

Work Item Specifications

A Dismantling, Demolition and Removal

Item No. A1: Providing and installation of barricading with retro reflective paint/ film/ tapes (Minimum 2.0Mt. height) for the construction of road work, along with necessary diversion arrangement for existing traffic movement in an unobstructed condition, all relevant markings, sign boards and illumination as per relevant MORT&H specification. Precoated galvanised iron profile sheets shall be of approved make and shade having 0.50 mm (+0.05 %) total coated thickness with zinc coating 120 grams per sqm as per IS: 277, in 550 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Rate to be inclusive of all materials, fabrication works, paint works for information (retro reflective paint), foundation works, transportation, loading, unloading, installation, dismantling and inclusive of all taxes and including the same design for providing openable gates. No extra rental will be given to the contractor in case of any delays from his part for construction or due to any valid time limit extensions. Each barricading sheet is to be numbered with a unique number. The barricading provided shall be retained in position at site continuously i/c shifting of barricading from one location to another location as many times as required during the execution of the entire work till its completion. Rate include its maintenance for damages, painting, all incidentals, labour materials, equipments and works required to execute the job. The barricading shall not be removed without prior approval of Engineer-in-Charge.

Measurement: Measurement shall be taken in square meters (Sq.m.) of the elevational area of barricade actually installed at the site.

Item No. A2: Removing and refixing the installed barricading system as per above item description with in site area. Rate to be inclusive of all materials, fabrication works, required for removing and refixing barricading with in site area, foundation works, transportation, loading, unloading, installation, dismantling etc. The barricading provided shall be retained in position at site continuously i/c shifting of barricading from one location to another location as required during the execution of the entire work till its completion. Rate include its maintenance for damages, painting, all incidentals, labour materials, equipments and works required to execute the job. The barricading shall not be removed without prior approval of Engineer-in Charge. The barricading provided shall remain to be the property of the contractor on completion of the work. Blinkers are to be installed on the barricading and rate for blinkers will be payable as per relevant item. Barricading is to be cleaned by means of washing with water on a weekly basis or as and when required as per the instructions of Engineer in charge. Payment shall be made for Sqm area of barricading sheet and number of shifting from start of work till completion of work.

Measurement: Measurement shall be taken in square meters (Sq.m.) of the elevational area of barricade actually installed at the site.

Item No. A3: 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.

The surface of the formation for a width of sub-base, which shall be 15 cm more on either side of base course, shall first be cut to a depth equal to the combined depth of sub-base and surface courses below the proposed finished level (due allowance being made for consolidation). It shall

then be cleaned of all foreign substances. Any ruts or soft yielding patches that appear due to improper drainage conditions, traffic hauling or from any other cause, shall be corrected and the sub-grade dressed off parallel to the finished profile.

Measurement: Measurement shall be taken in cubic metres (Cu.m) of the volume of the road surface excavated.

Item No. A4: Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work

Work shall be carried out with utmost care to avoid any damage or deposition on historic surfaces. The work of demolition, disposal or stacking should be done carefully and using manual methods as much as possible.

Measurement shall be considered for actual demolished area and paid for cu.m units.

Item No. A5: Demolition of Brick work and stone masonry including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift.(ii) In Cement Mortar.

Work shall be carried out with utmost care to avoid any damage or deposition on historic surfaces. The work of demolition, disposal or stacking should be done carefully and using manual methods as much as possible.

Measurement shall be considered for actual demolished area and paid for cu.m units.

Item No. A6: 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

Excavation shall be done carefully using manual means (spade, pickaxe) to prevent disturbance to adjacent old foundations. In areas away from historic structures, mechanical excavation may be permitted with prior approval. Depth shall not exceed 1.5 meters unless otherwise directed. Sides of excavation shall be trimmed and dressed to vertical or specified slope (generally 1:1 for loose soil) to prevent collapse. Serviceable materials such as stone fragments, bricks, or compacted soil suitable for backfilling shall be sorted, cleaned, and stacked separately at pre-designated places within the site. Unserviceable or waste soil shall be transported and disposed of within 50 meters lead to approved dumping sites, ensuring no damage to surrounding heritage areas. Excavated material shall not be stacked against existing historic walls or temple structures.

- IS 3764:1992 – *Safety Code for Excavation Work.*

Measurement: Measured in cubic meters (Cu.m) of actual excavated volume up to the specified depth (1.5 m). Rate includes sorting, stacking, disposal (50 m lead), and levelling, dressing, and safety provisions.

Item No. A7: Removal of existing any type of paving or paving stones of any type, any size, any thickness in required depth including removing paver with spil sub base and breaking sub base i.e concrete or metaling etc under the supervision of concerned department, disposal unserviceable material with all lifts and up to any lead at non objectional place and stacking the

serviceable material (paver) upto any private or corporation Land (if corporation land is used then contractor to pay rent to the corporation) store including loading, unloading as directed by Engineer in-charge. : paver blocks at the chowks

Temporary barricades and protection shall be installed around the dismantling zone to prevent movement of debris or damage to adjoining structures. Stones or tiles shall be loosened manually, using wooden or bamboo wedges to gently pry out pieces without cracking. The dismantled stones shall be cleaned of adhering mortar using wooden mallets and scrapers. Reusable stones shall be numbered on the underside or non-decorated surface using a reversible medium. Serviceable slabs or tiles shall be sorted, stacked, and stored within the site at a designated storage area, under tarpaulin cover.

Measurement: The work shall be measured in square metres (Sq.m) of flooring dismantled and cleared, including sorting, stacking, and disposal as specified.

Item No. A8: Removal of existing Light Poles/ telephone pole/ electrical pole/ signage pole with fixtures/ signage sheet/ac units all cabling work including excavation, Breaking concrete foundation under the supervision of concerned department, disposal unserviceable material with all lifts and up to any lead at non objectional place and stacking the serviceable material upto any private or corporation Land (if corporation land is used then contractor to pay rent to corporation) store including loading, unloading as directed by Engineer in-charge.

Measurement: The work shall be measured according to the number of fixtures to be dismantled and stacked.

B Surface Preparation

Item No. B1: Supplying of graded stone aggregate of following sizes (for W.B.M. Road)(3) Crushed stone aggregate for Hard Quality up to 63 mm size- upto 250mm and 350mm near otla/footpath

Coarse aggregate as specified in the item shall be either crushed/broken stone, crushed slag, over burnt (Jhama) brick aggregate or one of the naturally occurring aggregates such as kanker or laterite of suitable quality as stated hereinafter and approved by the Engineer-in-Charge.

The coarse aggregate shall conform to one of the gradings given in Table 16.2 as specified. For crushable type of aggregates such as brick metal, kankar and laterite, grading shall not be regarded as very important, but the material should generally be within the specified range.

Table 1 Table 16.1 from CPWD Specifications: Road works

TABLE 16.1
Physical Requirements of Coarse Aggregate for Water Bound Macadam for
Sub-Base / Base Courses

S. No	Test	Test method	Requirements
1.***	Los Angeles Abrasion value or Aggregate impact value	IS 2386 (Part-4) IS 2386 (Part-4) or IS 5640*	40% (Max.) 30% (Max.)
2.	Combined flakiness and Elongation Indices (Total)**	IS 2386 (Part-1)	35% (Max.)

Table 2 Table 16.2 from CPWD Specifications: Road works

TABLE 16.2
Grading Requirements of Coarse Aggregate for W.B.M.

<i>Grading No.</i>	<i>Size Range</i>	<i>IS Sieve Designation</i>	<i>Percent by weight passing the sieve</i>
1	90 mm to 45 mm	125 mm	100
		90 mm	90 – 100
		63 mm	25 – 60
		45 mm	0 – 15
		22.4 mm	0 – 5

Measurement: Measurement shall be taken in cubic metres (Cu.m) of aggregates supplied and laid on the surface.

Item No. B2: Supplying of brick aggregate 40mm nominal size- upto 150mm

Brick aggregate shall be made from over-burnt bricks and dense brick bats. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dust, dirt and other objectionable and deleterious materials.

Measurement: Measurement shall be taken in cubic metres (Cu.m) of aggregates supplied and laid on the surface.

Item No. B3: Spreading the stone aggregate for rolling and W.B.M. including filling the interstices to required camber and gradient (excluding spreading of Blindage)(ii) 40mm to 63mm size aggregates (H.B.)

The coarse aggregate shall be spread uniformly and evenly upon the prepared base in required quantities with a twisting motion to avoid segregation. In no case shall these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed base be permitted. The aggregates shall be spread uniformly to proper profile by using templates placed across the road six metres apart. Where specified, approved mechanical devices may be used to spread the aggregates uniformly. The levels along the longitudinal direction upto which the metal shall be laid, shall be first obtained at site to the satisfaction of Engineer-in-Charge, and these shall be adhered to.

The surface of the aggregate spread shall be carefully trued up and all high or low spots remedied by removing or adding aggregate as may be required. The W.B.M. sub-base shall be normally constructed in layer of 100 mm compacted thickness and W.B.M. base shall be normally constructed in layers of 75 mm compacted thickness. No segregation of large or fine particles shall be allowed and the coarse aggregate as spread shall be of uniform gradation with no pockets of fine material. The coarse aggregate shall normally not be spread in lengths exceeding three days average work ahead of the rolling and blending of the proceeding section.

Measurement: The length and breadth shall be measured to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre and at 30 cm from the left and right edges at a cross section taken at 100 metre interval or less as decided by the Engineer-in-Charge by making small pits. The consolidated cubical contents shall be calculated in cubic metres correct to two places of decimal.

Item No. B4: Preparing surface by Brushing with wire brushes for removing caked mud etc. sweeping with brooms and finally fanning the cleaned surface with gunney bags to remove all loose dirt etc.(i) Water bound macadam surface (New)

Prior to the application of the binder, all dust, dirt, caked mud, animal dung, loose and foreign material etc. shall be removed 30 cm on either side, beyond the full width to be treated, by means of mechanical sweepers and blowers, if available or otherwise with wire brushes, small picks, brooms etc. The material so removed shall be disposed off as directed by the Engineer-in-Charge. For a water bound macadam surface, the interstices between the road metal shall be exposed upto a depth of about 10 mm by means of wire brushes. The surface shall then be brushed with soft brooms to remove all loose aggregate. Finally the traces of fine dust which get accumulated while brushing shall be thoroughly removed from the surface by blowing with gunny bags. The prepared surface shall be closed to traffic and maintained fully clean till the binder is applied.

Measurement: The length and width of the finished work shall be measured correct to a cm along the finished surface of the road. The area shall be calculated in square metre, correct to two places of decimal.

Item No. B5 : Providing and laying cement concrete 1:3:6 (1-Cement : 3- coarse sand : 6- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth - 100mm

Before laying cement concrete for grading, the level markings to the required slope/gradient shall be made only with cement concrete on the surface of the slab at suitable spacing with the help of string and steel tape (Measuring tape) so that the mason can lay the concrete to the required thickness, slope / gradient easily in between the two level markings.

On getting the level marking approved by the Site Engineer the surface should be sprinkled with thick cement slurry and the concrete should be laid carefully, without throwing from height, in predetermined strips. The concrete should be consolidated by specially made wooden tamping. After the tamping is done the surface should be finished to required slope/gradient with wooden trowels without leaving any spots of loose aggregates etc. The mixed cement concrete must be laid in position, within half an hour of its mixing. In case any quantity of concrete remains unused for more than half an hour the same should be rejected and removed from the site.

Curing shall be done either by spreading straw/Hessian cloth over the graded surface, keeping the same wet for full 10 days or flooding the graded area with water by making kiaries with weak cement mortar, for 10 days.

Measurement: Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sqm. and the cubical contents shall be worked out to nearest 0.001 cum.

Item No. B6: Bitumen Impregnated Geotextile (Providing and laying bitumen impregnated geotextile layer after cleaning the road surface, geotextile conforming to requirements of clause 700, laid over a tack coat with 1.05 kg per sqm of paving grade bitumen 80-100 penetration and constructed to the requirement of clause 700)

The work shall include thorough cleaning of the existing road surface by mechanical brooming and compressed air to remove all dust, loose particles, and deleterious materials to ensure proper adhesion. A uniform tack coat shall then be applied using paving grade bitumen of 80–100 penetration at the rate of 1.05 kg per sqm, ensuring even distribution without streaking or pooling.

The geotextile shall conform to the requirements specified under Clause 700 and shall be laid over the tack coat while the bitumen is still tacky. The geotextile shall be placed smoothly without wrinkles, folds, or overlaps beyond those specified, and shall be properly aligned to avoid creases. Necessary rolling shall be carried out to ensure full contact and impregnation of the geotextile with the bitumen.

Measurement: Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sqm.

Item No. B7: Providing and laying controlled cement concrete M.150 and exposed work with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for R.C.C work in (iv) Slabs having more than 13 cm and upto 15 cm.thickness

Before laying cement concrete for grading, the level markings to the required slope/gradient shall be made only with cement concrete on the surface of the slab at suitable spacing with the help of string and steel tape (Measuring tape) so that the mason can lay the concrete to the required thickness, slope / gradient easily in between the two level markings.

On getting the level marking approved by the Site Engineer the surface should be sprinkled with thick cement slurry and the concrete should be laid carefully, without throwing from height, in predetermined strips. The concrete should be consolidated by specially made wooden tamping. After the tamping is done the surface should be finished to required slope/gradient with wooden trowels without leaving any spots of loose aggregates etc. The mixed cement concrete must be laid in position, within half an hour of its mixing. In case any quantity of concrete remains unused for more than half an hour the same should be rejected and removed from the site.

Curing shall be done either by spreading straw/Hessian cloth over the graded surface, keeping the same wet for full 10 days or flooding the graded area with water by making kiarries with weak cement mortar, for 10 days.

Measurement: Length and breadth shall be measured correct to a cm. Area shall be worked out to nearest 0.01 sqm. and the cubical contents shall be worked out to nearest 0.001 cum.

Item No. B8: Providing and placing in position FE 500D TMT bar reinforcement including cutting, bending, hooking, and tying complete as per detailed drawing.(A) Solid Slab.

Thermo-Mechanically Treated (TMT) high strength deformed bars used for reinforcement in reinforced cement concrete (RCC) works shall conform to the requirements of IS 1786 (latest revision). The bars shall be manufactured through a controlled thermo-mechanical process to

obtain a tough outer martensitic layer with a ductile ferrite-pearlite core, ensuring high strength, excellent ductility, and good weldability.

The steel shall be of grade Fe 500, having a minimum 0.2% proof stress (yield stress) of 500 N/mm². The ultimate tensile strength shall be at least 12% higher than the actual yield stress, and shall not be less than 565 N/mm². The ratio of tensile strength to yield strength shall comply with IS 1786 requirements, ensuring adequate strain hardening characteristics.

The material shall exhibit a minimum percentage elongation of 16%, measured on a gauge length of $5.65\sqrt{A}$, where A is the cross-sectional area of the test specimen. In addition, the total elongation at maximum force (Agt) shall not be less than 5%, ensuring adequate ductility and energy absorption capacity, making the bars suitable for use in seismic-resistant and high-performance RCC structures.

The bars shall possess good bend and rebend properties and shall successfully withstand the prescribed bend and rebend tests as specified in IS 1786, without any cracking or surface defects. The steel shall also have controlled chemical composition with low carbon equivalent to ensure good weldability, without the need for special precautions.

All TMT bars shall be free from surface defects such as cracks, laminations, seams, or excessive rust, and shall have well-defined ribs to ensure proper bond with concrete.

Measurement: Thermo-Mechanically Treated (TMT) Fe 500 reinforcement bars shall be measured and paid for in metric tonnes (MT).

Item No. B9: Supplying and fixing reinforced concrete heavy duty non-pressure pipes with collars for culverts carrying heavy traffic as per IS 458-1991 specifications including setting the pipes in C.M. 1:2 watering and laying (to level or slopes) of class NP3 of following internal diameters.(ii) 450mm dia. - sewer and rainwater drainage lines.

The pipes shall be with reinforcement as required and shall be of class not lesser than NP2. These shall conform to IS 458 and shall be capable of withstanding a test pressure of 0.07 MPa (7 m head). The reinforced cement concrete pipes shall be manufactured by centrifugal (or spun) process or vibrated casting process. All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding.

Concrete used for the manufacture of reinforced concrete pipes and collars shall be as per design mix. The concrete quality (concrete mix, maximum water-cement ratio, minimum cement content. etc) shall be as per IS 456 for at least very severe environment exposure condition with minimum cement content 260 kg/m³. The maximum size of aggregate should not exceed one third of the thickness of the pipe or 20 mm whichever is smaller for pipes above 250 mm internal diameter. But for pipes of internal diameter 80 to 250 mm, the maximum size of aggregate should be 10mm. The reinforcement in the reinforced concrete pipes shall extend throughout the length of the pipe. The circumferential and longitudinal reinforcements shall be adequate to withstand the specified hydrostatic pressure and further bending stresses due to the weight of water when running full across a span equal to the length of pipe plus three times its own weight.

Loading, transporting and unloading of concrete pipes shall be done with care. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain pulley block is

recommended. All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used. Pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Pipes shall be laid true to line and grade as specified. Laying of pipes shall proceed upgrade of a slope.

Measurement: The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken along the centre line of the pipes over all fittings such as bends, collars, junctions, etc. which shall not be measured separately.

Item No. B10: Ductile Iron Pipes with internal cement mortar lining and external Zinc coating with finishing layer of Bitumen; manufactured, tested and duly marked in strict accordance with and confirming to IS: 8329/2000 (as per latest amendment); suitable for push-on Jointing, along-with one number Rubber Gaskets for each length of pipe (EPDM Gasket as per IS: 5382/1985). (Class-K7) For 450 mm Dia.- water supply

The pipes shall be lowered into the trench by means of suitable pulley blocks, sheer legs chains ropes etc. In no case the pipes shall be rolled and dropped into the trench. One end of each rope may be tied to a wooden or steel peg driven into the ground and the other end held by men which when slowly released will lower the pipe into the trench. After lowering, the pipes shall be arranged so that the spigot of one pipe is carefully centered into the socket of the next pipe, and pushed to the full distance that it can go. The pipe line shall be laid to the levels required. Specials shall also be laid in their proper position as stated above.

After a new pipe has been laid, jointed and back filled (or any valved section thereof), it shall be subjected to the following two tests: (a) Pressure test at a pressure of at least double the maximum working pressure-pipe and joints shall be absolutely water tight under the test. (b) Leakage test (to be conducted after the satisfactory completion of the pressure test) at a pressure to be specified by the authority for duration of two hours.

Measurement: The net length of pipes as laid or fixed, shall be measured in the running metres correct to a cm. specials shall be excluded and enumerated and paid for separately. The portion of the pipe within the collar at the joints shall not be included in the length of pipe work

Item No. B11: Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.

The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth. Cover shall be measured from top of pipe to the surface of the ground. The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layers.

After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.

The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.

Measurement: The lengths shall be measured in running metre correct to a cm for the trenches in which pipes are to be laid.

Item No. B12: Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene (conforming to IS 14930 II) with necessary connecting accessories of same material at required depth in existing trench for laying of cable below ground / road surface for enclosing cable. (c). 90 mm outer dia. - private connections

Pipes shall be continuous and clear of debris or concrete before cables are drawn. Sharp edges if any at ends shall be smoothened to prevent damage to cable sheathing.

Measurement: The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed

Item No. B13: Constructing Brick masonry road gully chamber 500mm x 450mm x 600mm including 500mm x 450mm C.I. horizontal grating with frame complete.

The chamber shall be of brick masonry of specified class and shall have a C.I. grating with frame fixed in 15 cm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) at the top. The size of the chamber shall be taken as the clear internal dimensions of the C.I. frame. The chamber shall have a connection pipe, the length of which in metre between the road gully chamber and the manhole of the drain shall not be less than one by forty (1/40) times the nominal diameter of pipe in mm (i.e. for 150 mm connection pipe, length shall not be less than 3.7 m and for 250 mm connection pipe length shall not be less than 6.25 m). The chamber shall be built at the location fixed by the Engineer-in-Charge. Generally the spacing of the chambers shall be 18 to 36 m depending upon the grading of the road channel and the area of the drainage. R.C.C. gully grating shall be fixed in cement mortar 1:2 (1 cement: 2 coarse sand)

Measurement: Road Gully chambers shall be enumerated

Item No. B14: Constructing Manhole with R.C.C. top slab in 1:2:4 mix (1-cement :2-coarse sand : 4 graded stone aggregate 20mm nominal size) foundation concrete 1:3:6 mix (1 cement : 3-coarse sand :6-Brick bats 40 + 50mm size) inside plastering 15mm thick with Cement Mortar 1:3 (1-Cement : 3-coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 mix (1-Cement :2 Coarse sand :4-stone aggregate 20mm nominal size) finished smooth complete including curing and festing (i) Inside size 900mm x 1200mm and 1.5M. deep including C.I. cover with frame size 560mm diameter total weight of cover and frame to be not less than 128 kgs. (Wt. of cover 64 Kg. and Wt. of frame 64 Kg.)(A) With 230mm thick walls of brick masonry using brick having crushing strength not less than 35Kg. / Sq.cm. in Cement Mortar 1:5 (1- Cement: 5-Coarse sand) (2) B type depth 1.50 Metre for 150mm diameter sewer.

Measurement: Manholes shall be enumerated under relevant items. The depth of the manhole shall be reckoned from the top level of C.I. cover to the invert level of channel.

Item No. B15: Covering of cable with second class bricks or cement tiles laid cover the cable crosswise & also on both sides with covering of 7.5 Cm. layer of sand above & below cable (16 bricks per meter)

The cables, shall be protected by second class brick of nominal size 22cm x11.4cm x 7cm or locally available size, placed on top of the sand (or, soil as the case may be). The bricks shall be placed breadth-wise for the full length of the cable. Where more than one cable is to be laid in the same trench, this protective covering shall cover all the cables and project at least 5cm over sides of the end cables.

Measurement: The running length of the cable installed is to be measured.

Item No. B16: Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each disposable layer by ramming and watering.

Measurement shall be considered as per the actual filled area, for uniform depth after setting period of 1 week in cu.m units.

Item No. B17: Filling in plinth with sand under floors including watering ramming, consolidating and dressing complete

Sand filling shall be done in a manner similar to earth filling in plinth except that consolidation shall be done by flooding with water. The surface of the consolidated sand filling shall be dressed to the required level or slope and shall not be covered till the Engineer-in-Charge has inspected and approved the sand filling.

Measurement: The length, breadth and depth of consolidated sand shall be measured with steel tape correct to the nearest cm and cubical contents worked out in cubic metres correct to two places of decimal.

Item No. B18: Filling around the pipes with murrum including dressing, tampering etc. complete.

Measurement : Measurement shall be done in the the cubical contents of the total volume of murrum required for filling.

C Surface Paving and Edging

Item No. C1: Supply of Dished Channel of VYARA make, as per the below profile drawing, manufactured on Vacuum Wet Press Machine with hydraulic pressing of wet concrete mixture to a minimum of 400 tons with simultaneous vacuuming, using ECO filters with pimple finish. Brand name of the vendor should be embossed on the back side of every piece. size: 600x300x125mm

Measurement: Pieces of dished channel as specified needs to be enumerated.

Item No. C2: Providing and laying multi-colored stones like Mandhana, black kadappa, leather finished kota stone and rajula stone with avg. thickness of 30mm, in 1:6 cement laid over and jointed with groove and spacer and white and grey cement slurry mixed with pigments to match the shade of the flooring etc. in the outdoor plaza areas.

The base concrete or subgrade shall be properly compacted, cured, and cleaned of all dust and loose particles before starting work. The surface shall be checked for line, level, and slope as per the approved drawings to ensure proper drainage in outdoor areas. A neat cement slurry shall be applied on the clean, damp base immediately before laying the mortar bed. Mortar of mix 1:6 shall be laid evenly to an average thickness sufficient to achieve the final floor level. Stones shall be laid on the mortar bed, gently pressed and tapped with a wooden mallet to ensure proper bedding and alignment. Joints shall be kept uniform (typically 3–6 mm) using spacers as required. Grooves shall be provided as per the approved pattern and layout. Joints shall be filled with white/grey cement slurry mixed with pigments to match the colour of each stone. The finished surface shall be even, level, and true to pattern. The surface shall be cleaned thoroughly with water and soft cloth after jointing is complete. The flooring shall be cured using moist hessian or water curing as per site conditions. After curing, the surface shall be washed and polished if required to achieve an even, aesthetically uniform appearance.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

Item No. C3: Providing and Installation of Multicolour rough cut cobble stones 100x100x60mm in 1:4 cement mortar with 6mm grooves upon 50mm pcc bedding concrete and 50mm sand bed including installation as per pattern and design including cutting to shape, curing and cleaning complete as per the instructions of Engineer in charge

Measurement: Measurement shall be in square metres (sqm) of finished surface.

Item No. C4: Supplying and fixing cat eye made out from Acrylic beutile sterine injection high compressed molding with reflector made of MMC (prismatic type of size 12cm x 6cm x 2.5cm) provided with bituminous adhesive 100g. with each unit for fixing. (High Intensity grade)

The reflective marker shall be fixed to the road surface using the adhesives and the procedure recommended by the manufacturer. No nails shall be used to affix the marker so that they do not pose safety hazard on the roads. Regardless of the type of adhesive used, the markers shall not be fixed if the pavement is not surface dry and on new asphalt concrete surfacing until the surfacing has been opened to traffic for a period of not less than 14 hours. The portions of the highway surface, to which the marker is to be bonded by the adhesive, shall be free of dirt,

curing compound, grease, oils, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive.

Measurement: The number of fixtures to be installed needs to be measured.

Item No. C5: Solar Stud: Supplying of Solar Raised Pavement Markers made of polycarbonate molded body with circular shape, solar powered, LED self-illumination in active mode, 360 degree illumination and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face in passive mode. The marker shall support a load of 20000 kg tested in accordance to ASTM D 4280. The marker should be resistant to dust and water ingress according to IP 65 standards and should withstand temperatures in the range of 0 C to 70 C. Color of lighting could be provided in red or yellow (amber) as per requirement and typical frequency of blinking is 1 Hz. There should be current losses of less than 20 micro-amperes at 2.4 V in sleep-charging mode to enhance the life of the marker and a full charge should provide for a minimum autonomy of 50 hours. The height, width and length of the marker shall not be less than 10 mm x 100 mm x 100 mm. Also, the surface diameter of the marker shall not be less than 100 mm respectively. The weight of the marker shall not exceed 0.5 Kilograms. Fixing will be by drilling holes on the road for the shanks to go inside, without nails and using epoxy resin based adhesive as per manufacturers recommendation and complete as directed by the engineer.

The reflective marker shall be fixed to the road surface using the adhesives and the procedure recommended by the manufacturer. No nails shall be used to affix the marker so that they do not pose safety hazard on the roads. Regardless of the type of adhesive used, the markers shall not be fixed if the pavement is not surface dry and on new asphalt concrete surfacing until the surfacing has been opened to traffic for a period of not less than 14 hours. The portions of the highway surface, to which the marker is to be bonded by the adhesive, shall be free of dirt, curing compound, grease, oils, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive.

Measurement: The number of fixtures to be installed needs to be measured.

Item No. C6: Providing and laying cement concrete tactile tiles of size 300 x 300 x 25 to 30mm of Vyara, Super, Nishu, etc or equivalent of approved make and pattern having water absorption not over 6% and conforming to IS: 13801:1993, of approved make, pattern and shade (with UV light resistant colours from Lanxess only) in outdoor floors such as footpath, court yard, multi modals location etc., laid on 30 to 40mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.

Measurement: Measurement shall be in square metres (sqm) of finished surface.

D Electrical Works

- Conduits shall be laid in neat, straight runs with uniform slopes to avoid water accumulation. All bends shall be formed using inspection boxes at accessible points. No sharp bends or kinks permitted. All joints to be solvent welded with PVC adhesive.
- Wiring shall be done only after completion of plastering. All joints in wiring shall be made inside junction boxes with approved connectors. Adequate spare conduit boxes shall be provided for future extension.
- Switchboards shall be fixed at uniform height from finished floor level as per the drawings given by the Architect in charge. Each point shall be wired from the corresponding switch using proper colour-coded wires. All switches, sockets, and fan regulators shall be mounted on common plates wherever possible.
- Fixtures shall be mounted true to alignment with ceiling or wall surface. Ceiling fans shall be installed using down rods of approved length and securely fixed hooks. Exhaust fans shall be installed with proper wall frame and louver arrangement.
- Cables shall be laid in trenches at least 900 mm below ground level. The bed of the trench shall have 75 mm sand cushioning below and above the cable. Cables shall be protected with second-class bricks laid across and on both sides (16 bricks per metre). Cable route markers of CI or GI sheet shall be provided at every 30 m interval and at all turning points.
- Earth electrodes shall be installed as per approved layout and connected with copper/GI strip. Earth pits shall be provided with inspection chambers and watering arrangement. Resistance of each electrode shall be measured and recorded.

Tests to be conducted:

- Insulation resistance test between conductors and earth
- Earth continuity test
- Polarity test of single-pole switches
- Operational test of all switches, sockets, and points
- Earth resistance measurement for each pit (not exceeding 1 ohm)
- Functional testing of light fixtures, fans, and control circuits.

After successful testing, the entire system shall be energized in presence of the Engineer-in-Charge.

IS: 732 – *Code of Practice for Electrical Wiring Installations*

Item No. D1: Earthing: Providing earthing stations for equipment earthing as shown and specified in drawing for equipment complete with : Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications. (a) For Electrical Installation up to 440V in normal soil Length of pipe - 1 Mtr Back filling compound - 1 Nos Bag of 15 Kg

Measurement: Each (Nos.)

Item No. D2: Pole to luminaire internal connections: Supplying & erecting XLPE(IS:7098)(1)-88 ISI unarmoured copper cable 1.1 KV grade to be erected as directed of following size.

(A) 2 core 2.5 Sq. mm

Measurement: Running Metre (RM)

Item No. D3: Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size:

(f) 4 wire 2.5 sq. mm

Item No. D4: Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables.:

(A) 2 to 4 core 2.5/4 Sq. mm

Item No. D5: Solder less crimping type Copper lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner:

(A) 1.5/2.5 to 6 Sq.mm

Item No. D6: Providing following type of Modular Type Accessories mounted with PVC metallic/Wooden box, single mounting base frame covered with textured metallic/white front plate, modules erected with necessary connections as per site situation directed by Engineer In charge.:

21) Foot Light ... two modules cat-III

Measurement: Each (Nos.)

Item No. D7: Aesthetically designed decorative hot dipped galvanised mild steel step pole with grey powder finish. Compatible for all Havells post top range. Window - Plasma cut & duly chamfered opening window of 300x110 mm for terminal connections & mounting accessories. Window cover is fitted with allen screws to the pole. DECO POLE 4M TOP Ø 76 MM 7308

Measurement: Each (Nos.)

Item No. D8: BASE COVER: Aesthetically designed decorative pole base cover, enhancing the appearance of the pole. STARK Decorative Pole Base Cover 7308

Measurement: Each (Nos.)

Item No. D9: EROS DECORATIVE ARMSFamily of Decorative Arms in different designs, shaped and lengths to compliment the EROS LED Post Tops and Poles Family. Orbit Plus S Round Arm for Pole 7308

Measurement: Each (Nos.)

Item No. D10: FLEXISTRIP50MIP65AC6W/M830V1: Flexible LED strips with optimum brightness & uniformity of light for perfect cove lighting. IP65

Measurement: Running Metre (RM)

Item No. D11: BARON LED POST TOP

Design inspired from the classical Victorian era using new generation technology in LED to rejuvenate your outdoor areas with functionality during night and aesthetics during the day. IP65 die cast aluminium Post top lantern designed with long life LED engine & Electronic Driver, designed for glare free symmetrical light distribution. BARONPT70WLED757PSYMTOPC

Measurement: Each (Nos.)

E Special Items for Street Enhancement

Item No. E1: Providing an installation for roadside signage wall mounted using cast iron brackets and fixing a Corten steel-plate of 6mm thickness over it including laser cut name signage of the monument coated with epoxy paint, as per the design issued by the architect incharge

The Corten steel plate shall be of approved grade and thickness, neatly cut to shape, and fixed securely over the cast iron brackets as per the approved design. The signage text, graphics, and lettering shall be laser cut accurately in accordance with the drawings and design issued by the Architect-in-Charge.

All exposed steel surfaces, including laser-cut edges, shall be treated and finished with approved epoxy paint system to ensure durability, corrosion resistance, and uniform appearance. The cast iron brackets shall be properly anchored to the wall using suitable fasteners, anchor bolts, and fixtures, ensuring correct alignment, plumb, and structural stability.

The item shall include all materials, labour, tools, tackles, scaffolding, cutting, drilling, welding, fixing accessories, surface preparation, painting, and installation complete in all respects, strictly as per the design, drawings, and directions of the Architect-in-Charge.

Measurement: Measured according to the number (Nos.) of signages installed.

Item No. E2: Providing an installation of tactile information signage in stone masonry work including shaping and chiselling, embedded with a ceramic plate with multi-colored graphics glazed after printing min. 6mm thick with 1 backup panel using the fixing chemicals, within the chase provided in the masonry construction including curing, as per the design issued by the architect incharge.

The stone surface shall be carefully carved and chiseled to match the dimensions and profile required for embedding the signage components. The ceramic plate and backup panel shall be fixed within the chase, using approved fixing chemicals ensuring full contact without voids. The 3D model shall be mounted on a stable, level base integrated into the stone or adjoining structure, using corrosion-resistant fasteners or epoxy anchors. Alignment, orientation, and visual clarity shall match the approved architectural drawings and tactile accessibility standards. All materials shall be handled to prevent damage, scratching, or staining during installation. Exposed stone surfaces shall be cleaned and finished neatly, free from mortar stains and rough edges. Ceramic plate surfaces shall be thoroughly cleaned and protected during curing.

Measurement: Measured according to the number (Nos.) of signages installed.

Item No. E3: Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.

The covers and frames shall conform to IS 1726 for cast Iron. Manhole covers and frame shall be manufactured from appropriate grade of grey cast iron not inferior than FG150 grade of IS 210. They shall be cleanly cast and shall be free from air and sand holes, cold shuts and warping. Covers shall have on its operative top a raised chequered design to provide for an adequate no-slip grip. The rise of chequers shall be not less than 4mm. Key holes, keys and lifting devices

shall be provided in the manhole covered to facilitate their placement in the frames and their operative maintenance. Manhole covers and frames shall be coated with materials having base with a black bituminous composition. The coating shall be smooth and tenacious. It shall not flow when exposed to temperature of 63°C and shall not be so brittle as to chip off at temperature of 0°C. Size and shape and performance requirement of manhole covers and frames shall conform to IS 1726.

Each manhole covers and frame shall have cast on them the following information:

Manufacturer's name or trade-mark, Grade designation, Date of manufacture The words SWD or 'Sewer' to denote 'storm water drain' or 'sewer' respectively, Identification marks as required by Engineer-in-Charge and logo of The respected Municipal corporation.

Measurement: Measurement shall be taken in the total count of CI Manhole covers required as specified in BOQ.

Item No. E4: Applying priming coat over new steel and other metal surface after and including preparing the surface by thoroughly cleaning, oil, grease, dirt and other foreign matter and scoured with brushes fine steel wood, scrapers and sand paper with ready mixed priming paint brushing red lead.

Providing and applying one coat of ready-mixed red lead priming paint on new steel and other metal surfaces.

The work shall include thorough preparation of the surface by completely removing oil, grease, dirt, rust, mill scale, and all other foreign matter. Surface preparation shall be carried out by brushing with wire brushes, fine steel wool, scrapers, and sandpaper to ensure a clean, smooth, and dry surface suitable for painting.

After proper surface preparation, one uniform coat of ready-mixed red lead priming paint shall be applied by brushing to achieve an even and continuous film over the entire surface. The primer shall be allowed to dry properly before application of subsequent coats.

Measurement to be done in sqm, of surface area to be painted.

Item No. E5: Painting two coats (excluding priming coat) on new steel and other metal surface with enamel paint, brushing, interior to give an even shade including cleaning the surface an even shade including cleaning the surface of all dirt, dust and other foreign matter.

Providing and applying two coats of enamel paint (excluding priming coat) on new steel and other metal surfaces.

The work shall include cleaning the primed surface to remove all dirt, dust, and foreign matter before application of paint. Enamel paint shall be applied by brushing in two coats to obtain an even shade and smooth, uniform finish. Each coat shall be allowed to dry thoroughly before applying the subsequent coat.

Measurement to be done in sqm, of surface area to be painted.

Item No. E6: Steel work, welded in built up sections framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint. (A) In beams and joists, channels

angles Tees, flats, with connecting plates or angle cleats as in main and cross beams. Hip and jack rafters, purlins conneted to common rafters and the like. - For steel arcade on both the side of streets.

Measurement to be done in Quintals