

DEENDAYAL PORT AUTHORITY



EPC (Engineering, Procurement and Construction)
Schedules for

Construction of Road Over Bridge (ROB) including Roads and allied facilities at Tuna - Tekra

EXECUTIVE ENGINEER (C-I)
CONSTRUCTION -I DIVISION
DEENDAYAL PORT AUTHORITY
ROOM NO. 303, 2nd FLOOR,
NEW ANNEX BUILDING
GANDHIDHAM- KACHCHH- 370201
MOBILE – 8758659669
E-MAIL: constdiv1@gmail.com

Section 1 : General Technical Specifications

GENERAL:

These specifications cover the items of work in both structural and non-structural components falling under the scope of this document. All work shall be carried out in conformity with these specifications.

In general, the provisions of relevant Indian Standards, Indian Roads Congress (IRC) codes, MORTH Specifications (5th Revision), standard specifications of the Government of Gujarat, and other applicable national standards shall be followed unless otherwise specified.

These specifications are not intended to cover minor details. The work shall be executed in accordance with best modern practices and all latest codes and standards referred to in these specifications. Revisions issued up to 30 days prior to the submission of tenders shall be considered.

This document shall be read in conjunction with other contract documents, including tender specifications, the price bid, contract drawings, and other related documents

ORDER OF PRECEDENCE

For this document, in case of errors, omissions and/or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications etc. the following order of precedence shall apply:

- a) Between scaled dimensions and written dimensions / description on a drawing, the later shall be accepted.
- b) Between the written or shown description/or dimensions in the drawing, and the corresponding one in the specification, the later shall apply.
- c) For execution stage, the following order of precedence shall apply.
 - (i) Specific provisions of specifications and conditions of this contract document.
 - (ii) Execution drawings/ notes/modifications specifically approved for construction.
 - (iii) In the absence of above, standard specifications of MORTH (5th Revision) /R&B and Good engineering practices in that order.

In case of conflicting provisions of IRC specifications and IS specifications, former shall prevail, i.e. IRC specifications would have precedence over IS specifications unless tender provisions are specific for the particular item of work.

However, notwithstanding anything said above, the interpretation/ decision of the Port Authority /Engineer-in-charge shall be final and binding.

1. Inclusive documents:

The provisions of all conditions of contract, those specified in this tender as well as execution drawings, and notes or other specifications issued in writing by the Engineer-in charge shall form part of these specifications.

2. Order of precedence, clarifications and interpretations:

When the various specifications and codes referred to in preceding portion are at variance with these specifications and or with each other, the order of precedence will generally be as under;

The attention of the contractor is drawn to those clauses of the relevant IS Codes that require either supplementary specifications from the Engineer-in-Charge or mutual agreement on such specifications between the supplier and the purchaser.

In such cases, it shall be the responsibility of the contractor to seek clarification on any uncertainty or ambiguity and to obtain prior approval from the Engineer-in-Charge before undertaking any supply, construction, etc.

3. Measurement and Payments:

- a) The methods of measurement and payment shall be as given in Price Bid–Payment Terms. Should there be any detail of construction of materials which has not been referred to in the specifications or in the drawings but the necessity for which may be implied or inferred there from, or which are usual or essential for the completion of the work in the trades, the same shall be deemed to be included in the rates quoted by the contractor in the Price Bid.

- b) **Unacceptable work**

All defective works are liable to be demolished, rebuilt and defective materials replaced by the contractor at his own cost. In the event of such works being accepted by carrying out repairs etc.as specified by the Engineer-in-charge, the cost of repairs will be borne by the contractor and will be paid for the works actually carried out by him at reduced rates of the tendered rates, as may be considered reasonable by the Engineer-in-charge, in the preparation off in aileron account bills.

Section 2 : Item wise Technical Specifications and Codes to be followed (Civil Portion)

The Technical Specifications to be followed shall be as per "Specifications for Road and Bridge Works" Fifth Revision published by Indian Roads Congress on behalf of Ministry of Road Transport and Highways (MORTH), Govt. of India.

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
SECTION-1:PRELIMINARY WORKS		
1	Clearing and grubbing site/road/land including uprooting all vegetation, grass, bush shrubs, saplings and trees with girth, removal of stumps of trees of girth of all sizes including removing stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable materials as directed by Engineer with all leads and lifts etc. complete as per specification before commencement and after completion of the work.	Cl. No. 201
1a	Providing and fixing of 4 mm thk ACP Takti or SS Takti with minimum Size of 4' x 3' on RCC/Decorative pylons or directed by client along with Water Proof Mandap of minimum Size 100' x 100', 75 Nos of VIP Chairs, 15 Nos of VIP Sofa including necessary electric fixtures like fan, cooler, lighting arrangement, D.G Set set as per site requirement and wequired to make it functional or as directed by Engineer In charge for Functions of Khat Muhurt and Lokarpan Vidhi/Vidhies of above work.	As per item description & directed by Engineer-in-charge
2	arry out survey work using total station (1 second accuracy) for the length and width of existing area & structures as decided by Engineer in charge and additional length if required. The width to be surveyed will be up to ROW Boundary and beyond that as required, including marking of TBM, its coordinates, station points, their coordinates, centre line of alignment, taking ground level details of existing structures, details of all utilities below GL, manholes, catch pits, existing utility services, light poles, trees, over head electrical lines, BSNL section pillar / box, Torrent electrical boxes, including any number marked on them, road dividers, foot paths, culvert, Bridge, etc. within construction area and additional areas/lengths if required. Rate includes fixing TBM & necessary reference pillars, fixing alignment at site, establishing benchmark, establishing foundation layout, and pier coordinates, on ground, including submission of longitudinal sections, cross sections, drawing report etc. of survey work in three hard copies with soft copy in CD to Engineer-in-charge as directed for the Flyover bridge.	Cl. No. 109, 1102, 2400
3	Dismantling the rigid/Flexible pavement including removing and stacking the dismantled materials as and where directed.	Cl. No. 202
4	Providing and installation of temporary barricades including supplying, painting with fluorescent paint/white paint and fixing CGI sheets 0.8 mm thick of 1.8 m height and M.S. Posts angle 40 x 40 x 5 mm at 2.5 m c/c and dismantling the same after completion of work and allowing for movement of traffic	Cl. No. 112, 813, 1900

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	as per drawing and as per instruction from Engineer in charge. Necessary arrangements shall be made to divert the existing traffic in an unobstructed manner. Rate to be inclusive of all materials, fabrication works, paint works, retroreflective films/sticker, Blinkers, foundation works, transportation, loading, unloading. installation, dismantling and inclusive of all taxes and including the same design for providing openable gate. No extra rental will be given to the contractor in case of any delays on his part for construction or due to any valid time limit extensions. Each barricading sheet is to be numbered with a unique number. If shifting of barricading is required within the project boundary then contractor should shift/relocate the same sheet/barricades as required and no extra payment made for shifting/relocation. After the completion of project, the ownership of barricading will remain with the contractor. Barricading is to be cleaned as per the instruction of Engineer in charge. (i.e., Temporary barricading will be property of contractor after completion of work. Rate is only for providing temporary work during construction work)	
5	Dismantling the existing structure including removing and stacking the dismantled materials as and where directed - RCC work.	Cl. No. 202
5a	Dismantling the existing structure including removing and stacking the dismantled materials as and where directed - Brick Masonry.	Cl. No. 202
6	Carry out Geo-technical investigation work including drilling 150 mm dia. bore holes in all sorts of soil, ordinary rock and hard rock, up to maximum depth as mentioned, collection undisturbed samples and conduction standard penetration tests alternate at an interval of 1.5 to 2.0 m depth, conducting necessary laboratory tests for all type of classification and determination of soil parameters if required, including submission of report in three copies covering investigation data and recommendation for SBC and the pile capacity considering the design criteria, all per specification. 1) The rate is inclusive of submitting soil investigation report in three sets in hard copy as well soft copies. 2) The rate is inclusive of all materials with contractor's labour, tools and plants, machineries, as required. 3) The rate is inclusive of all taxes including service tax	Cl. No. 2004
7a	Providing Trial Pits to find out the utilities in the proposed alignment. The Location details shall be submitted by the Contractor as directed by the Engineer. a) up to 3m.	As per Item description & directed by Engineer in charge
7b	Above 3m.	
SECTION-2: FOUNDATION & SUBSTRUCTURE		
8	Excavation for foundation of structures including existing pavement surfaces including dewatering, shoring, and strutting as necessary and backfilling the trenches with suitable excavated material in layers of 15 to 20 cms and disposing of remaining unsuitable material with all lifts and lead as directed and preparation of bed for concreting of	Cl. No. 304

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	foundations etc. complete as directed by Engineer and as per specification	
9	Providing and laying in situ machine mixed minimum M-15 grade bedding concrete in foundation / below pile cap including dewatering, shuttering, compacting, curing etc. complete true to level and position as directed by Engineer and as per specification.	Cl. No. 1500, 1700
10	Providing and casting in situ Controlled Cement concrete M-30 for Toewalls including necessary shuttering, laying, vibrating, ramming, and curing complete.	Cl. No.1500, 1700, 2200
11	Empty boring through all sorts of strata for providing RCC bored piles to required depth including flushing necessary casting pipe with all plants and equipments as required as per detailed specifications for Abutment and Piers (Excluding Concrete & Reinforcement) - 1500 Dia	Cl. No. 1100
11a	Empty boring through all sorts of strata for providing RCC bored piles to required depth including flushing necessary casting pipe with all plants and equipments as required as per detailed specifications for Abutment and Piers (Excluding Concrete & Reinforcement) - 1400 Dia	Cl. No. 1100
12	Providing and casting in situ machine mixed controlled cement concrete minimum M-40 for RCC bored pile using Tremie Pipe including necessary flushing, dewatering, formwork, transporting, compacting, vibrating, curing and finishing including all leads & lifts complete as per Detailed specifications. (Excluding Reinforcement)	Cl. No.1500, 1700, 2200
13	Chipping and dressing of the RCC piles up to cut-off level as given in drawing including cleaning of reinforcement and removal of dismantled materials, etc. for providing pile caps as directed by Engineer and as per specification. For any dia. size of RCC pile	Cl. No.1107.5
14	Carrying out load test on any pile as per standard procedure laid down in the IS:2911 specification including construction of test cap, dismantling the cap after test and cleaning the site and maintaining complete records of load settlement as directed by Engineer and as per specification, and submission of records. a) Initial Pile Load Test on piles for 2.5 times the design load specified in drawings in non-working areas in the vicinity of the bridge site, including cost of test pile.	IS-2911, Cl.No.1105, 1113
14a	Carrying out High strain Dynamic Test on any working pile / Test pile as selected by the Engineer in-charge. The test shall be carried out by agency approved by Engineer in charge as per IRC Notification 54 and submitting results/reports in three hard copies with soft copy in CD. Item includes all necessary arrangements required for the test. (with guided frame arrangement)	IS-2911, Cl.No.1105, 1113
15	Performing Integrity Test (low strain) on all vertical pile. The item shall include chipping of weak concrete at the top of pile, levelling, bending of reinforcing bars, preparation of pile head including testing with pile driving analyzer or approved	IS-2911, Cl.No.1105, 1113

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	equivalent. To be carried out at least 15 days after concreting of piles. A specialist approved Agency shall be employed by the Contractor for the test. The test shall be carried out as per relevant IRC78. The item is including complete testing with approved apparatus, analysis of results and conclusions including submission of test reports in three hard copies with soft copy in CD	
16	Providing and installing 6mm MS liner for bored-cast-in-situ concrete piles including applying protective coating as per drawing and specification and as directed by Engineer.	Cl. No. 1100, 1107.3
17	Providing and laying in situ machine mixed RCC minimum M-50 grade Controlled Cement Concrete in foundations of piers, abutments, return Wall, box return, pile caps, etc. at any depth, including centering, shuttering, mixing in mechanised batch mix plant, compaction, curing and dewatering if necessary, excluding reinforcement as per specification and as directed by Engineer.	Cl. No. 1100, 1500, 1700
18	Providing and laying machine mixed minimum M-50 grade Controlled cement concrete for cast-in-situ piers, abutments, wing wall, Dirt wall, side wall etc. at any height or depth as per approved design and drawings, with necessary centering, shuttering, scaffolding, transporting, placing, compacting by mechanical vibrators, finishing, curing, and casting as per drawing etc. complete excluding reinforcement as directed by Engineer and as per specification. - Upto 5m Height	Cl. No. 1500, 1700, 2100
18a	Providing and laying machine mixed minimum M-50 grade Controlled cement concrete for cast-in-situ piers, abutments, wing wall, Dirt wall, side wall etc. at any height or depth as per approved design and drawings, with necessary centering, shuttering, scaffolding, transporting, placing, compacting by mechanical vibrators, finishing, curing, and casting as per drawing etc. complete excluding reinforcement as directed by Engineer and as per specification. - Upto 5m-10m Height	Cl. No. 1500, 1700, 2100
19	Providing and casting in situ-controlled cement concrete minimum M-50 for R.C.C. work in pier cap, abutment cap including controlled cement concrete M-50 bed blocks or pedestals and seismic restrainer of required size below bearings as per detailed drawings, centering, shuttering, scaffolding, wherever necessary, laying vibrating, curing and finishing complete.	Cl. No. 1500, 1700, 2200
20	Providing & fixing in position (Thermo mechanically treated bars) TMT Fe-550D CRS steel bars of various diameters for all RCC works in Piles, Piles Caps and foundations as per detailed design & drawings and schedule including cutting, bending, hooking the bars, binding with 18 SWG GI wires or tack welding (only for piles) and supporting as required with all lifts and leads etc. complete including cost of all labour, materials, tools, plants, equipment sets etc. all complete as directed by Engineer and as per specification. - a) Pile	Cl. No. 1600
21	Providing & fixing in position (Thermo mechanically treated bars) TMT Fe-550D CRS steel bars of various diameters for all RCC works in Piles, Piles Caps and foundations as per detailed design & drawings and schedule including cutting, bending, hooking the bars, binding with 18 SWG GI wires or tack welding (only for piles) and supporting as required with	Cl. No. 1600

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	all lifts and leads etc. complete including cost of all labour, materials, tools, plants, equipment sets etc. all complete as directed by Engineer and as per specification. - b) Pilecap	
22	<p>Providing & fixing in position (Thermo mechanically treated bars) TMT Fe-550D CRS conforming to IS 1786 reinforcing steel bars of various diameters for all RCC works in Foundations, Pier, Abutment wall, box wall, Abt. cap, pier cap, seismic arrester, Dirt wall, sidewall, Retaining wall, Pedestals as per detailed design & drawings and schedule including cutting, bending, hooking the bars, binding with 18 SWG GI wires and supporting as required with all lifts and leads etc. complete including cost of all labour, materials, tools, plants, equipment sets all complete as Directed by Engineer and as per specifications. The rate includes for supply, loading, unloading, transporting to site, cutting, bending, hooking, placing, tying in position with contractor's own binding wire, welding, forming the cage and lowering it in position in pile bore, etc. Welding and supporting in position to ensure lines and levels during concreting, maintaining proper cover/spacing, all leads & lifts, etc., including contractor's own equipment, labour, supervisor, taxes, machineries, etc., complete as per drawings and specification.</p> <p>Applicable to: c) Piers, d) Pier cap, e) Pedestal & Arrester, f) Cladding Wall, g) Toe Wall</p>	Cl. No. 1600
23	Providing and fixing in position fully moulded restrained PTFE POT Bearings as per detailed drawings.	Cl. No. 2005
24	Providing and applying one coat of zinc-rich epoxy primer and two coats of coal tar epoxy paint of reqd. thickness as per specifications to all concrete surfaces in contact with earth in foundation and substructure including all cost of material, labour, transportation and preparing the surfaces by cleaning, washing, brushing, sand/grit blasting etc. complete as directed by Engineer and as per specification. (Paint shall be got tested from approved laboratory).	As per Item description & directed by Engineer incharge.
25	Providing and applying anti carbonation, antifading, mold resistant, heat insulating and 100% acrylic breathable decorative external waterproof coating of approved shade having viscosity @ room temperature by Ford cup No. B-4 (dilute 2 parts of product with 1 part of water) 18 to 30 sec. pH of 7.00 to 10.00 and specific gravity @ Room temperature 1.30+0.1, tested for carbon dioxide diffusion resistance properties for coating materials and coating systems for exterior masonry and concrete as per DIN EN 1062-6(2002-2010) by a NBA Grade "A" accredited institution.	As per Item description & directed by Engineer incharge.
26	Providing and filling sand behind abutments and between returns in layers as directed by engineer in-charge.	Cl. No. 305
27	Providing and laying - Filter Media 600mm thick directed at the back of abutments, returns and wing walls as per detailed specifications.	Cl. No. 2504.2.2
28	Providing and Laying weepholes in abutment and return by using A.C. pipes of 100mm diameter with laying in proper grade and jointing complete etc. as per detailed specifications.	Cl. No. 2706

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
SECTION-3: SUPER STRUCTURE		
29	Providing and Casting in situ-controlled cement concrete for R.C.C. Solid Slab including centering, scaffolding, curing, and finishing complete. M 45	Cl. No. 1500,1700 & 2300
30	Providing and casting in situ or precast controlled cement concrete minimum M 55 for Prestressed concrete work in superstructure including centering, shuttering, curing, scaffolding, ramming, vibrating, finishing, launching or shifting complete: (i) Solid Slab, (ii) Deck Slab, (iii) Main Girder, (iv) Diaphragm or Cross Girder	Cl. No. 1500,1700& 2300
31	<p>Supplying and fabrication of steel Girder spans including its components (stiffeners, Bracing, splices, Studs, etc.) as per approved drawing for composite construction of superstructure of the road over bridge with contractor's own steel confirming to IS 2062 (Latest), Grade E350 (B0) quality, with all welds, rivets, nuts, bolts, etc., with contractor's own materials, fabrication, machinery, templates, fixtures, equipments, tools and plants, transportation, skilled/unskilled labour, excise duty, octroi, sales tax, and other taxes, all leads, lifts, descent, loading, unloading if required, etc., complete and as per Approved QAP and Drawings confirming to URS B1 - 2001 and other relevant codes and specifications. The rate is inclusive of transportation of fabricated girder parts to site by contractor's own means at his cost. The rate shall also be inclusive of cold straightening of deformed and bent girder parts before their assembly. Work has to be done as per drawings and specifications approved by R&B Design Circle. High quality superior brand paint should only be used. For painting, prior approval for superior brand/make of the paint should be taken as per instruction of Engineer-in-Charge.</p> <p>Notes:</p> <ol style="list-style-type: none"> Detailed fabrication and erection drawings & launching methodology will be prepared by the contractor and got approved from R&B Design Circle. Rate includes fabrication of all types of battens, bracings, ties, stiffeners, packing, diaphragms, shop rivets/welding, T&F bolts, drifts, SAW, templates, jigs, fixtures, accessories, transporting various components from fabrication shop to site including loading & unloading, assembly of girders with drifts/bolts, field riveting/welding/HSFG bolting, assembling of temporary support for side slewing, raising of girders to the bed block level, providing sliding arrangements and slewing the girder in position, lowering of girder on bearings and bed plates with all temporary arrangements or any other method of launching complete. The bearing sets to be provided with the girders will be paid separately as per relevant item. Payment for addition in weight for rivets/welds shall be made as per clause 45 of IRSB-1-2001. In case of composite work (welding and HSFG bolts), addition in weight shall be 1% for welding and HSFG 	As per Item description & directed by Engineer in charge., IRS code

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	<p>bolts shall be paid separately under relevant item.</p> <p>6. Painting of girders will be paid separately under relevant item.</p> <p>7. Launching of steel girder spans including its components on running line/running electrified line/under block period with the help of road crane of required capacity as per R&B Design Circle approved drawings with other ancillary steel structures fixed to the girder where necessary in proper level and alignment and as per technical specifications.</p> <p>8. Assembling, welding, erecting, riveting, launching, bolting by HSFG bolts wherever required (as per approved drawings) with contractor's rivet materials, weld materials, HSFG bolts, service bolts, erection and launching of steel girder span to R&B Design Circle approved drawings with other ancillary steel structures fixed to the girder where necessary in proper level and alignment and as per technical specifications. Payment is including bolt.</p> <p>9. Payment Schedule:</p> <ul style="list-style-type: none"> • On Material Procurement: 40% • On Assembled at factory/yard: 15% • On Assembled at Site: 15% • Erection/Launching of Girder: 30% 	
32	Metalizing of steel work of girders and deck sheet with sprayed aluminium after surface preparation by Sand/grit blasting, followed by one coat of etch primer (IS:5666) & one coat of Zinc Chrome primer (IS:104) and two coats of aluminium paint (IS:2339) with all labour, T&P and material as a complete job duly conforming to all relevant specifications and process given under Clause 39 of IRS-B1-2001. Note: Nominal Thickness of Aluminium coating shall be 150 microns. DFT of Zinc chrome primer shall be 25-30 microns and DFT of each coat of Aluminium paint shall be 12-14 microns	As per Item description & directed by Engineer in charge., IRS Code
33	Providing, fabricating and fixing in position Deck sheet for the deck slab of Composite super structure and other Structural steel sections such as plate. The rate to be inclusive of all charges such as loading, unloading, transporting, cost of fabrication, erection, all accessories to be used for connection, anti corrosive primer and paint of approved make/shade and cleaning works, inclusive of all taxes.	As per Item description & directed by Engineer in charge., IRS Code
34	Providing & fixing in position (Thermo mechanically treated bars) TMT Fe-550D CRS steel bars of various diameters for all RCC works in super structure as per detailed design & drawings and schedule including cutting, bending, hooking the bars, binding with 18 SWG GI wires and supporting as required with all lifts and leads etc. complete including cost of all labour, materials, tools, plants, equipments etc. all complete as directed by Engineer and as per specifications. Solids lab & Deck slab, Main girders, cross girders	Cl. No. 1600
35	Providing and fixing in position to exact profile 12.9 / 15.2 mm nominal dia. High tensile prestressing steel strands conforming to low Relaxation Prestressing steel strands - Cl II as per IS 14268 of specified ultimate strength including	Cl. No. 1800 & 2300

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	cutting, cleaning, forming cables etc and further including providing and laying corrugated HDPE sheathing of specified dia., anchorages, stage wise stressing, grouting testing of materials and all enabling work for pre tensioning / post tensioning of steel etc. complete including all lifts and leads as per Sp. And drawing and as directed by Engineer. (including reserve prestressing cable)	
36	Providing and carrying out load test on bridge deck with simulated loading including provision, placing and removal of loading, supplying, fixing and removing deflection measuring instruments etc. complete with platforms for fixing the instruments etc. complete as per the details supplied and specification and as directed by Engineer and including submission of required results in triplicate after satisfactory completion of the load test.	As per Item description & directed by Engineer in charge.
37	Providing and fixing in position Strip Seal Type Expansion Joint (for movement up to 80mm) as per detailed drawing MORTH specification. The rate is inclusive of supplying, fixing with contractor's own materials, equipments, machineries, labour, transport, testing, bolts, socket tubes, Neoprene sheet/cap etc. complete. The rate is finished item complete and will be paid after fixing in all respect (PSC SPANS).	Cl. No. 2600
38	Providing and fixing metal expansion joints as per drawings. Details of expansion joint 50 x 50 x 6 mm size two IS and 100 x 6 mm MS plate with 6 x 20 x 25 mm long holdfast @50 cm/c on both sides of expansion joints. (RCC SOLID SLABS SPANS)	Cl. No. 2600
39	Providing pre-moulded asphalt filler joints as per drawings. (A) 12 mm	As per Item description & directed by Engineer in charge.
40	Providing and laying 25 mm to 50 mm thick compacted BITUMINOUS CONCRETE using aggregates as per gradation and percentage of bitumen for mixing shall be as arrived from mix design, provided in no case bitumen percentage shall be less than 5.2% for Grade I and 5.4% for Grade II by Wt. of total mix as binder by batch mix type hot mix plant and laying by sensor paver finisher including consolidation by rollers as specified including providing and operating plant, sensor paver and machinery, cost of fuel, oil, lubricant and labour charges including cost of aggregate and filler (if found required as per mix design) etc. complete. a) Viaduct Portion b) Approach Portion	Cl. No. 507
41	Providing and laying DENSE GRADED BITUMINOUS MACADAM (DBM) as per gradation and bitumen for mixing shall be as arrived from mix design, provided in no case it shall be less than 4.0% for Grade I and 4.5% for Grade II by wt. of total mix as binder by batch mix type hot-mix plant and laying by sensor paver finisher including consolidation by rollers as specified including providing and operating plant, sensor paver and machinery, cost of fuel, oil lubricant and labour charges, tests required to be carried out including cost of aggregate and filler (if found required as per mix design)	Cl. No. 505

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	etc complete (But including cost of providing bitumen)	
42	Providing and casting RCC in minimum M-40 controlled concrete Crash Barriers as per detailed drawings including necessary scaffolding, centering, formwork, mixing in machine, transporting, placing, compacting, finishing, curing, etc. complete including providing and fixing of inserts if any with all leads and lifts as per drawing & specification and as directed by Engineer, excluding reinforcement.	Cl. No. 1500, 1700, 2300
43	Providing and casting in situ-controlled cement concrete M-30 for R.C.C. pier protection periphery wall as per drawings including centering shuttering, scaffolding where necessary, laying vibrating, curing, and finishing complete.	Cl. No. 1500, 1700, 2300
44	Providing and Casting in situ-controlled cement concrete M30 for R.C.C. Approach Slab including centering, scaffolding, curing, and finishing complete.	Cl. No. 1500, 1700, 2300
45	Providing and fixing in position (Thermo mechanically Treated bars) TMT Fe-550D CRS reinforcing bars of various diameters for the above all RCC works as per detailed designs and drawings and schedule including cutting, bending, hooking the bars, binding with 18 SWG GI Wires with cost of all labour, materials, tools, plants, equipments, supporting as required with all lifts and leads etc. all complete as per specification and as directed by Engineer.	Cl. No. 1600
46	Providing and fixing 100 mm dia. G.I. Drainage spouts, as per MOST Drg.No.SD/303 including grating with suitable cleanout fixtures including all leads and lifts etc. complete as per specification, design & drawings and as directed by Engineer.	Cl. No. 2705
47	Providing, laying and jointing in true line and level 160 diameter U.P.V.C(Type B) conforming to IS 13592-1992 with one end plain and other end socketed with rubber ring, & fittings conforming to ISI 14735-1999 of approved make for drainage system pipe line, pipe shall be jointed with each other with rubber lubricant, pipe shall be fixed on wall using of PVC clamp of the size 160 mm diameter x 210 mm length x 196 mm height at every 2000 mm center to center or shall be concealed in walls as directed including necessary fittings such as bends, shoes etc. including testing of pipes and joints and jointed with adhesive solvent cement including cost of all materials.	As per Item description & directed by Engineer in charge.
48	Providing and laying Mineral Water proofing Membrane 4mm - SUPERSHIELD BRIDGE PROTEK (App Membrane for bridge decks polyester and FGre infoeced), Include water-based primer (SUPERPRIMER) Including Gas Torching, overlapping of membrane for complete scope of work including all requisite material, consumables and service.	As per Item description & directed by Engineer in charge.
SECTION-4: APPROCHES AND AMENITIES		
49	Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30cm length, 30cm height and 15cm thick of M250 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M1:3 (1 cement:3 fines and) etc complete.	As per Item description & directed by Engineer in charge.
50	Direction (Junction) Sign :- Providing and fixing sign boards made out of 2mm aluminium sheet / 4mm ACP (Aluminium	Cl. No. 800

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	composite Panel); size 244x122 cms. rectangular as per design of IRC-67-2012. Pre treated with phospheting process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with High Intensity Prismatic Grade retroreflective sheeting of Type-4 as per ASTM D-4956 and latest M.O.S.T. Specifications; 4.0 mtr (2 Nos.) long stand post of Iron Angle 75 x 75 x 6mm / 65NB Circular MS Pipe as required and frame fabricated from suitable size iron angle of 50x50x5mm; painted with best quality epoxy coatings in black and white bends. The details of symbol for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg including excavation, curing etc. complete under the supervision of engineer in charge. A warranty for 7 years for the Retro reflective sheeting from original manufacturer & a certified copy of 3-year outdoor exposure test report from third party test lab for the product offered shall be submitted by contractor. (B) Class-B Type-4 Retro Reflective sheeting.	
51	Providing and fixing two M-25 pylons, one at each corner of each of the Providing and fixing bridge of approved architectural design with pedestals to house the granite tablets as per details approved by the Corporation, including transportation, placing, concreting, reinforcement, etc., complete with all leads and lifts as per specification and as directed by Engineer	Cl. No. 1500. 1700, 2100
52	Regulatory/ Mandatory Signs: - Providing and fixing sign boards made out of 2 mm aluminium sheet; size 60 cms. diameter circle as per design of IRC 67-1977. Pretreated with phospheting process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with retro reflective sheeting as per latest M.O.S.T. Specifications; 3.1 m long stand post and frame fabricated from suitable size iron angle of 35 x 35 x 3 mm, 75 x 75 x 6 mm as required; painted with best quality epoxy coatings in black and white bends. The details of symbol for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg. including excavation, curing etc. complete under the supervision of engineer in charge. (B) High Intensity Grade.	Cl. No. 800
53	Cautionary warning sign:- Providing and fixing sign boards made out of 2 mm aluminum sheet; size 90 x 90 x 90 cms. equilateral triangle as per design of IRC 67-2012. Pretreated with phospheting process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with retro reflective sheeting as per latest M.O.S.T. Specifications; 3.1 m long stand post and frame fabricated from suitable size iron angle of 35 x 35 x 3 mm, 75 x 75 x 6 mm as required; painted with best quality epoxy coatings in black and white bends. The details of symbol for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg. including excavation, curing etc. complete under the supervision of engineer in charge. (B)	Cl. No. 800

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	High Intensity Grade.	
54	Informatory Signs: - Providing and fixing sign boards made out of 2 mm aluminum sheet; size 80 x 60 cms. rectangle as per design of IRC 67-2012. Pretreated with phospheting process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with retro reflective sheeting as per latest M.O.S.T. Specifications; 3.1 m long stand post and frame fabricated from suitable size iron angle of 35 x 35 x 3 mm, 75 x 75 x 6 mm as required; painted with best quality epoxy coatings in black and white bends. The details of symbol for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg. including excavation, curing etc. complete under the supervision of engineer in charge. (B) High Intensity Grade.	Cl. No. 800
55	Painting Two Coats on New Concrete Surfaces (Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces)-For inner face of crash barrier	As per Item description & directed by Engineer in charge.
56	Road marking with hot applied thermoplastic paints with reflectorising glass beads on bitumen surface providing and laying a hot applied thermoplastic compound 2.5mm thick including reflectorising glass beads @ 250 gms per sqm area, thickness of 2.5 mm is excluding of surface applied glass beads as per IRC: 35-2015. The finished surface to be levelled, uniform and free from streaks and holes. Zebra patta/ bump patta lane/ centreline/ edgeline/ cut patta. The white colour markings should provide luminance coefficient on cemented road shall be 130 mcd / m ² / lux and asphalt roads shall be minimum 100–130 mcd / m ² / lux during the service life during the day time. The marking should meet the performance criteria for night time reflectivity, wet reflectivity and skid resistance as mentioned in the section -15 of IRC:35-2015.	Cl. No. 803
57	Cat Eye / Road Stud / RPM: Supplying of Molded Twin Shanks Raised Pavement Markers made of polycarbonate and ABS moulded body and reflective panels with Micro prismatic lens (No Glass bead lens) capable of providing total internal reflection of the light entering the lens face and shall support a load of 13635 kgs. tested in accordance to ASTM D 4280 Type Hand complying to Specifications of Category A of MORTH Circular No RW/NH/33023/10-97 – DO III Dt 11.06. 1997. The height, width and length shall not exceed 20 mm, 130 mm and 130 mm and with minimum reflective area of 13 Sq cm on each side and the slope to the base shall be 35+/-5 degree. The strength of detachment of the integrated cylindrical shanks, (of diameter not less than 19 +/- 2 mm and height not less than 30+/- 2 mm) from the body is to be a minimum value of 500 Kgf. 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 manufacturer's recommendation and the colour of the markers should be as per the IRC35-2015 and as directed by Engineer-in-charge.	Cl. No. 804
58	Providing Supplying and fixing Solar Raised Pavement	As per Item

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	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 68 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 1Hz. There should be current losses of less than 20 micro amperes at 2.4 V in sleep-charging mode to enhance 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 manufacture's recommendation and complete as directed by the engineer. (3M or Equivalent)	description & directed by Engineer in charge.
59	Providing and laying Double Walled corrugated Pipes (DWC) of Polyethylene (conforming to IS:14930-II) of 63mm O.D. with fittings and necessary connecting accessories of same material at required depth for laying cable below footpath slab etc. complete as per specification and as directed by Engineer two rows in each crash barrier, 1 for power, 1 for smartpole cable.	As per Item description & directed by Engineer in charge.
60	Providing and laying Asphalt painting on B.T. surface immediately after work complete with all respect using bitumen grade (VG-40) @ rate of 5 kg/10 smt by Mechanical sprayer and spreading the stone dust on prepared surface at the rate of 0.03 cum/10 smt. and rolling with smooth wheeled and pneumatic roller and brushing etc. complete.	As per Item description & directed by Engineer in charge.
61	Providing, fabricating and fixing in position Gantry / other elements from Structural steel sections such as ISMB, ISMC, ISHB, any rolled section, hollow section, any type of plate etc. The rate to be inclusive of all charges such as loading, unloading, transporting, cost of fabrication, erection, all accessories to be used for connection, anti corrosive primer and paint of approved make/ shade and cleaning works, inclusive of all taxes to be installed.	Cl. No. 1900
62	Providing and fixing marble slab including engraving and painting complete. (i) Size 75cm x 60cm x 4cm.	As per Item description & directed by Engineer in charge.
63	Earthwork for embankment including breaking clods, dressing with all lead and lift and including watering rolling and consolidation of subgrade in layers at O.M.C. to required dry density including filling the depression which occur during the process using (...)	Cl. No. 300
64	Providing and laying Granular Subbase (drainage layer) conforming to grading V of Table 400-1 of compacted	Cl. No. 401

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	thickness of 200 mm with specified graded stone metal and sand mixed in pugmill and laid with mechanical means spreading with motor grader and compacting with vibratory roller having minimum 80-100 kN static weight to achieve desired density of 98% of MDD including all materials, labour, machinery with all leads and lifts etc., complete.	
65	Providing and laying 250 mm thick Wet Mix Macadam with paver finisher in specified thickness, each layer not exceeding 250 mm compacted thickness including pre mixing in WMM plant with well graded crushed stone aggregate, with watering and spreading by mechanical means to required profile and compacting by vibratory roller of minimum 80-100 kN static weight to achieve desired density of 98 % of MDD including all material, labour, machinery with all leads and lifts etc.	Cl. No. 406
66	Supplying and applying Slow Setting-1 (SS-I) bitumen emulsion confirming to IS 8887, for application of prime coat over Wet Mix Macadam at the rate of 0.85 kg per Sq. Meter area, including all materials, labour, machinery, test with all leads and lifts etc., complete as per details tender specification & as directed by engineer in charge.	Cl. No. 502
67	Providing Supplying & Fixing Jumbo Swiss type traffic bollard made out Of 1.5 mm thick CRC sheet in conical shape having 188 cms, bottom dia 30 cms, top dia 22 cms, with top circular direction plate of 30 cms dia for arrow fabricated as per attached drawing and coated with black epoxy powder coating and Retro reflectorised three yellow strip 15 cms wide and arrow Micro Prismatic grade sheeting as per ASTM 4956-09 Type-XI Fixing with cement concrete M-25 grade, Foundation size 30 cm x 30 cm x 35 cm as per the instruction of Engineer in charge.	Cl. No. 800 or as per Item description and directed by Engineer in-charge.
68	Chevron sign: - Providing and fixing signboards made out of 1.5 mm aluminium sheet/3 mm ACP (Aluminum composite Panel); size 60 x 50 cm as per design of IRC-67-2012. Pre treated with phosphating process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with Micro Prismatic Grade retro reflective sheeting of Type-11 as per ASTM D-4956 and latest M.O.S.T. Specifications; 3.3 mtr long stand post of 75 x 75 x 6 mm / 65 NB Circular MS Pipe as required and frame fabricated from suitable size iron angle of 50 x 50 x 5 mm; painted with best quality epoxy coatings in black and white bends. The details of symbol or inscription / numerals for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg. including excavation, curing etc. complete under the supervision of engineer in charge. A warranty for 10 years for the Retro reflective sheeting from origin as manufacturer & a certified copy of 3 year outdoor exposure test report from third party test lab for the product offered shall be submitted by contractor. (A) Class-C Type-11 Retro Reflective sheeting	Cl. No. 800
69	Providing and fixing pre-cast concrete kerb stone of gray cement based concrete block 30 cm length, 30 cm height and 15 cm thick of M200 grade concrete as per approved design	Cl. No. 409

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
	and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1 cement:3 fine sand) etc complete.	
70	Tubular Steel Railing on Medium Weight steel channel (ISMC series) 100 mm x 50 mm (Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50 mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings)	As per Item description and directed by Engineer in-charge.
71	Dry Lean Cement Concrete Sub-base (Construction of dry lean cement concrete Sub-base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 1:5, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roller, finishing and curing.)	Cl. No. 601
72	Cement Concrete Pavement (Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @ 400 kg per cum, coarse and fine aggregate conforming to IS383, maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver, spread, compacted and finished in a continuous operation including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, dowel bar, tie rod, admixtures as approved, curing compound, finishing to lines and grades as per drawing)	Cl. No. 602
73	STOP Sign: - Providing and fixing sign boards made out of 2 mm aluminium sheet/4 mm ACP (Aluminum composite Panel); size 90 cms. Octagonal as per design of IRC-67-2012. Pre treated with phosphating process & acid etching; coated with one coat of epoxy primer and two coats of best quality epoxy paint; reflectorised with High Intensity Prismatic Grade retro reflective sheeting of Type-4 as per ASTM D-4956 and latest M.O.S.T. Specifications; 3.6 mtr long stand post of Iron Angle 75 x 75 x 6 mm / 65 NB Circular MS Pipe as required and frame fabricated from suitable size iron angle of 35 x 35 x 3 mm; painted with best quality epoxy coatings in black and white bends. The details of symbol for each board shall be as per the instruction of engineer in charge. The fixing at site shall be in 1:2:4 CC block of size 45 x 45 x 60 Cms. for each leg including excavation, curing etc. complete under the supervision of engineer in charge. A warranty for 7 years for the Retro reflective sheeting from original manufacturer & a certified copy of 3 year outdoor exposure test report from third party test lab for the product offered shall be submitted by contractor. (B) Class-B Type-4 Retro Reflective sheeting.	Cl. No. 800

Sr. No.	Item Description	MORTH 5 th Revision Specifications /IS Code/ ASTM Code (Applicable)
74	Providing and fixing MS Anchor Plates of size 250 x 250 x 6 mm thick along with 4 Nos. of 20 mm dia., 600 mm long GI "J" Type bolts with suitable size of GI Nuts & washer with one coat of Red Oxide and two coats of Bituminous Black Paint and fixing on Crash Barrier/Parapet including necessary erection, labour, equipments, welding/drilling, grouting/fixing of plates as per specifications and as directed by the Engineer in charge.	As per Item description & directed by Engineer in charge.
75	Providing and laying bitumen mastic wearing course (as per specifications) with industrial bitumen of grade 85/25 conforming to IS : 702, prepared by using mastic cooker and laid to required level and slope, including providing anti-skid surface with bitumen precoated fine grained hard stone chipping of approved size at the rate of 0.005 cum per 10 sqm and at approximate spacing of 10 cm centre to mm. centre in both directions, pressed into surface protruding 1 mm to 4 mm over mastic surface, including cleaning the surface, removal of debris etc. all complete. (Considering bitumen using 10.2% as per MORTH specification). Of 25 mm thickness	Cl. No. 2700
76	Providing and laying 25 mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-39, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing anti-skid surface with bitumen precoated fine grained hard stone chipping of 13.2 mm nominal size at the rate of 0.005 cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces not less than 1000 C, protruding 1 mm to 4 mm over mastic surface,	Cl. No. 516
77	Painting speed breakers with paint of approved quality & colour over the Bituminous/ Concrete surface near approaches to level crossing. Road Marking with Hot Melt Thermoplastic Road Paint	Cl. No. 803
78	Providing R.E.Wall complete in all respect with design of panels, Geogrid/Geo Strip. Casting of R.E.Wall panels as per design & Drawing including supply & Erection of R.E. Wall panels in line, level & slope fixing as per the direction of Engineer –in-charge including supply & placing of geogrid/ Geo strip as per drawing with all Machines, Labour, Geogrid ,Geotextile, Perforated Pipe and other Consumable items etc. Complete as per Technical specifications.	Cl. No 3100, IRC:SP:102-2014 & directed by Engineer in charge.

Section 3 : List of Approved Makes of Materials for Civil Works

Sr. No.	Materials	Makes
1	Cement	Ambuja, Ultratech, J.K.laxmi, Sanghi
2	Mild and Tor Steel	SAIL, TATA, Rashtriyaspat(Visag), JSWSteelLtd.
3	StructuralSteel	SAIL, Tisco, Essar, JSWSteel Ltd.
4	Plasticizer/Admixtures(Nanthaline base only)	Sika, CICO, Fosroc, MCSWCL, Fairmate. –Bauchemie, BASF
5	Waterproofing Compound	AccordproofAmpermo, Pediproof, CICO, SWCL
6	Cement paint	Super Snocem, Nitcocem, Surfacem or equivalents
7	Epoxy paint	Fosrock, Berger, MC-Bauchemie or Equivalent
8	Coal Tar Epoxy paint	Fosrock, Berger, MC-Bauchemie, Shalimar
9	Paints & Distempers	Asian, Berger or Equivalent
10	Hardeners	Ironite, Ferrok, Hardnate
11	Membrane waterproof	STP Limited / Sanfield(India)Limited
12	Polysulphide sealants	STP Limited / Pidilite / Choksy Chemicals
13	Expansion board Joints (asphalt filler)	METCO, Sanfield(India)Limited, MAGEBA and MORTH approved makes & also RDSO Approved
14	Waterproofing Polymer	Roofex, Fosroc, SWCL
15	Stainless Steel	Salem, SAIL
16	Elastomeric Bearings	Polyme rproducts, METCO, MAGEBA, KillickNixon and MORTH approved makes
17	POT/PTFE Bearings	Sanfield (India) Limited, Dynamic Prestress, MAGEBA, METCO and MORTH approved Makes
18	Prestressing Strands	TataSSL, D>P.Wire, UshaMartin
19	Prestressing System	Dynamic Prestress, VSL, FPCC, Freyssinet
20	HDPE Pipe for electrical cable ducts & ducts for prestressing	Rex Polyextrusion Ltd., D.P Wire, Dynamic Prestress
21	Splicing for reinforcement	Dextra
22	Silica fume	Elkem
23	PVC Pipe	Supreme, Jain, Finolex, Prince, Astral
24	Thermo-plast	Asian, Berger
25	Cat Eye	3M Only
26	Anti-Carbonation	AsianPaints Ltd; Apurva India Ltd; Berger Paint India Ltd; Buildcore Chemicals Mumbai, Chembond Chemical Ltd; Clean Coat Pvt Ltd; Fairmate Chemical Pvt Ltd; FOSROC Chemicals; Jotun India Pvt Ltd; Sunanda Chemicals Pvt Ltd; Nerolac Paint Ltd
27	Fabrication of Steel Girder	RDSO approved vendor

Name of the Work:

Construction of Flyover Bridge near **TUNA TEKRA** on E.P.C Basis (Design, Engineering, Procurement & Construction)

SCHEDULE OF TESTING OF MATERIALS

- For ensuring quality control and workmanship, various tests prescribed below corresponding to the material concerned shall be taken at periodic intervals as stipulated.
- The material shall be got tested through **Govt. Recognized Laboratory** or **Field Laboratory Approved by Client**.

Item No.	Material to be Tested	Type of test, which shall be carried out	Frequency @ which test shall be carried out
1	Cement	Consistency, Setting time, compressive strength, Fineness, Chemical Analysis, Soundness	Upto 50 T – 1 Test 100 T – 2 Tests (As per GERI Manual 2002) 200 T – 3 Tests 300 T – 4 Tests 500 T – 5 Tests 800 T – 8 Tests 1300 T – 8 Tests and 8 Tests for larger consignment
2	40mm to 63 mm metal [M.C. Metal]	Gradation, Flakiness, Impact Value, Abrasion, Specific Gravity	One Test Per 100 cum
4	20mm to 40 mm metal [M.C. Metal]	Gradation, Flakiness, Impact Value, Abrasion, Specific Gravity	One Test Per 100 cum
5	Kapchi below 20mm	Gradation, Flakiness, Impact Value, Abrasion, Specific Gravity	One Test Per 100 cum
6	Sand	CBR – 1 Test per work. Silt Content Gradation	One Test Per 100 cum
7	40mm nominal size H.B. Metal	Gradation, Flakiness, Impact Value, Abrasion, Specific Gravity	One Test Per 100 cum
8	Asphalt	1. Penetration Test as per I.S. 12032. Ductility Test 3. Specification Gravity Test as per I.S. 1208, As per I.S. 1202 as per I.S. 12044. Softening point Test 5. Viscosity Test as per I.S. 1206	Penetration Test: No. of Tanker – 1 to 10: 1, 11 to 20: 2, 21 to 50: 3, 51 to 100: 4, Remaining every 50 tanker: 1
9	C.C. Cube (M-15 to M-50)	Compressive Strength (I.S. 516-1959)	Qty. C.C. M3 – 1 to 5: 1 no., 6 to 15: 2 no., 16 to 30: 3 no., 31 to 50: 4 no., 51 & above: 4 + 1 For each additional 50 M3 or part thereof
10	Steel each category	Tensile Strength, Yield stress, Elongation, Size	1 test / 40 tonnes / per Each category
11	Murum	PI value	1 Test Per / 50 cum
12	Tiles	Abrasion, water absorption, Compressive Strength, size	1 Test For Each Source
13	Water	Chemical Analysis	1 Test For Each Source

