be 15 Cms. for manhole up to 1 m. depth and 20 Cms. for manholes over meter and up to 2 metre. Depth and 30 Cms. for manhole of greater depth.

2.2.2 Projection of bed concrete beyond the masonry wall shall be 15 Cms.

2.3 Walls: The walls or manhole shall be carried out with burnt bricks using bricks, having crushing strength not less than 35 Kg/Cm² in C.M. 1:5 (1 cement: 5 coarse sand). The thickness of brick masonry wall shall be 230 mm. The jointing face of such brick shall be well buttered with cement mortar before laying so as to ensure full joints.

2.4 Plaster: The inside of walls shall be plastered 15 mm. thick with C.M. 1:5 (1 cement: 5 coarse sand) and finished with floating coat of neat cement. All angle shall be rounded to 7.50 Cms. radius and all rendered internal surface shall hard impervious finish obtained by using a steel trowel. The external joints of masonry shall be finished smooth.

2.5 Channels & Benching:

2.5.1 Channels shall be semicircular in the bottom half and diameter equal to the sewer. above the horizontal diameter, the sides shall be extended vertically to the same level as the crown of the outgoing pipe and the top edges shall be suitably rounded off. The branch shall also shall be similarly constructed with respect to the benching but at their junction with the main channel and appropriate fall suitably rounded off in the direction of flow in the main channel shall be given.

2.5.2 The channel and benching shall be done C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) rising at a slop in line from edges of channel. The channels of the bottom of the chamber shall be plastered with C.M. 1:2 (1 cement: 2 coarse sand) and steel trowelled smooth.

2.6 Cover slab: The cove slab of R.C.C. 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 15 Cms. thick reinforced with 10 mm. brass at 15 Cms. C/C both ways, surface and edges finished fair. Full bearing equal to the width of wall shall be given to the slab on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top on all sides. The frame of manhole cover shall be embedded firmly in R.C.C. slab so that the top of the frame remains flush with the top of R.C.C. slab.

2.7 Testing:

2.7.1 Manhole shall be tested by filling with water to a depth not exceeding 1.2 M. as directed.

2.7.2 After completion of work, manhole covers shall be sealed by means of thick grease.

3.0 Mode of Measurements & payment:

3.1 The depth of manhole shall be distance between the top of the manhole cover in the invert level of the main drain. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item as directed above.

The rate shall be for a unit of one number.

APPENDIX APPENDIX No. – I

Details of plants and machinery immediately available with the tenderer for use in this work.

Sr. No.	Name Of Equipment	N0. Of Units	Kind Or Name	Capacity	Age And Condition	Present Location	Remark
	To be attached separately						

DATE :

SIGNATURE OF CONTRACTOR

APPENDIX - II

LIST OF WORKS ALREADY COMPLETED BY TENDERER

Sr. No.	Name of work	Place	Cost On completion	Time taken in months To complete the work	Remarks
	To be attached separately				

* Necessary certificate from the officer concerned shall be attached with the tender.

SIGNATURE OF CONTRACTOR

AUTHORITY

APPENDIX - III

DECLARATION REGARDING WORKS ON HAND WITH TENDERER

Sr. No.	Name of Work	Place	Tender cost	Works on Hand		Estimated cost	Date when decision is expected	Stipulated date and period of completion	Remarks
				Cost of remaining to be executed	Anticipated date of completion				
	To be Attach separately								

SIGNATURE OF CONTRACTOR

AUTHORITY