

Name of Work : Repairing and Renovation of EVM Warehouse Building at Valsad (C.C. Work and Miscellaneous Work) Ta.& Dist.Valsad

ITEM WISE SPECIFICATIONS

Item No: 1 Box cutting the road surface to proper slop and chamber for making a base of road work including removing the excavated stuff and depositing on the road side slope as directed upto 50 mts, lead.

Materials

- No specific material involved.
- Existing soil/moorum/road crust encountered during excavation.

Equipment

- Excavator/JCB, grader, tractor trolleys, dumpers, hand tools, etc.
- Water tanker and compaction equipment if required for finishing.

Procedure

1. The area shall be marked to required alignment, width, grade, slope, and camber.
2. Existing road surface/earth shall be excavated to the specified depth and profile.
3. Excavation shall be carried out carefully to avoid disturbance of adjacent portions.
4. The formation shall be trimmed and dressed true to required levels and cross-fall.
5. Loose, soft, unsuitable, or excess material shall be removed.
6. Excavated material shall be disposed of on road side slopes or at locations directed by the Engineer-in-Charge within 50 m lead.
7. Formation surface shall be properly compacted and prepared for subsequent road layers.
8. Any depressions or irregularities shall be corrected by cutting or filling as directed.

Finished Surface Requirements

- Surface shall conform to specified line, level, grade, slope, and camber.
- Tolerances shall comply with applicable road specifications.

Measurement

- Measured in **cubic metres (m³)** of excavation based on original and finished levels.
- Lead for disposal considered up to 50 m.

Rate Includes

- Setting out.
- Excavation in all types of ordinary soil/road crust.
- Dressing and trimming.
- Loading, conveying, unloading, and depositing excavated material within 50 m lead.
- Labour, machinery, fuel, tools, and incidental charges.

Item No: 2 Construction of 150 mm thick compacted coarsed granular subbase by providing coarse graded machine crushed B.T. material satisfying MOST specification (Grade-V crushed B.T. stone aggregate 26.5 mm to 9.5 mm @ 50 %, 9.5 mm to 2.36 mm @ 20% and 2.36 mm below @ 30 %) including spreading in uniform layer with

motor grader on prepared surface, mixing by mix in place method with rotavator at OMC and compacting with vibratory roller to achieve the desired density, complete clause as per 401.

401 GRANULAR SUB-BASE

401.1 Scope

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

401.2 Materials

401.2.1 The material to be used for the work shall be of grading required. The grading to be adopted for a project shall be as specified in the Contract. Where the sub-base is laid in two layers as upper sub-base and lower sub-base, the thickness of each layer shall not be less than 150 mm.

401.2.2 If the water absorption of the aggregates determined as per IS:2386 (Part 3) is greater than 2 percent, the aggregates shall be tested for Wet Aggregate Impact Value (AIV) (IS:5640). Soft aggregates like Kankar, brick ballast and laterite shall also be tested for Wet AIV (IS:5640).

Table 400-1 : Grading for Granular Sub-base Materials

IS Sieve Designation	Percent by Weight Passing the IS Sieve					
	Grading I	Grading II	Grading III	Grading IV	Grading V	Grading VI
75.0 mm	100	-	-	-	100	-
53.0 mm	80-100	100	100	100	80-100	100
26.5 mm	55-90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25-55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20-40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10-15	-	-	0-5	0-8
0.075 mm	<5	<5	<5	<5	-	0-3

Table 400-2 : Physical Requirements for Materials for Granular Sub-base

Aggregate Impact Value (AIV)	IS:2386 (Part 4) or IS:5640	40 maximum
Liquid Limit	IS:2720 (Part 5)	Maximum 25
Plasticity Index	IS:2720 (Part 5)	Maximum 6
CBR at 98% dry density (at IS:2720-Part 8)	IS:2720 (Part 5)	Minimum 30 unless otherwise specified in the Contract

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

401.3.2 Spreading and Compacting

The sub-base material of the grading specified in the Contract and water shall be mixed mechanically by a suitable mixer equipped with provision for controlled addition of water and mechanical mixing. So as to ensure homogenous and uniform mix. The required water content shall be determined in accordance with IS:2720 (Part 8). The mix shall be spread on the prepared subgrade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation, or other means as approved by the Engineer.

Moisture content of the mix shall be checked in accordance with IS:2720 (Part 2) and suitably adjusted so that, at the time of compaction, it is from 1 to 2 percent below the optimum moisture content.

Immediately after spreading the mix, rolling shall be done by an approved roller. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 200 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall or on superelevation. For carriageway having crossfall on both sides, rolling shall commence at the edges and progress towards the crown.

Each pass of the roller shall uniformly overlap not less than one-third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots or depressions which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour.

Rolling shall be continued till the density achieved is at least 98 percent of the maximum dry density for the material determined as per IS:2720 (Part 8). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

401.4 Surface Finish and Quality Control of Work

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

401.5 Arrangements for Traffic

During the period of construction, arrangements for the traffic shall be provided and maintained in accordance with Clause 112.

401.6 Measurements for Payment

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

401.7 Rate

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

- i) making arrangements for traffic to Clause 112 except for initial treatment to verges, shoulders and construction of diversions;
- ii) supplying all materials to be incorporated in the work including all royalties, fees, rents where applicable with all leads and lifts;
- iii) all labour, tools, equipment and incidentals to complete the work to the Specifications;
- iv) carrying out the work in part widths of road where directed; and
- v) carrying out the required tests for quality control.

Item No: 3 Rolling and consolidation using vibratory road roller 8 - 10 tonne capacity (incl. watering)(A) Earth work (layer not exceeding 200mm thickness)

Materials

- Approved earth/moorum/fill material as specified.
- Water fit for construction and compaction purposes.

Equipment

- Vibratory road roller of 8–10 tonne static weight.
- Water tanker with sprinkler arrangement.
- Motor grader/tractor blade or suitable leveling equipment.
- Hand rammers/plate compactors for edges and confined areas.

Procedure

1. The earth shall be spread in uniform layers not exceeding 200 mm loose thickness.
2. Clods larger than 50 mm, roots, rubbish, and deleterious materials shall be removed.
3. The layer shall be dressed to required line, grade, camber, and cross-fall.
4. Moisture content shall be adjusted to near Optimum Moisture Content (OMC) by watering or aeration.
5. Compaction shall be carried out using an 8–10 tonne vibratory roller from edges towards center with adequate overlapping.
6. Rolling shall continue until the required dry density/degree of compaction is achieved or refusal is reached.
7. Soft spots, uneven areas, and depressions developed during rolling shall be corrected and recompacted.
8. Edges and inaccessible portions shall be compacted using suitable smaller equipment/manual methods.
9. Finished surface shall be true to line, level, and grade within permissible tolerances.

Degree of Compaction

- Minimum compaction shall generally be:
 - **95% of Maximum Dry Density (MDD)** for subgrade/embankment unless otherwise specified.
- Testing shall be carried out as per relevant IS/MORTH specifications.

Measurement

- Measured in **square metres (m²)** for the compacted surface area, or as specified in BOQ.
- Thickness considered shall be the compacted thickness not exceeding 200 mm per layer.

Rate Includes

- Spreading and leveling.
- Watering.
- Rolling and vibration.
- Labour, machinery, fuel, and T&P.
- Dressing and finishing surface.
- All incidental operations required for proper compaction.

Item No: 4 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

Materials

- 1. Cement**
 - Ordinary Portland Cement/PPC conforming to relevant IS specifications.
- 2. Fine Aggregate**
 - Clean coarse sand free from silt, clay, organic matter, and deleterious substances.
- 3. Coarse Aggregate**
 - Hand broken hard stone aggregates of 40 mm nominal size, clean and well graded.
- 4. Water**
 - Clean and fit for construction purposes.

Proportion

Concrete shall be mixed in the proportion:

1:3:6 (Cement : Coarse Sand : Stone Aggregate by volume)

Mixing

1. Materials shall be measured accurately using gauge boxes.
2. Mixing shall preferably be done in a mechanical mixer until uniform consistency is achieved.
3. Water shall be added to obtain workable concrete without segregation.

Laying

1. Surface shall be cleaned and properly prepared before laying concrete.
2. Concrete shall be placed gently in layers without segregation.
3. Thickness and levels shall conform to drawings/specifications.
4. Concrete shall be compacted thoroughly using hand tamping/roding or mechanical vibrators where required.
5. Construction joints, if any, shall be made only at approved locations.

Finishing

- Top surface shall be finished even and to required line and level.

Curing

- Concrete shall be cured continuously for at least 7 days or as specified by keeping surface moist.

Formwork

- Formwork/shuttering shall be provided separately and is excluded from this item.

Measurement

- Measured in cubic metres (m³) of finished concrete work.

Rate Includes

- Cost of cement, sand, aggregates, water.
- Mixing, laying, compacting, finishing, and curing.
- Labour, machinery, tools, and incidental charges.
- Excludes shuttering/formwork.

Item No: 5 Providing and laying cement concrete work cement Concrete M200 and curing complete excluding cost of formwork and reinforcement for reinforced concrete work in (A) Foundations, footings, Base or columns and Mass concrete

Materials

- 1. Cement**
 - OPC/PPC cement conforming to relevant IS specifications.

2. **Fine Aggregate**

- Clean coarse sand conforming to relevant IS standards.

3. **Coarse Aggregate**

- Hard broken stone aggregate of approved quality and grading.

4. **Water**

- Clean and potable quality water suitable for concrete work.

Grade of Concrete

Concrete shall be of **M20 grade** with characteristic compressive strength of 20 MPa at 28 days.

$f_{ck}=20$ MPa at 28 days

Nominal mix/design mix shall conform to approved specifications and IS recommendations.

Mixing

1. Concrete shall be machine mixed in approved batch mixers.
2. Ingredients shall be measured accurately by weight/approved batching method.
3. Water-cement ratio shall be controlled to obtain required strength and workability.

Laying

1. Surface receiving concrete shall be cleaned and prepared.
2. Concrete shall be placed in position without segregation and in layers of suitable thickness.
3. Placement shall be completed within initial setting time of cement.
4. Concrete shall be compacted thoroughly using mechanical vibrators to achieve dense concrete free from honeycombing and voids.

Finishing

- Exposed surfaces shall be finished smooth, even, and true to line, level, and plumb.

Curing

- Concrete shall be cured continuously for a minimum period of 7–14 days or as specified to ensure proper hydration and strength development.

Formwork and Reinforcement

- Cost of shuttering/formwork and reinforcement steel is excluded from this item and shall be measured and paid separately.

Measurement

- Measured in **cubic metres (m³)** of finished concrete work.

Rate Includes

- Materials including cement, sand, aggregates, and water.
- Batching, mixing, transporting, placing, compacting, finishing, and curing.
- Labour, machinery, tools, plants, and incidental charges.
- Excludes reinforcement and formwork.

Item No: 6 Compaction and finishing of cement concrete road by trimix process providing extra Labour charges for the trimix vacume dewatering service process on cement concrete road surface by using vacume dewatering pump floater surface vibrator including making groves and rough finish to surface including leveling etc complete

Materials

- Freshly laid cement concrete of specified grade (measured separately).
- Vacuum dewatering mats/filter pads where required.

Equipment

- Vacuum dewatering pump with accessories.

- Trimix screed vibrator.
- Surface vibrator/floater.
- Power floater/trowel.
- Groove cutting tools/templates.
- Leveling and finishing tools.

Procedure

1. Concrete shall be laid to the required thickness, line, level, slope, and camber.
2. Initial compaction shall be carried out using screed vibrators/surface vibrators.
3. Vacuum dewatering mats shall be placed over the concrete surface immediately after vibration.
4. Vacuum pump shall be operated to remove excess water and entrapped air from concrete surface layers.
5. Dewatering shall continue for the required duration to achieve dense and durable concrete surface.
6. Surface shall then be finished using power floater/Trimix finishing equipment to obtain uniform level and texture.
7. Required grooves/joints shall be made at specified spacing and alignment.
8. Surface shall be given rough/non-skid finish as directed.
9. Finished concrete surface shall conform to required levels, thickness, slope, and camber.
10. Proper curing shall be carried out after completion of finishing operations.

Finish Requirements

- Surface shall be dense, smooth, durable, and free from cracks, honeycombing, undulations, or laitance.
- Non-skid rough finish shall be uniform throughout the road surface.
- Grooves/joints shall be straight, properly aligned, and of specified dimensions.

Measurement

- Measured in **square metres (m²)** of finished concrete road surface treated by Trimix vacuum dewatering process.

Rate Includes

- Labour charges for Trimix process.
- Vacuum dewatering operation.
- Surface vibration and floating.
- Leveling and finishing.
- Grooving and roughening of surface.
- Machinery, tools, plants, power, fuel, and incidental charges.
- Complete finishing operations only; concrete quantity measured separately unless otherwise specified.

Item No: 7 Providing and fixing in position FE 415 TMT barreinforement including cutting, bending and tyingcomplete as per detailed drawings. (A) R.C.C. Kerb. (B)R.C.C. Footpath.(C) R.C.C.Approch slab.(D) WearingCoat.

Materials

1. **Reinforcement Steel**
 - FE 415 grade TMT bars conforming to relevant IS specifications.
2. **Binding Wire**
 - Annealed steel binding wire of approved quality.

Procedure

1. Reinforcement bars shall be cleaned free from rust, oil, grease, loose mill scale, mud, or other deleterious substances.
2. Bars shall be cut, bent, and shaped accurately as per bar bending schedule and approved structural drawings.
3. Bending shall be done mechanically or by approved methods without causing damage to bars.
4. Reinforcement shall be placed in correct position maintaining:
 - Proper spacing,
 - Alignment,
 - Cover,
 - Lap lengths,
 - Anchorage length, as specified in drawings and relevant codes.
5. Bars shall be securely tied with annealed binding wire at intersections to prevent displacement during concreting.
6. Concrete cover blocks/chairs/spacers shall be provided to maintain required cover.
7. Welded joints shall not be permitted unless specifically approved.
8. Reinforcement shall be checked and approved before placing concrete.

Measurement

- Measured in **kilograms (kg)** or **quintals/metric tonnes** as per standard practice based on theoretical weight of reinforcement fixed in position.
- Measurement shall include hooks, bends, cranks, laps, and authorized chairs/spacers as specified.

Rate Includes

- Cost of FE 415 TMT reinforcement steel.
- Straightening, cutting, bending, binding, placing, and fixing.
- Binding wire, labour, tools, tackles, and incidental charges.
- All operations complete as per drawings and specifications.

Item No: 8 Providing and Laying homogenous Grey cement based concrete kerbing of size 30 cm x 30cm x 15 cm size as per detailed drawing having grade of concrete M25 grade, including necessary excavation, BBCC 1:5:10 7.5cm as per detailed drawing, fixing in line and level, filling joints in CM 1:3 with smooth finishing, white washing three coats etc. complete as directed by Engineer in charge.

Materials

1. **Concrete Kerb Blocks**
 - Precast homogeneous grey cement concrete kerbing units.
 - Size: 30 cm × 30 cm × 15 cm.
 - Concrete grade: M25.
fck=25 MPa at 28 days
2. **Bed Concrete (BBCC)**
 - Cement concrete in proportion 1:5:10.
 - Thickness: 7.5 cm.
3. **Mortar for Joints**
 - Cement mortar 1:3 (1 cement : 3 sand).
4. **White Wash**

- Approved white wash material for three coats.

Procedure

1. Necessary excavation shall be carried out to required width, depth, line, and level as per drawings.
2. Foundation bed shall be properly dressed and compacted.
3. BBCC 1:5:10 of 7.5 cm thickness shall be laid and finished to proper level and alignment.
4. Precast concrete kerbing blocks shall be placed accurately in required line, level, slope, and curvature as shown in drawings.
5. Kerb units shall be properly aligned and firmly bedded over the concrete base.
6. Joints between kerb blocks shall be filled with cement mortar 1:3 and neatly finished smooth.
7. Excess mortar shall be cleaned and exposed faces finished properly.
8. Three coats of white washing shall be applied uniformly after curing or as directed.
9. Curing shall be carried out adequately to ensure proper strength and durability.

Finish Requirements

- Kerbs shall be true to alignment, grade, and profile.
- Joints shall be even, properly filled, and finished smooth.
- Finished surface shall be neat, uniform, and free from cracks or damage.

Measurement

- Measured in **running metres (Rmt)** of completed kerbing work.

Rate Includes

- Excavation and disposal of surplus earth within specified lead.
- Supplying and laying M25 concrete kerbing units.
- Providing BBCC 1:5:10 base concrete.
- Joint filling with cement mortar 1:3.
- White washing three coats.
- Labour, materials, curing, tools, plants, machinery, and incidental charges complete.

Item No: 9 Supplying premoulded bituminous joint filler 12 mm thick

Material

- Premoulded bituminous joint filler board of approved quality and manufacture.
- Thickness: 12 mm.
- Material shall conform to relevant IS specifications for bituminous joint fillers.

Requirements

1. Joint filler shall be:
 - Compressible,
 - Durable,
 - Bitumen impregnated,
 - Resistant to weathering and water penetration.
2. The material shall have uniform thickness and density throughout.
3. Filler boards shall be free from cracks, warping, and other defects.
4. Edges shall be straight and true to shape.

Use/Application

- Used in expansion joints, isolation joints, and construction joints in:
 - Cement concrete roads,

- Pavements,
- Kerbs,
- Footpaths,
- RCC structures,
- Drainage works, etc.

Measurement

- Measured in **square metres (m²)** of premoulded joint filler supplied and fixed, or as specified in BOQ.

Rate Includes

- Cost of premoulded bituminous filler material.
- Cutting to required size and shape.
- Supplying at site including handling and incidental charges.

Signature of Contractor

**Deputy Executive Engineer
Valsad (R&B) Sub-Division
Valsad**

**Executive Engineer
Valsad (R&B) Division
Valsad**