

GOVERNMENT OF TRIPURA
PUBLIC WORKS DEPARTMENT



सत्यमेव जयते

SCHEDULE OF RATES

Volume: I

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GOVERNMENT OF TRIPURA

FOREWORD

Tripura Schedule of Rates being published by Public Works Department, Government of Tripura is a very comprehensive and useful technical document in connection with execution of Civil Construction works in Road Sector. Apart from PWD, this Schedule of Rates is used as a benchmark by many Departments, Institutions, Public Sector Undertakings, Builders and Contractors etc.


PWD Schedule of Rates, Tripura, was first compiled in the year 1972, followed by publication or revisions from time to time in order to update the same with prevailing technology and market rates in 1985, 1990, 1995, 1998, 2002, 2008, 2011, 2017 and 2020. These revisions have also been necessitated due to the advent of new technologies, incorporation of new types of work, new machineries in Schedule of Rates 2023, Vol. I [Road & Bridge Works].

The last PWD Schedule of Rates was published in the year 2020. Revision of this Tripura Schedule of Rates [Road & Bridge Works] has become necessary due to the revision in wages of labour & escalation in price of materials, adoption of new construction technologies in road sector & materials as well as revision of GST. These components have been incorporated in the Schedule of Rates 2023 by revising Schedule of Rates 2020.

I wish to place on record my appreciation for the efforts taken for preparation of the same, the technical inputs and the effective coordination on the part of the Review Committee for revision of Schedule of Rates headed by Er. A Das CE, PWD (NH) Tripura with other members - Er. N P Chakrabarti SE, Project Unit, PWD (Buildings), Er. A Bhadra SE, Monitoring Cell, PWD(R&B), Er. M Debbarma SE, Planning & Design Unit, PWD(R&B) and team of officers in Planning & Design Unit, PWD (R&B) in finalizing the Schedule of Rates for 2023, Vol. I [Road & Bridge Works] in a time bound manner.

I am sure that PWD Schedule of Rates - 2023, Vol. I [Road & Bridge Works], Tripura, will be quite useful to all concerned Engineers in the Road & Bridge Construction Sector in general and besides various units of P.W.D. in particular.

Agartala, Tripura
June, 2023


[RAJIB DEBBARMA]
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PREFACE

1. **Schedule of Rates 2023, Vol. I [Road & Bridge Works], Public Works Department, Government of Tripura will be read along with MoRT&H Specification for Part-I: for Highways and MDRs, MoRD specification for Part-II: for ODRs and Rural Roads, and Addl. Specification incorporated in this SOR for Part - III: Miscellaneous items for road work or with relevant IRC codes with up-to-date correction slips.**
2. **SoR-2023, Vol. I [Road & Bridge works] incorporates all of the items of SoR-2020, changes of nomenclature of some items and addition of new items for use of waste plastic in road construction for a cleaner environment.**
3. **To economize the project costs and to find out the actual costs for projects located at different location of the State, a new system was adopted in SOR '08 and subsequently in SOR'11, SOR '17 & SOR '20 which has been kept same in this SOR also. For finding out the final rates of the items for any project, the sources of the materials are to be investigated properly and then the exact haulage of the materials, loading & unloading of materials are to be incorporated at the time of preparation of the cost estimate.**
4. **On earlier occasions, SOR '08, SOR '11, SOR '17 & SOR '20 were prepared mainly following the basic structure and methodology for analysis of items as per the Standard Data Book of the Ministry of Road Transport and Highways & Ministry of Rural Development, Govt. of India, New Delhi for the respective Part I & II which has been followed in this SOR also.**
5. **The Schedule of Rates is based on the study and consideration of current market rates of materials and labour at Tripura, collected during the period from March 2023 to April 2023. However, rate of different types of Bitumen & Emulsion are as per Door Delivery Rate at Dharmanagar, Tripura as on 01.06.2023.**
6. **The following are the salient features of SoR-2023:**
 - 6.1. **The basic rates of materials, incorporated in the analysis, pertain to materials conforming to MoRTH/ MoRD/ IRC/ CPWD/ BIS specifications/ Materials of best quality available in the market. The Government of India, Ministry of Finance (Department of Revenue) vide notification No. 03/2022- Central tax (Rate) dated 13 July, 2022 has made amendments to notification No. 11/2017 - Central Tax (Rate) dated 28.06.2017 by omitting entries against serial number 3, in column (3) (a) items (iii), (iv), (v), (va), (vi) and (ix) and the corresponding entries relating thereto in column (4) and (5) in the original notification no 11/2017-Central (Rate) dated 28.06.2017, thereby the existing concessional rate of GST @ 12% for Central Government, State Government, Union Territory and a Local Authority has been withdrawn and now the applicable rate of GST is 9 (CGST) +9 (SGST) = 18% on construction services covered under S. No. 3 (i) (f) at page no. 6 and S. No. 3(xii) at page no. 15 of Notification No. 11/2017-Central Tax (Rate) dated 28 June 2017 for Central Government, State Government, Union Territory and a Local Authority with effect from 18th July, 2022. Accordingly, the effect of**

GST on construction services has been incorporated in all items.

- 6.2. Labour cess @ 1% has been incorporated in all items.
- 6.3. At the end of each item 15% of the cost of item is added towards overheads and contractor's profit. This provision covers apart from contractor's profit, the cost of Engineering Establishment deployed by the Contractor, cost of effort in arranging Tools and Plants (T&P) and heavy machinery which have not been considered in the analysis of rates for the items included in the Schedule of Quantities of the work, cost of providing cleaner environment at site & labour welfare facilities, cost of Quality Assurance set up enhancing testing lab, cost of Office set up including engagement of necessary staff for computerized billing etc., any expenditure incurred on cost of Earnest Money/Performance Guarantee/ Security Deposits. Therefore no extra cost is to be added in justification on account of various factors mentioned above.
- 6.4. The description of items is given briefly and linked with relevant Sections and Clauses of MoRTH/ MoRD Specifications/ relevant IRC codes.
- 6.5. Basic rates of relevant/related materials are provided sub-head wise at the start of each sub-head for convenience of the users.

Lot of efforts has gone into the preparation of this Schedule of Rates-2023 [Road & Bridge Works], Tripura. We convey our deep appreciation and sincere thanks to:

The review Committee for revision of Schedule of Rates headed by Er. A Das CE, PWD (NH) Tripura with other members namely Er. N P Chakrabarti SE, Project Unit, PWD (Buildings), Er. A Bhadra SE, Monitoring Cell, PWD(R&B), Er. M Debbarma SE, Planning & Design Unit PWD(R&B) and the co-opted members of Project Unit, PWD (Buildings) for sincere efforts made in the preparation of this document in such a time bound manner. Various field units, who contributed field inputs, also deserve appreciation for their timely help.

Although, all care has been taken to update the schedule in the best possible manner, there may be still undetected error and scope for its further improvement. All Engineers under PWD and other works department may, therefore feel free to point out any error, or give their suggestion for further improvement and feedback on reasonability of rates while preparing estimates.


27/6/23

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BASIC APPROACH AND GENERAL CONDITIONS AND ASSUMPTIONS FOR THE PREPARATION OF SCHEDULE OF RATES - 2023 FOR ROADS & BRIDGES

The basic approach for the preparation of Schedule of Rates for Roads and Bridges - 2023 based on Standard Data Book for Analysis of Rates for Rural Roads is indicated as under :

1 General

The Schedule of Rates - 2023 for Roads and Bridges has been prepared in three parts :

- i. PART - I : Roads and Bridge Works for Highways and MDRs.
- ii. PART - II : Roads and Bridge Works for ODRs and Roads.
- iii. PART - III : Miscellaneous Items for Roads, Timber Bridges, River Training Works.

2 Description of Items and specification

The description of items is given briefly and linked with the relevant Sections and Clauses of the MoRT&H Specification for Part - I : Roads and Bridge Works for Highways and MDRs, MoRD Specifications for Rural Roads for Part - II : Roads and Bridge Works for ODRs and Rural Roads referred as Technical Specifications in the description of items, wherever feasible, which may be referred for detailed description, provisions and interpretation.

The specification for the miscellaneous items in Part - III, which are not available in the MoRT&H and MoRD specification is attached with this Schedule of Rates.

3 Use of Machinery

- 3.1 The Rates for roads & bridges - 2023 for Highways & MDRs is based on the assumption that these are to be constructed with the technology, with high input of machinery, wherever required to ensure the required quality of work.
- 3.2 The Rates for roads & bridges - 2023 for ODRs & rural roads is based on the assumption that Rural Roads are to be constructed with intermediate technology, i.e., manual means with medium input of machinery, wherever required to ensure the required quality of work.
- 3.3 For rolling, use of static roller has been generally considered. However, use of vibratory/ pneumatic tyre roller has been considered wherever required as per provisions of MoRT&H and MoRD Specifications.

4 Working Conditions

- 4.1 Rates have been analysed for average working conditions prevailing in the country & State.
- 4.2 Average achievable outputs of machinery and labour have been considered taking into account for the job and management factors.

5 Overheads

Normally the overheads are considered to include interalia the following elements :

- i. Site accommodation, setting up plant, access road, water supply, electricity and general site arrangements.
- ii. Site office infrastructure.
- iii. Expenditure on :
 - a) Corporate office of the Contractor.
 - b) Site supervision by the Contractor.
 - c) Preparation of 'as built' drawings.
- iv. Mobilisation/demobilisation of resources.
- v. Labour camps with minimum amenities, required as per labour laws.
- vi. Light vehicles for site supervision including administrative and managerial requirements.
- vii. Minor Tools & Plants (T&P) including needle vibrators required for concrete work.
- viii. Survey instruments and the task of setting out of works including verification of line and dimensions (but excluding construction of benchmarks and reference pillars which are separate items under setting out).
- ix. Watch and ward
- x. Arrangement for traffic and traffic management during construction.
- xi. Expenditure on safeguarding environment during construction.
- xii. Sundries (except wherever separately considered)
- xiii. Financing expenditure of the Contractor.
- xiv. Work insurance/compensation.
- xv. In the analysis of each items of works, multiplying factor 0.2127 is considered for reversible calculation of GST so that 18.00 % GST on works contract/ gross amount excluding 1.00 % Cess is worked out.

6 Contractor's Profit

Contractor's profit and overheads is assumed as @ 15.00 %.

7 General

- 7.1 The section and Clause numbers refer to the MoRT&H and MoRD Specifications.
- 7.2 Additional assumptions made for analysing different items have been indicated in respective Chapters in the form of Preamble and notes/footnotes wherever required.

- 7.3 For some of the items, certain size/ specifications have been assumed. If size/ specifications other than the same are adopted, corresponding modifications may be made in the inputs of analysis.
- 7.4 In the rate analysis of some items, the quantities of sub-items involved in that analysis, like, excavation for foundation, foundation concrete, masonry work, painting, lettering, etc. have been given. For rate analysis of such sub-items, reference may be made to relevant Chapters dealing with the sub-items.
- 7.5 The sources of all materials and samples of materials are required to be approved by the Engineer before start of any work.
- 7.6 Quality control of works shall be governed by the relevant Specifications.

8 Basic Inputs

- 8.1 The analysis of the Schedule of Rates is based on the requirements of basic inputs of materials, labour and machineries for various items.
- 8.2 The rates for labour, material and usage charges of machinery has been ascertained from local authorities/enquiries to prepare SOR.
- 8.3 The basic rates of all materials, such as, crushed stone aggregate, stone dust, lime, manure, bricks, Jhama brick aggregate, fine sand , etc. at quarry/ crusher sites has been fixed and mentioned.
- 8.4 The cost of materials is considered as the cost at source as mentioned and the cost of loading, unloading and their carriage/ haulage, upto the work site will be considered and calculated while preparing the DPR/ Cost estimates adding actual Haulage to the particular project site.

9 Plants and Equipment

- 9.1 Keeping in view the job and managerial factors and the age factor of machines, the output of plant and equipment is taken approximately 70 per cent of the rated capacity given by manufacturer under ideal conditions.
- 9.2 The requirement of machinery has been worked out assuming working period of 6 hours per shift of 8 hours.
- 9.3 Certain equipment, like, road rollers, are required to be available at site for complete period of the shift, though from the consideration of their output, they may be required only for 3 to 4 hours. This is necessitated to match with the output of other associated machines, like, HMP, Pavers, Cement concrete batch mix plant etc. In such cases, the hire charges of road rollers have been multiplied with a factor of 0.65 to account for the idle period wherever considered appropriate.
- 9.4 Though electrically operated equipment, like, concrete mixers and vibrators have been provided, diesel/ kerosine operated equipment can be used where electricity is not available.
- 9.5 Wherever electric generator has not been provided to run a plant or equipment, it is assumed that it is fitted with a diesel engine.
- 9.6 For small jobs where loading and unloading is required to be done manually, tractor-trolley has been considered for carriage instead of tipper.

- 9.7 Output of plant/ equipment is considered for the compacted quantities.
- 9.8 A water tanker of 6 kl capacity which is commonly used at construction sites has been considered.
- 9.9 The usage charges for machines include ownership charges, cost of repair and maintenance including replacement of tyres and running and operating charges which includes crew, fuel and lubricants.

10 Labour

- 10.1 One mate has been provided for 25 (10 in case of Horticulture) labours for all items of works.
- 10.2 The labour wages has been considered as per rates in the local market.

11 Materials

- 11.1 Quantities of materials considered in the rate analysis are approximate for the purpose of estimation and include normal wastages. Actual consumption would depend on mix design where required.
- 11.2 The rates of material is considered as basic cost at locations of stone crushers/ factory /rail head /brick kiln /Sub-divisional Head Quarters and cost of its carriage to the site of work /plant including loading, unloading and stacking should be added as for actual distance to the particular project as Haulage, while calculating the final item rate while preparing the DPR /Cost estimate.
- 11.3 The supply of materials will be taken either at the location of mixing plant or at the work site as per requirement of use.
- 11.4 Contractor will make his own arrangements for borrowing earth. However, compensation for earth taken from private land has been included in the rate analysis for construction of embankment /sub-grade with borrowed earth.
- 11.5 Credit for Dismantled Material: The dismantled materials should be examined and a realistic assessment made for credit for such materials, which can be utilized for works or auctioned.
- 11.6 The basic rates include all duties, levies, octroi charges, toll tax, sale tax, VAT, municipal taxes and other local taxes, etc including surcharges if any.

12 Concrete Items

- 12.1 The analysis of rates accounts for input of materials by weight and use of weigh batch mixer for Highways and MDRs and ordinary mixer for ODRs and Rural Roads.
- 12.2 Use of vibrators for all concreting work has been included in the items.
- 12.3 Steel reinforcement for cement concrete work is required to be provided separately unless otherwise specified in the item. The rate for the same has been analysed separately. The wastage @ 5% for lapping, chairs etc. has been considered in the analysis. So no measurement for lapping, chairs etc. should be recorded for payment.
- 12.4 Cost toward formwork has been added to all concrete items. Hence separate measurement and payment toward formwork is not required.

ABBREVIATIONS

AC	Asphaltic Concrete
BC	Bituminous Concrete
BM	Bituminous Macadam
BUSG	Built-up Spray Grout
CI	Cast Iron
cfm	Cubic Feet per minute
cm	Centimetre
cum	Cubic metre
dia	Diameter
e.g.	for example
FE Loader	Front End Loader
GBFS	Granulated Blast Furnace Slag
GI	Galvanised Iron
GL	Ground Level
h	Hours
HMP	Hot Mix Plant
HP	Horse Power
i.e.	That is
IRC	Indian Roads Congress
IS	Indian Standards
kg	Kilogram
kl	Kilolitre
km	Kilometre
kN	Kilo Newton
lit	Litre
m	Metre
Max	Maximum
Min	Minimum
mm	Millimetre
MORD	Ministry of Rural Development
MORT&H	Ministry of Road Transport & Highways
Nos	Numbers
NRRDA	National Rural Roads Development Agency
OMC	Optimum Moisture Content
PCC	Plain Cement Concrete
PQC	Pavement Quality Concrete
q	Quintal
RCC	Reinforce Cement Concrete
RR	Road Roller
₹	Rupees
sqm	Square metre
t	Tonne
T&P	Tools and Plants
t.km	Tonne kilometre
WBM	Water Bound Macadam
WMM	Wet Mix Macadam
Spec.	Specification

**BASIC RATES OF SCHEDULE OF RATES
FOR ROADS AND BRIDGES FOR PWD, TRIPURA - 2023**

(A) LABOUR

Sr. No.	Description of Labour	Unit	Rate as on or just before 01.04.2023
L-01	Bhisti	day	₹ 391.00
L-02	Bitumen Sprayer	day	₹ 447.00
L-03	Blacksmith*	day	₹ 480.00
L-04	Blaster	day	₹ 512.00
L-05	Butane torch operator	day	₹ 475.00
L-06	Carpenter 1 st Class	day	₹ 512.00
L-07	Carpenter 2 nd Class	day	₹ 475.00
L-08	Chips spreader	day	₹ 391.00
L-09	Chiseller	day	₹ 391.00
L-10	Dresser (Skilled)	day	₹ 391.00
L-11	Driller	day	₹ 475.00
L-12	Electrician	day	₹ 475.00
L-13	Fitter*	day	₹ 447.00
L-14	Helper (skilled)	day	₹ 447.00
L-15	Mason (1 st class)	day	₹ 512.00
L-16	Mason (2 nd Class)	day	₹ 475.00
L-17	Mate	day	₹ 391.00
L-18	Mazdoor (Unskilled)	day	₹ 391.00
L-19	Mazdoor (Semi skilled)	day	₹ 447.00
L-20	Mazdoor (Skilled)	day	₹ 475.00
L-21	Mistri (for wooden pile driving/lifting)	day	₹ 512.00
L-22	Painter (I st class)	day	₹ 475.00
L-23	Plumber	day	₹ 475.00
L-24	Sinker (skilled)	day	₹ 512.00
L-25	Sinking Helper (Semi-skilled)	day	₹ 391.00
L-26	Surveyor	day	₹ 640.00
L-27	Welder	day	₹ 512.00
L-28	White Washer	day	₹ 447.00

Note:- *Avegare rate for use in analysis of rate only.

Note:

1. The rates of Labour indicated above has been considered as per present market rate.
2. The above rates are exclusive of overheads, contractor's profit & GST.

**BASIC RATES OF SCHEDULE OF RATES
FOR ROADS AND BRIDGES FOR PWD, TRIPURA - 2023**

(B) USAGE RATES OF PLANT & MACHINERY

Sr. No.	Description		Output of Machine		Usage Rates	
	Machine	Activity	Unit	Output	Unit	As on or just before 01.04.2023
P&M-001	Air Compressor 210 / 250 cfm	Supplying compressed air	cfm	210 / 250	per hour	₹ 235.00
P&M-002	Air Compressor 210 cfm with 2 jack hammers of pneumatic breaker	Supplying compressed air & breaking of rock	cfm	210.00	per hour	₹ 353.00
P&M-003	Air compressor with pneumatic chiesel attachment	for cutting of earth in well foundation	cfm	210.00	per hour	₹ 361.00
P&M-004	Air compressor with guniting equipment along with accessories	guniting concrete surface	-	-	per hour	₹ 385.00
P&M-005	Batch mix HMP 100-120 TPH hydrostatic with sensor control	BM, DBM, SDBC, PM	t/h	75.00	per hour	₹ 15,400.00
P&M-006	Batch mix HMP 40-60 TPH	BM, DBM, SDBC, PM	t/h	50.00	per hour	₹ 13,552.00
P&M-007	Batch type HMP 30/40 TPH	BM, DBM, SDBC, PM	t/h	35.00	per hour	₹ 9,968.00
P&M-008	Mini Hot mix plant	BM, DBM, SDBC, PM	t/h	5.00	per hour	₹ 2,805.00
P&M-009	Batch type Cold Mixing Plant 100-120 TPH	Mixing of ingredients	t/h	75.00	per hour	₹ 9,812.00
P&M-010	Bitumen boiler oil fired/200 litre	Heating of Bitumen	litre/ h	400.00	per hour	₹ 226.00
P&M-011	Bitumen boiler oil fired/1000 litre	Heating of Bitumen	litre/ h	2000.00	per hour	₹ 222.00
P&M-012	Bitumen emulsion pressure distributor	Applying bitumen tack coat	sqm/h	1750.00	per hour	₹ 226.00
P&M-013	Cement Concrete batch mix plant	concrete mixing	cum / hour	20.00	per hour	₹ 7,088.00
P&M-014	Concrete mixer 0.28/0.4 cum	Mixing of ingredients	cum/h	2.50	per hour	₹ 215.00
P&M-015	Concrete pump with piping and accessories	pumping of concrete	cum/h	20.00	per hour	₹ 409.00
P&M-016	Concrete saw cutter	cutting of concrete	cum/h	4.00	per hour	₹ 315.00
P&M-017	Crane 20- 40 t capacity	Lifting of materials	t/h	-	per hour	₹ 1,708.00
P&M-018	Crane upto 8T	Lifting of materials	cum/h	-	per hour	₹ 1,288.00
P&M-019	Crane with grab bucket of 0.75 / 1.0 cum capacity and accessories	pouring concrete in pile foundation	t/h	-	per hour	₹ 1,036.00
P&M-020	Crane (Light) 3-5 t capacity	for handling tremie pipe	t/h	-	per hour	₹ 560.00
P&M-021	Cold milling machine	recycling of concrete	cum/ hour	20.00	per hour	₹ 1,850.00
P&M-022	Dozer D 50 /80	Dozing cutting	cum/h	30.00	per hour	₹ 2,654.00
P&M-023	Dozer D 50 /81	Dozing cutting	cum/h	50.00	per hour	₹ 2,654.00
P&M-024	Drum mix plant	mixing of cold mixes	t/ h	75.00	per hour	₹ 2,298.00
P&M-025	Electric generator set, 250 KVA	Electricity generation	KVA	200.00	per hour	₹ 700.00

Sr. No.	Description		Output of Machine		Usage Rates	
	Machine	Activity	Unit	Output	Unit	As on or just before 01.04.2023
P&M-026	Electric generator set, 125 KVA	Electricity generation	KVA	100.00	per hour	₹ 498.00
P&M-027	Electric Generator- 33 KVA	Electricity generation	KVA	25.00	per hour	₹ 252.00
P&M-028	Emulsion Sprayer with Tractor	Spraying of Emulsion	-	-	per hour	₹ 1,008.00
P&M-029	Epoxy injection gun	injecting epoxy grout	kg / hour	10.00	per hour	₹ 194.00
P&M-030	Front end-loader 1 cum bucket capacity @ 45 cum/hour	Loading Aggregates	cum/h	45.00	per hour	₹ 1,030.00
P&M-031	Front end-loader	Loading Soil	cum/h	100.00	per hour	₹ 1,030.00
P&M-032	Grout pump with agitator and accessories	Sealing of cracks/porous concrete	kg/ hour	10.00	per hour	₹ 304.00
P&M-033	Hydraulic broom with tractor	Surface cleaning	sqm/h	1250.00	per hour	₹ 386.00
P&M-034	Hydraulic Excavator 0.9 / 1.0 cum bucket capacity	Excavation	cum/h	100.00	per hour	₹ 1,344.00
P&M-035	Hydraulic Excavator 0.9 cum (with rock breaker attachment)	Excavation in rock	cum/h	6.00	per hour	₹ 1,547.00
P&M-036	Hydraulic piling Rig with bentonite pump	for boring of pile foundation	-	-	per hour	₹ 6,067.00
P&M-037	Hydraulic piling Rig with power unit and double acting pile driving hammer complete	for driving of pile foundation	-	-	per hour	₹ 5,628.00
P&M-038	Hydraulic self propelled chip spreader	Surface Dressing	sqm/h	1500.00	per hour	₹ 4,064.00
P&M-039	Jack Hammer with tractor	Pavement breaking & rock drilling	cum/h	0.5 to 1	per hour	₹ 419.00
P&M-040	Jack of 40 t lifting capacity	lifting of structures	t	40.00	per hour	₹ 213.00
P&M-041	Joint Cutting Machine with 2-3 blades	Cutting of Joints	-	-	per hour	₹ 186.00
P&M-042	Kerb casting and laying machine	Kerb casting and laying	m/h	60.00	per hour	₹ 487.00
P&M-043	Mastic Cooker	Mixing of bituminous materials	t/h	1.00	per hour	₹ 138.00
P&M-044	Mixall 6-10 t capacity	Mixing of bituminous materials	t/h	8.00	per hour	₹ 857.00
P&M-045	Mobile slurry seal equipment	Mixing and laying slurry seal	sqm/h	2700	per hour	₹ 1,137.00
P&M-046	Motor Grader	Scarifier & levelling	cum/h	200.00	per hour	₹ 2,940.00
P&M-047	Motor Grader	Scarifier & levelling	cum/h	50.00	per hour	₹ 2,940.00
P&M-048	Needle vibrator	Vibrating cement concrete mix	cum/h	3.5	per hour	₹ 74.00
P&M-049	Paver finisher Mechanical	Laying/spreading	t/h	75	per hour	₹ 1,176.00
P&M-050	Paver finisher Hydrostatic with electronic sensor control	Laying / spreading	t/h	75	per hour	₹ 2,505.00
P&M-051	Plate compactor	Compaction	cum/h	3.5	per hour	₹ 84.00
P&M-052	Plate vibrator	Compaction	cum/h	3.5	per hour	₹ 84.00
P&M-053	Pneumatic tyred road roller	Rolling of asphalt surface	cum / hour	25	per hour	₹ 1,180.00

Sr. No.	Description		Output of Machine		Usage Rates	
	Machine	Activity	Unit	Output	Unit	As on or just before 01.04.2023
P&M-054	Paint Applicator	Road marking	sqm/h	40/ 60	per hour	₹ 158.00
P&M-055	Road sweeper	cleaning of road surface	sqm/h	1250	per hour	₹ 385.00
P&M-056	Screed vibrator	Compaction	cum/h	3.5	per hour	₹ 106.00
P&M-057	Shotcreting equipment	applying shotcrete mixture	cum/hour	3	per hour	₹ 318.00
P&M-058	Smooth wheeled 80-100 kN tandem roller	Compaction of Sub-base/ Asphalt	cum/h	30	per hour	₹ 1,350.00
P&M-059	Stone crusher (Integrated) of 200 TPH	Crushing of Spalls	t/h	200	per hour	₹ 15,579.00
P&M-060	Pre stressing jack with pump	stresing of steel wire/ strands	t/h	0.25	per hour	₹ 325.00
P&M-061	Texturing machine	texturing of concrete	-	-		₹ 218.00
P&M-062	Three wheel 80-100 KN Static Roller	Compaction/ Rolling	-	-	per hour	₹ 439.00
P&M-063		Earth:- Embankment or sub-grade	cum/h	80/70	per hour	₹ 439.00
P&M-064		Sub-base G-I	cum/h	10.00	per hour	₹ 439.00
P&M-065		Sub-base G-II/G-III	cum/h	8.00	per hour	₹ 439.00
P&M-066		WMM	cum/h	16.00	per hour	₹ 439.00
P&M-067		BUSG	cum/h	10.00	per hour	₹ 439.00
P&M-068		BM 50/75 mm	cum/h	12.00	per hour	₹ 439.00
P&M-069		Premix 20/ 25 mm	sqm/h	250.00	per hour	₹ 439.00
P&M-070		Seal Coat	sqm/h	500.00	per hour	₹ 439.00
P&M-071		Surface Dressing 1st Coat	sqm/h	400.00	per hour	₹ 439.00
P&M-072		Surface Dressing 2ndCoat	sqm/h	500.00	per hour	₹ 439.00
P&M-073		Tipper 5.5 cum/10 t	Carriage	cum/trip	5.5	per hour
P&M-074	Tractor with Disc Harrows	Pulverisation of soil	cum/h	80	per hour	₹ 431.00
P&M-075	Tractor with ripper @ 60 cum per hour	Ripping Pavements, uprooting trees	cum/h	60	per hour	₹ 250.00
P&M-076	Tractor with trolley	Transportation of materials	t/trip	3 to 5	per hour	₹ 265.00
P&M-077	Tractor mount with Rotavator / Grader	Scarifying / Mixing / Grading	cum/h	25	per hour	₹ 358.00
P&M-078	Trailor 30 t capacity	carriage	t/h	30	per hour	₹ 890.00
P&M-079	Transit mixer	transportation of concrete mix	cum/h for 1 km lead	4	per hour	₹ 883.00
P&M-080	Truck 10 t capacity	Carriage	cum/trip	5.5	per hour	₹ 418.00
P&M-081	Vibrating Pile driving hammer complete with power unit and accessories.	driving of pile	-	-	per hour	₹ 950.00

Sr. No.	Description		Output of Machine		Usage Rates	
	Machine	Activity	Unit	Output	Unit	As on or just before 01.04.2023
P&M-082	Vibratory roller 80-100 kN	Compaction of soil WMM	cum/h	100.00	per hour	₹ 1,562.00
P&M-083	Vibratory roller 80-100 kN	Compaction of BM/ concrete	cum/h	60.00	per hour	₹ 1,562.00
P&M-084	Water tanker 6 kl capacity (Truck Mounted)	Carriage of water	litre/ h	12000	per hour	₹ 224.00
P&M-085	Wet mix plant (Pug Mill)	Wet Mix	cum/h	25	per hour	₹ 3,769.00
P&M-086	Wet mix plant	Wet Mix	t/h	75	per hour	₹ 3,769.00
P&M-087	Shredding Machine	Shredding of waste Plastic			per hour	₹ 549.00

Note:

1. The rates of Labour indicated above has been considered as per the present market rates.
2. The above rates are exclusive of overheads, contractor's profit.
3. Above hire charges include cost of services of operating staff, Cost of lubricating oil, diesel / Petrol/ Kerosene oil , other consumables for running the plant and machinery and excluding GST.

**BASIC RATES OF SCHEDULE OF RATES
FOR ROADS AND BRIDGES FOR PWD, TRIPURA - 2023**

(C) MATERIAL

Note : These rates are exclusive of contractor's profit, over heads, loading, unloading, stacking, haulage and applicable GST.

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-001	AC Pipe 100 mm dia/ uPVC pipe (6.0 Kg/cm ²) 110 mm OD	Sub-Divn. HQ of Tripura	m	₹ 198.50
M-002	Accelator compound for guniting	Sub-Divn. HQ of Tripura	kg	₹ 156.00
M-003	Acrylic polymer bonding coat	Sub-Divn. HQ of Tripura	litre	₹ 289.00
M-004	Admixture- super plasticizer	Sub-Divn. HQ of Tripura	kg	₹ 42.00
M-005	Aggregate (stone) - Grading I/ II (13 mm nominal Size) 13.2 mm -10 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,281.40
M-006	Aggregate (stone) - Grading I/ II (40/ 19/ 13 mm nominal Size) 10 mm - 5 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,355.60
M-007	Aggregate (stone) - Grading I (40 mm nominal Size) 10 mm - 4.75 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,350.00
M-008	Aggregate (stone) - Grading II (10 mm nominal Size) 9.5 mm - 4.75 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,326.30
M-009	Aggregate (stone) - Grading I / II (40/ 10 mm nominal Size) 4.75 mm and below	Sub-Divn. HQ of Tripura	cum	₹ 4,282.60
M-010	Aggregate (stone)- Grading I / II (40/ 19 mm nominal Size) 25 mm – 10 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,017.00
M-011	Aggregate (stone) - Grading I (19 mm nominal Size) 20 mm - 10 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,149.20
M-012	Aggregate (stone) - Grading I (40 mm nominal Size) 37.25 mm - 25 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,663.20
M-013	Aggregate (stone) - Grading I / II (40 /19 / 13 mm nominal Size) 5 mm and below	Sub-Divn. HQ of Tripura	cum	₹ 4,450.50
M-014	Aggregate (stone) - 19 mm to 9.5 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,281.40
M-015	Aggregate (stone) - 9.5 mm to 6 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,286.50
M-016	Aggregate (stone) - 6 / 4.75 mm to 0.075 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,636.50
M-017	Aggregate (stone) - 37.5 mm to 19 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,751.30
M-018	Aggregate (stone) - 19 mm to 6 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,193.30
M-019	Aggregate (stone) (19 mm nominal Size) as per Table 500.4 (of MoRD specification)	Sub-Divn. HQ of Tripura	cum	₹ 4,237.30
M-020	Aggregate 10 mm (Stone)	Sub-Divn. HQ of Tripura	cum	₹ 4,269.00
M-021	Aggregate 12/ 12.5 mm crushed (Stone)	Sub-Divn. HQ of Tripura	cum	₹ 4,304.00
M-022	Aggregate 20 mm (Stone)	Sub-Divn. HQ of Tripura	cum	₹ 4,374.00
M-023	Aggregate 40 mm (Stone)	Sub-Divn. HQ of Tripura	cum	₹ 4,236.00

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-024	Aggregate (stone)-Grading I 90 mm to 45 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,354.60
M-025	Aggregate (stone)-Grading II 63 mm to 45 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,575.00
M-026	Aggregate (stone)-Grading III 53 mm to 22.4 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,751.30
M-027	Aggregate (stone)-45 mm to 22.4 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,024.10
M-028	Aggregate (stone)-22.4 mm to 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,839.50
M-029	Aluminium alloy plate, 2 mm thick, fixed with high intensity grade sheeting vide clause 801.3 of MoRT&H specification	Sub-Divn. HQ of Tripura	sqm	₹ 1,188.00
M-030	Aluminium sheeting (1.5 mm thick)	Sub-Divn. HQ of Tripura	sqm	₹ 891.00
M-031	Aluminium sheeting (2.0 mm thick)	Sub-Divn. HQ of Tripura	sqm	₹ 1,188.00
M-032	Aluminium Studs 100 mm x 100 mm fitted with lense reflectors	Sub-Divn. HQ of Tripura	nos	₹ 118.50
M-033	Bamboo (1 st Class) 85 mm - 100 mm dia,	At site	m	₹ 24.00
M-034	Bamboo (2 nd Class) 65 mm to 75 mm dia,	At site	m	₹ 16.50
M-035	Bamboo (Muli) 40 mm to 50 mm dia,	At site	m	₹ 4.00
M-036	Bentonite	Sub-Divn. HQ of Tripura	kg	₹ 3.20
M-037	Barbed wire G.I.	Sub-Divn. HQ of Tripura	kg	₹ 82.40
M-038	Binding Material	Near site	cum	₹ 17.10
M-039	Binding wire	Sub-Divn. HQ of Tripura	kg	₹ 69.00
M-040	Binding wire (G.I. 2.00 mm)	Sub-Divn. HQ of Tripura	kg	₹ 80.00
M-041	Bitumen VG-30	Dharmanagar	t	₹ 61,186.00
M-042	Bitumen VG-10	Dharmanagar	t	₹ 60,386.00
M-043	Bitumen drum (empty)	Sub-Divn. HQ of Tripura	nos	₹ 315.00
M-044	Bitumen Drum Sheet (with nails for fixing)	Sub-Divn. HQ of Tripura	sqm	₹ 345.00
M-045	Bitumen Emulsion (RS-1)	Dharmanagar	t	₹ 57,286.00
M-046	Bitumen Emulsion (SS-1)	Dharmanagar	t	₹ 60,228.00
M-047	Bitumen Solution Primer	Sub-Divn. HQ of Tripura	kg	₹ 62.00
M-048	Bituminous sealant	Sub-Divn. HQ of Tripura	litre	₹ 79.50
M-049	Brick 1 st Class	At Kiln	nos	₹ 12.20
M-050	Brush wood (tetul, sheora, mandar etc)	At site	cum	₹ 123.50

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-051	C.I shoes for the concrete pile	Sub-Divn. HQ of Tripura	kg	₹ 55.00
M-052	Cement	Sub-Divn. HQ of Tripura	t	₹ 6,797.00
M-053	Cement Primer	Sub-Divn. HQ of Tripura	litre	₹ 66.00
M-054	Coal Tar	Sub-Divn. HQ of Tripura	kg	₹ 37.00
M-055	Coarse graded material for GSB (Table-400.2), 53 mm to 26.5 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,839.50
M-056	Coarse graded material for GSB (Table-400.2), 26.5 mm to 4.75 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,281.40
M-057	Coarse graded material for GSB (Table-400.2), 9.5 mm to 4.75 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,325.50
M-058	Coarse graded material for GSB (Table-400.2), 2.36 mm below	Sub-Divn. HQ of Tripura	cum	₹ 2,202.70
M-059	Coarse graded material for Sub-Base 37.5 mm to 9.5 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,193.30
M-060	Coarse graded material for Sub-Base 4.75 mm to 75 micron	Sub-Divn. HQ of Tripura	cum	₹ 3,619.10
M-061	Compensation for earth taken from private land	Near site	cum	₹ 18.00
M-062	Compressible fibre board 20 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 747.40
M-063	Copper plate	Sub-Divn. HQ of Tripura	kg	₹ 850.00
M-064	Corrosion Resistant Structural Steel Grating	Sub-Divn. HQ of Tripura	kg	₹ 75.30
M-065	Corrugated sheet, 3.0 mm thick, "W" beam section railing	Sub-Divn. HQ of Tripura	kg	₹ 69.50
M-066	Crow bars 40 mm dia (hire charges)	Near site	hour	₹ 10.90
M-067	Crushed stone as per table 300.3 of MoRTH specification	Sub-Divn. HQ of Tripura	cum	₹ 3,707.30
M-068	Crushed stone dust or Grit 3 mm size	Sub-Divn. HQ of Tripura	cum	₹ 2,274.50
M-069	Crushed stone dust or Grit Passing 2.36 mm and retained on 180 micron	Sub-Divn. HQ of Tripura	cum	₹ 2,252.60
M-070	Crushed stone dust or Grit Passing 2.36 mm and retained on 75 micron	Sub-Divn. HQ of Tripura	cum	₹ 2,252.60
M-071	Crushed stone coarse aggregate of 25 mm and 12.5 mm nominal sizes graded as per table 600-1 of MoRT&H specification.	Sub-Divn. HQ of Tripura	cum	₹ 4,413.70
M-072	Crushed Stone Aggregate 26.5 mm to 75 micron (Table 1500.1/ 3 of MoRD specification)	Sub-Divn. HQ of Tripura	cum	₹ 4,325.50
M-073	Crushed Stone chipping 19 mm nominal size	Sub-Divn. HQ of Tripura	cum	₹ 4,061.00
M-074	Crushed Stone chipping 13.2 mm nominal size	Sub-Divn. HQ of Tripura	cum	₹ 4,325.50
M-075	Crushed Stone Chipping 6.7 mm size 100% passing 11.2 mm and retained on 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,972.90

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-076	Crushed Stone Chipping 6.7 mm size 100% passing 9.5 mm and retained on 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,972.90
M-077	Crushed Stone chipping 9.5 mm nominal size	Sub-Divn. HQ of Tripura	cum	₹ 4,237.30
M-078	Crushed Stone Coarse Aggregate Passing 63 mm and retained on 2.8 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,619.10
M-079	Crushed Stone Coarse Aggregate Passing 53 mm and retained on 2.8 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,707.30
M-080	Crushed Stone Coarse Aggregate Passing 45 mm and retained on 2.8 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,751.30
M-081	Curing compound	Sub-Divn. HQ of Tripura	litre	₹ 62.80
M-082	Debonding strips	Sub-Divn. HQ of Tripura	m	₹ 23.50
M-083	Doob grass	At site	kg	₹ 2.55
M-084	Earth, free from clay with a Plasticity Index not exceeding 6.	Local quarry	cum	₹ 166.50
M-085	Elastomeric bearing assembly	Sub-Divn. HQ of Tripura	cucm	₹ 1.10
M-086	Elastomeric slab seal expansion joint assembly manufactured by using chloroprene, elastomer for elastomeric slab unit conforming to clause 915.1 of IRC: 83 (part II)	Sub-Divn. HQ of Tripura	m	₹ 20,900.00
M-087	Electric detonator	Sub-Divn. HQ of Tripura	each	₹ 21.00
M-088	Empty gunny/ polythene (of minimum wall thickness of 500 micron) bags	Sub-Divn. HQ of Tripura	nos	₹ 2.50
M-089	Epoxy Resin	Sub-Divn. HQ of Tripura	kg	₹ 702.00
M-090	Epoxy Mortar	Sub-Divn. HQ of Tripura	kg	₹ 430.00
M-091	Epoxy Paint	Sub-Divn. HQ of Tripura	litre	₹ 268.00
M-092	Epoxy Primer	Sub-Divn. HQ of Tripura	litre	₹ 175.00
M-093	Epoxy resin-hardener mix	Sub-Divn. HQ of Tripura	Kg	₹ 361.00
M-094	Farmyard manure	At Farm	cum	₹ 541.00
M-095	Synthetic adhesive	Sub-Divn. HQ of Tripura	kg	₹ 256.00
M-096	Filter media (stone aggregate)	Sub-Divn. HQ of Tripura	cum	₹ 2,496.30
M-097	Fine aggregate (stone) 3.00 mm and below	Sub-Divn. HQ of Tripura	cum	₹ 2,274.50
M-098	Flower plant	At site	nos	₹ 13.80
M-099	Flower shrubs	At site	nos	₹ 9.70
M-100	Fuel - LPG	Agartala	Kg	₹ 82.80

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-101	Galvanised steel/ angle/plates /pipes	Sub-Divn. HQ of Tripura	kg	₹ 63.00
M-102	Galvanised angle Section 100 mm x 100 mm of 12 mm thickness	Sub-Divn. HQ of Tripura	kg	₹ 63.00
M-103	Galvanised MS flat clamp	Sub-Divn. HQ of Tripura	nos	₹ 53.50
M-104	Galvanised steel wire crates	Sub-Divn. HQ of Tripura	kg	₹ 72.60
M-105	Gelatine 80 per cent	Sub-Divn. HQ of Tripura	kg	₹ 138.00
M-106	Geotextile 120 gsm non woven membrane, 100% polyester of thickness 1 to 1.25 mm	Sub-Divn. HQ of Tripura	sqm	₹ 58.50
M-107	GI Bolt with nut 10 mm dia	Sub-Divn. HQ of Tripura	nos	₹ 12.00
M-108	GI Nipple 150 mm long 20 mm dia for grouting	Sub-Divn. HQ of Tripura	nos	₹ 35.50
M-109	GI Pipe 100 mm dia (medium class)	Sub-Divn. HQ of Tripura	m	₹ 873.00
M-110	GI Pipe 50 mm dia (medium class)	Sub-Divn. HQ of Tripura	m	₹ 366.00
M-111	Granular material for backfilling abutment, wing wall, return wall etc.	Sub-Divn. HQ of Tripura	cum	₹ 2,274.50
M-112	HDPE pipes 75 mm dia	Sub-Divn. HQ of Tripura	m	₹ 123.00
M-113	HDPE pipes 90 mm dia	Sub-Divn. HQ of Tripura	m	₹ 158.80
M-114	Thermoplastic paint	Sub-Divn. HQ of Tripura	kg	₹ 75.90
M-115	H.T. Strand @ 9.42 Kg/m	Sub-Divn. HQ of Tripura	t	₹ 78,254.00
M-116	Indigo	Sub-Divn. HQ of Tripura	kg	₹ 66.00
M-117	Joint filler board 25 mm as per IS:1838	Sub-Divn. HQ of Tripura	sqm	₹ 1,029.00
M-118	Joint filler board 20 mm as per IS:1838	Sub-Divn. HQ of Tripura	sqm	₹ 816.20
M-119	Joint sealant	Sub-Divn. HQ of Tripura	kg	₹ 351.00
M-120	Jute netting, open weave, 2.5 cm square opening	Sub-Divn. HQ of Tripura	sqm	₹ 9.80
M-121	Jute rope 12 mm dia	Sub-Divn. HQ of Tripura	m	₹ 5.90
M-122	Key Aggregates passing 26.5 mm and retained on 2.8 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,278.00
M-123	Key Aggregates passing 22.4 mm and retained on 2.8 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,981.00
M-124	LDO for steam curing	Agartala	litre	₹ 88.40
M-125	Lime	Sub-Divn. HQ of Tripura	kg	₹ 3.50
M-126	Lime stone dust filler with calcium content not less than 80 per cent	Sub-Divn. HQ of Tripura	t	₹ 3,540.00
M-127	Modular strip/ box seal expansion joint catering to a horizontal movement beyond 70 mm and upto 140 mm	Sub-Divn. HQ of Tripura	m	₹ 11,785.00

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-128	Modular strip/ box seal expansion joint catering to a horizontal movement beyond 140 mm and upto 210 mm	Sub-Divn. HQ of Tripura	m	₹ 14,305.00
M-129	MS Angles 100 x 100 x 10 mm /MS plate 10 mm thick	Sub-Divn. HQ of Tripura	kg	₹ 59.50
M-130	MS clamps	Sub-Divn. HQ of Tripura	kg	₹ 76.30
M-131	MS clamps	Sub-Divn. HQ of Tripura	nos	₹ 51.60
M-132	MS Angle Iron	Sub-Divn. HQ of Tripura	kg	₹ 59.50
M-133	MS Flat/ Structural Steel	Sub-Divn. HQ of Tripura	t	₹ 59,530.00
M-134	MS Sheet Tube (75 mm x 75 mm x 12 SWG Sheet)	Sub-Divn. HQ of Tripura	kg	₹ 73.60
M-135	MS Sheet Tube (47 mm x 47 mm x 12 SWG Sheet)	Sub-Divn. HQ of Tripura	kg	₹ 72.40
M-136	MS Sheet 1.5 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 700.80
M-137	MS Sheet 1.6 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 747.80
M-138	MS Sheet 2.0 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 934.80
M-139	MS Sheet 6.0 mm thick	Sub-Divn. HQ of Tripura	kg	₹ 59.50
M-140	MS Spikes/ nails	Sub-Divn. HQ of Tripura	kg	₹ 65.00
M-141	Nuts, Bolts and Rivets (MS)	Sub-Divn. HQ of Tripura	kg	₹ 64.50
M-142	Paint (Synthetic Enamel)	Sub-Divn. HQ of Tripura	litre	₹ 201.00
M-143	Pesticide	Sub-Divn. HQ of Tripura	kg	₹ 162.00
M-144	Plasticizer - as per IS : 9103-1999	Sub-Divn. HQ of Tripura	litre	₹ 42.00
M-145	Polythene/ plastic sheeting (125 micron)	Sub-Divn. HQ of Tripura	sqm	₹ 14.40
M-146	Polythene Sheathing (25 mm inner dia and length of 0.66 m)	Sub-Divn. HQ of Tripura	nos	₹ 11.70
M-147	Polythene/ plasting Sheath 1.25 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 37.00
M-148	Bearing (Pot type bearing assembly consisting of a metal piston supported by a disc, PTFE pads providing sliding surfaces against stainless steel mating together with cast steel assemblies/fabricated structural steel assemblies duly painted with all components	Sub-Divn. HQ of Tripura	nos	₹ 54,435.00
M-149	Precast cement concrete tiles of size 300 x 300 mm and 25 mm thick	Sub-Divn. HQ of Tripura	nos	₹ 33.70
M-150	Premoulded joint filler board 20 mm thick	Sub-Divn. HQ of Tripura	sqm	₹ 816.20
M-151	Pre-packed polymer concrete based on epoxy system complete with curing compound, initiator and promoter	Sub-Divn. HQ of Tripura	kg	₹ 33.50

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-152	Quarried stone 150 mm to 200 mm size	Sub-Divn. HQ of Tripura	cum	₹ 2,843.10
M-153	Quarried stone 150 mm and below	Sub-Divn. HQ of Tripura	cum	₹ 2,821.20
M-154	Quick setting compound	Sub-Divn. HQ of Tripura	kg	₹ 64.10
M-155	RCC Pipe NP3 (1200 mm dia)	At Factory	m	₹ 12,200.00
M-156	RCC Pipe NP3 (1000 mm dia)	At Factory	m	₹ 9,380.00
M-157	RCC Pipe NP3 (750 mm dia)	At Factory	m	₹ 6,250.00
M-158	RCC Pipe NP3 (600 mm dia)	At Factory	m	₹ 4,490.00
M-159	RCC Pipe NP2 (1200 mm dia)	At Factory	m	₹ 6,246.00
M-160	RCC Pipe NP2 (900 mm dia)	At Factory	m	₹ 3,969.00
M-161	RCC Pipe NP2 (600 mm dia)	At Factory	m	₹ 2,467.00
M-162	RCC Pipe NP2 (450 mm dia)	At Factory	m	₹ 1,588.00
M-163	RCC Pipe NP2 (300 mm dia)	At Factory	m	₹ 746.00
M-164	RCC Pipe NP2 (200 mm dia)	At Factory	m	₹ 468.00
M-165	Red-oxide Primer	Sub-Divn. HQ of Tripura	litre	₹ 134.20
M-166	Reflectorising glass beads	Sub-Divn. HQ of Tripura	kg	₹ 82.80
M-167	Road delineators from ISI certified firm as per the standard drawing given in IRC - 79	Sub-Divn. HQ of Tripura	nos	₹ 380.00
M-168	Road marking paint	Sub-Divn. HQ of Tripura	litre	₹ 149.00
M-169	Sand (Coarse)	Churaibari	cum	₹ 2,887.00
M-170	Sand (Fine) : from selected quarries	Selected Local quarry	cum	₹ 740.00
M-171	Sand (Fine) : from local quarries	Local quarry	cum	₹ 590.00
M-172	Sealant primer	Sub-Divn. HQ of Tripura	kg	₹ 140.00
M-173	Seeds	At Site	kg	₹ 338.00
M-174	Selected earth	Local quarry	cum	₹ 90.50
M-175	Sheathing duct ID 66 mm	Sub-Divn. HQ of Tripura	m	₹ 60.00
M-176	Steel Pipe 25/ 50 mm dia	Sub-Divn. HQ of Tripura	t	₹ 66,500.00
M-177	Steel Channels ISMC 100	Sub-Divn. HQ of Tripura	kg	₹ 59.50
M-178	Steel helmet and cushion block on top of casing head	Sub-Divn. HQ of Tripura	kg	₹ 71.55

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-179	Steel Joists ISMB	Sub-Divn. HQ of Tripura	t	₹ 59,530.00
M-180	Steel (mild) round bar	Sub-Divn. HQ of Tripura	t	₹ 57,000.00
M-181	Twisted steel / deformed bars	Sub-Divn. HQ of Tripura	t	₹ 58,000.00
M-182	Stone boulders of size 200 mm and above	Sub-Divn. HQ of Tripura	cum	₹ 3,000.90
M-183	Stone boulders of size 150 mm and below	Sub-Divn. HQ of Tripura	cum	₹ 2,824.50
M-184	Stone Chips 13.2 mm nominal size	Sub-Divn. HQ of Tripura	cum	₹ 4,325.50
M-185	Stone Chips 13.2 mm to 5.6 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,061.00
M-186	Stone Crushed Aggregate 13.2 mm to 0.9 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,389.30
M-187	Stone Crushed Aggregate 11.2 mm to 0.9 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,501.80
M-188	Stone Screening - Type A 13.2 mm for Grading 1	Sub-Divn. HQ of Tripura	cum	₹ 4,061.00
M-189	Stone Screening - Type B 11.2 mm for Grading 2	Sub-Divn. HQ of Tripura	cum	₹ 4,389.30
M-190	Stone Screening - Type B 11.2 mm for Grading 3	Sub-Divn. HQ of Tripura	cum	₹ 4,389.30
M-191	Stone Spalls of minimum size 25 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,044.90
M-192	Strip seal type Elastomeric expansion joint	Sub-Divn. HQ of Tripura	m	₹ 12,204.00
M-193	Structural steel, in bars, plates, angles, channels etc.	Sub-Divn. HQ of Tripura	t	₹ 59,530.00
M-194	Traffic cone of LDPE with a square base of 390 x 390 x 35 mm and a height of 770 mm, 4 kg in weight	Sub-Divn. HQ of Tripura	nos	₹ 410.00
M-195	Tube anchorage set complete with bearing plate, permanent wedges, etc.	Sub-Divn. HQ of Tripura	nos	₹ 5,360.00
M-196	Water	Near site	kl	₹ 133.00
M-197	Water based paint of approved quality for cement concrete surface	Sub-Divn. HQ of Tripura	litre	₹ 66.00
M-198	Well Graded Stone Aggregate for Sub-Base - Grading I - 2.36 mm below	Sub-Divn. HQ of Tripura	cum	₹ 2,281.10
M-199	Well Graded Stone Aggregate for Sub-Base - Grading I - 53 mm to 9.5 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,795.40
M-200	Well Graded Stone Aggregate for Sub-Base - Grading I - 9.5 mm to 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,413.70
M-201	Well Graded Stone Aggregate for Sub-Base - Grading II - 2.36 mm below	Sub-Divn. HQ of Tripura	cum	₹ 2,274.50
M-202	Well Graded Stone Aggregate for Sub-Base - Grading II - 26.5 mm to 9.5 mm	Sub-Divn. HQ of Tripura	cum	₹ 3,972.90
M-203	Well Graded Stone Aggregate for Sub-Base - Grading II - 9.5 mm to 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,413.70
M-204	Well Graded Stone Aggregate for Sub-Base - Grading III - 2.36 mm below	Sub-Divn. HQ of Tripura	cum	₹ 2,274.50
M-205	Well Graded Stone Aggregate for Sub-Base - Grading III - 4.75 mm to 2.36 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,501.80

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-206	Well Graded Stone Aggregate for Sub-Base - Grading III - 9.5 mm to 4.75 mm	Sub-Divn. HQ of Tripura	cum	₹ 4,413.70
M-207	Wire mesh	Sub-Divn. HQ of Tripura	kg	₹ 69.90
M-208	Wooden sleepers (2500 mm x 250 mm x 125 mm) (hire charges)	Near site	No/ hour	₹ 22.50
M-209	3/4 th to 1.0 ton Monkey with necessary chains, pully, and other accessories for handling and driving of wooden piles (hire charges)	Near site	day	₹ 3,280.00
M-210	1/2 ton Monkey with necessary chains, pully, and other accessories for handling and driving of wooden piles (hire charges)	Near site	day	₹ 2,566.00
M-211	Chains, pully, and other accessories for handling and lifting of wooden piles (hire charges)	Near site	day	₹ 2,085.00
M-212	Jhama Brick Aggregate 10 mm	At Kiln	cum	₹ 3,841.00
M-213	Jhama Brick Aggregate 20 mm	At Kiln	cum	₹ 3,917.00
M-214	Jhama Brick Aggregate 40 mm	At Kiln	cum	₹ 3,417.00
M-215	Jhama Brick Aggregate-Grading I - 53 mm to 0.075 mm	At Kiln	cum	₹ 3,369.30
M-216	Filter media (considering Jhama Brick metal)	At Kiln	cum	₹ 2,349.00
M-217	Well Graded Material for Sub-Base - Grading I 53 mm to 0.075 mm jhama brick aggregate	At Kiln	cum	₹ 3,369.30
M-218	Jhama Brick Aggragate Grading 2, 63 mm to 22.4 mm	At Kiln	cum	₹ 3,290.30
M-219	Jhama Brick Aggragate Grading 3, 53 mm to 11.2 mm	At Kiln	cum	₹ 3,329.80
M-220	Jhama Brick Aggragate 45 mm to 22.4 mm	At Kiln	cum	₹ 3,329.80
M-221	Jhama Brick Aggragate 22.4 mm to 2.36 mm	At Kiln	cum	₹ 3,407.50
M-222	Jhama Brick Aggragate 2.36 mm to 75 micron	At Kiln	cum	₹ 2,544.90
M-223	1 st class local wood piles (sal/nahar /nageswar) 150 mm dia	Near site	m	₹ 650.00
M-224	1 st class local wood piles (sal /nahar /nageswar) 250 mm to 300 mm dia	Near site	m	₹ 1,790.00
M-225	1 st class local wood piles (sal /nahar /nageswar) 200 mm to 250 mm dia	Near site	m	₹ 1,575.00
M-226	Sal wood - Beams	Near site	cum	₹ 78,000.00
M-227	Karai wood - Beams	Near site	cum	₹ 45,200.00
M-228	Sal wood - deckings, trackways, battens and planks for abutments & wing walls	Near site	cum	₹ 52,000.00
M-229	Karai wood - deckings, trackways, battens and planks for abutments & wing walls	Near site	cum	₹ 34,650.00
M-230	Sal wood - joist runner, wheel guards, rail post, struts, railings, bracings of piles	Near site	cum	₹ 50,800.00

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-231	Karai wood - joist runner, wheel guards, rail post, struts, railings, bracings of piles	Near site	cum	₹ 35,210.00
M-232	2 nd class local wood scantling (chamal/ garjan)	Near site	cum	₹ 31,000.00
M-233	3 rd class local wood scantling (soft wood)	Near site	cum	₹ 28,300.00
M-234	Sal Ballies 100 mm dia	Near site	m	₹ 350.00
M-235	3 rd class local wood piles 300 mm to 350 mm dia	Near site	m	₹ 1,510.00
M-236	3 rd class local wood piles 250 mm to 300 mm dia	Near site	m	₹ 1,020.00
M-237	3 rd class local wood piles 200 mm to 250 mm dia	Near site	m	₹ 730.00
M-238	3 rd class local wood Ballies 50 mm dia	At site	m	₹ 37.30
M-239	3 rd class local wood Ballies 100 mm dia	At site	m	₹ 49.50
M-240	3 rd class local wood Ballies 200 mm dia	At site	m	₹ 261.00
M-241	Credit for excavated rock found suitable for use	At site	cum	₹ 1,989.00
M-242	RCC Collar NP2 (1200 mm dia)	At Factory	each	₹ 1,348.00
M-243	RCC Collar NP2 (900 mm dia)	At Factory	each	₹ 1,019.00
M-244	RCC Collar NP2 (600 mm dia)	At Factory	each	₹ 556.00
M-245	RCC Collar NP2 (450 mm dia)	At Factory	each	₹ 378.00
M-246	RCC Collar NP2 (300 mm dia)	At Factory	each	₹ 153.00
M-247	RCC Collar NP2 (200 mm dia)	At Factory	each	₹ 101.00
M-248	Wire brush (with thick wire)	Sub-Divn. HQ of Tripura	each	₹ 23.00
M-249	Soft brush	Sub-Divn. HQ of Tripura	each	₹ 23.00
M-250	Galvanised carbon steel strips (60 mm wide 5 mm thick as per clause 3102.)	Sub-Divn. HQ of Tripura	m	₹ 164.00
M-251	Aluminium Strips (60 mm wide 5 mm thick as per clause 3102.)	Sub-Divn. HQ of Tripura	m	₹ 178.20
M-252	Stainless steel strips (60 mm wide 5 mm thick as per clause 3102.)	Sub-Divn. HQ of Tripura	m	₹ 268.10
M-253	Synthetic Geogrids as per clause 3102.8 and approved design and specifications.	Sub-Divn. HQ of Tripura	sqm	₹ 92.00
M-254	Interlocking C.C. paver block (60 mm thick, M-30)	At Factory	sqm	₹ 709.00
M-255	Interlocking C.C. paver block (80 mm thick, M-35)	At Factory	sqm	₹ 944.00
M-256	Interlocking C.C. paver block (60 mm thick, M-35)	At Factory	sqm	₹ 745.00
M-257	Precast C.C. Kerb Stone M - 25	At Factory	cum	₹ 8,580.00
M-258	Modified Bitumen Refinery produced CRMB - 55	Dharmanagar	t	₹ 63,879.00

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-259	Polymer Modified Bitumen PMB - 70	Dharmanagar	t	₹ 71,320.00
M-260	Over burn bricks (Picked Jhama)	At Kiln	nos	₹ 12.20
M-261	Jhama brick aggregate for WBM Grading - 1, 90 mm to 22.4 mm	At Kiln	cum	₹ 3,191.60
M-262	Welded steel wire fabric	Sub-Divn. HQ of Tripura	kg	₹ 69.90
M-263	Steel Wire Rope 40 mm	Sub-Divn. HQ of Tripura	kg	₹ 83.40
M-264	Steel Wire Rope 20 mm	Sub-Divn. HQ of Tripura	kg	₹ 83.40
M-265	Steel circular hollow pole of standard specification for street lighting to mount light at 9 m height above road level	Sub-Divn. HQ of Tripura	nos	₹ 10,854.00
M-266	Sodium vapour lamp	Sub-Divn. HQ of Tripura	nos	₹ 540.00
M-267	Steel circular hollow pole of standard specification for street lighting to mount light at 5 m height above deck level	Sub-Divn. HQ of Tripura	nos	₹ 7,510.00
M-268	Aluminium alloy/galvanised steel	Sub-Divn. HQ of Tripura	t	₹ 63,000.00
M-269	Scrap tyres of size 900 x 20	Sub-Divn. HQ of Tripura	nos	₹ 310.00
M-270	Hedge plants	At Site	nos	₹ 25.00
M-271	Sapling 2 m high 25 mm dia	At Site	nos	₹ 26.00
M-272	Bearing (Cast steel rocker bearing assembly of 250 tonne)	Sub-Divn. HQ of Tripura	nos	₹ 1,15,000.00
M-273	Bearing (Forged steel roller bearing of 250 tonne)	Sub-Divn. HQ of Tripura	nos	₹ 1,01,000.00
M-274	Bearing (PTFE sliding plate bearing assembly of 80 tonnes)	Sub-Divn. HQ of Tripura	nos	₹ 20,585.00
M-275	Bearing (Supply of sliding plate bearing of 80 tonne)	Sub-Divn. HQ of Tripura	nos	₹ 18,430.00
M-276	Solar Powered Road Markers made of aluminium alloy and poly carbonate material (Solar studs)	Sub-Divn. HQ of Tripura	nos	₹ 786.00
M-277	Solvent (for bitumen)	Sub-Divn. HQ of Tripura	kg	₹ 34.50
M-278	ABS /ASA /HIPS body road stud	Sub-Divn. HQ of Tripura	nos	₹ 99.00
M-279	Geonets	Sub-Divn. HQ of Tripura	sqm	₹ 69.00
M-280	Geomembrane	Sub-Divn. HQ of Tripura	sqm	₹ 69.00
M-281	Geotextile	Sub-Divn. HQ of Tripura	sqm	₹ 58.50
M-282	Perforated geosynthetic pipe 150 mm dia	Sub-Divn. HQ of Tripura	m	₹ 53.65
M-283	Geotextile filter fabric	Sub-Divn. HQ of Tripura	sqm	₹ 58.50

Sr. No.	Description	Place of origin	Unit	Rates as on or just before 01.04.2023
M-284	Paving Fabric	Sub-Divn. HQ of Tripura	sqm	₹ 52.00
M-285	ABS Delineator	Sub-Divn. HQ of Tripura	nos	₹ 336.00
M-286	uPVC pipe 90 mm OD	Sub-Divn. HQ of Tripura	m	₹ 142.00
M-287	uPVC pipe 75 mm OD	Sub-Divn. HQ of Tripura	m	₹ 102.00
M-288	Instant Road Repair Compound (INSSTAPATTCH/ SHELMAC - PR/ SHALIPATCH or Equivalent)	Sub-Divn. HQ of Tripura	kg	₹ 21.10
M-289	Nano Acrylic Co-polymer (Zycobond)	Guwahati	kg	₹ 152.50
M-290	Organosilane Nanotechnology (Nanotac)	Guwahati	kg	₹ 1,017.00
M-291	Organosilane Nanotechnology (Terraprime)	Guwahati	kg	₹ 1,017.00
M-292	Organosilane Nanotechnology (Terrasil)	Guwahati	kg	₹ 466.10
M-293	Organosilane Nanotechnology (Zycotherm)	Guwahati	kg	₹ 1,144.00
M-294	Dry hydrated lime (factory made)	Sub-Divn. HQ of Tripura	quintal	₹ 354.00
M-295	Waste plastic additive	Sub-Divn. HQ of Tripura	t	₹ 38,100.00
M-296	Solar Powered Road Delineator	Sub-Divn. HQ of Tripura	each	₹ 475.00
M-297	Convex Mirror 32 inches - 800 MM Dia	Sub-Divn. HQ of Tripura	each	₹ 2,422.00
M-298	Retro Reflective Tapes of red, white & yellow colour (45mx72mm)	Sub-Divn. HQ of Tripura	each roll	₹ 1,244.50
M-299	Flexible median marker with ABS body material of standrd size	Sub-Divn. HQ of Tripura	each	₹ 95.00
M-300	Epoxy adhesive	Sub-Divn. HQ of Tripura	kg	₹ 171.60
M-301	Connectors/ Staples	Sub-Divn. HQ of Tripura	each	₹ 6.95
M-302	Fly Ash	Bongaigaon	t	₹ 20.40
M-303	Brick 2nd class	At kiln	nos	₹ 10.20
M-304	Polymer braids	Sub-Divn. HQ of Tripura	m	₹ 13.20
M-305	Spring Posts or Rebound able Delineators 450 mm	Sub-Divn. HQ of Tripura	nos	₹ 180.00
M-306	Spring Posts or Rebound able Delineators 700 mm	Sub-Divn. HQ of Tripura	nos	₹ 270.00

- Note :**
1. These rates are exclusive of contractor's profit, over heads, loading, unloading, stacking, haulage and applicable GST.
 2. Basic rate of different types of Bitumen and emulsion are as on 01.06.2023.

PART - I

Roads and Bridge works for Highways and MDRs

Chapter - 1

Loading, Unloading, Carriage, Crushing / Breaking of Materials

(a) Preamble

- 1. The rate analysis of loading and unloading of various items include stacking.*
- 2. The rate analysis of loading and unloading has been given both by manual and mechanical means. Means of loading / unloading appropriate to the work and site is to be adopted.*
- 3. The rate analysis for haulage of materials has been made in terms of tonne - kilometer (t.km) for ease of adoption depending upon the lead in km and load in tonnes.*
- 4. The cost for carriage will vary depending upon the riding surface of the road. Provision has accordingly been made considering surfaced roads, unsurfaced gravel roads and katcha tracks.*
- 5. Analysis of carriage of materials is exclusive of the loading, unloading and stacking and this has to be added as applicable.*
- 6. Carriage of materials if done by boats shall be Paid @ 50% extra above the rates as given for carriage of materials by road.*
- 7. The Provision of tipper has been made in hours where lead is known like disposal of materials upto 1000 m. In case where the lead is variable and more than 1000 m, the haulage rates are to be added as per particular site conditions.*

Chapter 1 : Loading, Unloading, Carriage, Crushing / Breaking of Materials

Sl. No.	Ref. to MORT&H SQec.	DescrIQtion	Unit	Rate
1.1		Loading and unloading of Stone Boulder, stone aggregate, Brick Aggregate, Kankar, earth, Crushed slag, Stone for masonry Work by Mechanical Means including a lead upto 30m.	cum	₹ 121.10
1.2		Loading and unloading of Stone Boulder, stone aggregate, Brick Aggregate, Kankar, earth, Crushed slag, Stone for masonry Work by Manual Means including a lead upto 30m.	cum	₹ 149.90
1.3		Loading, Unloading of Cement or steel by Manual Means and stacking	t	₹ 232.30
1.4		Haulage excluding Loading & Unloading		
		(i) Surfaced road	t.km.	₹ 4.20
		(ii) Unsurfaced Gravel Road	t.km.	₹ 5.30
		(iii) Katcha Track and Track in River Bed / Nallah Bed and Choe Bed	t.km.	₹ 8.80
1.5		Hand broken stone aggregate 63 mm nominal size Supply of quarried stone and hand breaking into coarse aggregate to 63 mm nominal size (passing 80 mm and retained on 50 mm) and stacking as directed.	cum	₹ 5,264.30
1.6		Crushed stone aggregates of 13.2 mm nominal size Supply of Stone boulders and crushing in an integrated stone crushing unit of 200 t/h capacity comprising of primary and secondary crushing units, conveyor belt and vibrating screens to obtain stone aggregates 13.2 mm nominal size.	cum	₹ 5,328.10
1.7		Crushed stone aggregates of 20 mm nominal size Supply of Stone boulders and crushing in an integrated stone crushing unit of 200 t/h capacity comprising of primary and secondary crushing units, conveyor belt and vibrating screens to obtain stone aggregates of 20 mm nominal size.	cum	₹ 4,520.30
1.8		Crushed stone aggregates of 40 mm nominal size Supply of Stone boulders and crushing in an integrated stone crushing unit of 200 t/h capacity comprising of primary and secondary crushing units, conveyor belt and vibrating screens to obtain stone aggregates of 40 mm nominal size.	cum	₹ 3,813.80

Chapter - 2

Site Clearance

(a) Preamble

1. *Unless otherwise stated, the rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and upto a lead of 1000 m.*
2. *The rates include Tools & Plants (T&P) and scaffolding required for items of dismantling.*
3. *Carriage of dismantled materials, bushes, branches of tree, etc. has been catered with a tractor-trolley of 3 tonnes capacity with manual loading and unloading @ 2 trips per hour within a lead of 1000 m. This will be economical for such works as compared to tipper.*
4. *Where only grass / wild growth is met with, rate of item No.2.2, i.e., clearing grass and removal of rubbish can be applied.*
5. *The dismantling of structures has been catered both by manual and mechanical means. The Engineer can use his discretion depending upon quantum of work and particular site conditions.*
6. *Rate analysis for removing of stumps and roots has also been provided separately.*
7. *The dismantling of Hume pipes has been catered manually as pipes can easily be rolled by men to a suitable stacking place within the right of way.*
8. *For dismantling of structures, which remain submerged in water, the cost may be enhanced by 50 per cent. If site condition warrant lowering of water level to facilitate dismantling, the cost may be enhanced by additional 25 per cent.*
9. *Dismantling of utilities like water supply lines, electric and telephone lines is required to be done under the supervision of concerned departments with prior information to the users.*
10. *In certain items of dismantling, like, pipe culverts, utilities, etc., excavation in earth and dismantling of masonry works is not included in this analysis. These items are required to be priced separately based on actual quantities at site and nature of work.*
11. *The dismantled materials should be examined and a realistic assessment and provision should be made after due process for the salvage value for such materials, can be utilised for works or auctioned.*
12. *In case where lead for disposal is more than 1000 m, extra cost of carriage is required to be added based on tonne-kilometerage as per Chapter 1.*
13. *All minor Tools & Plants (T&P) items required have been considered to have been included in overhead charges.*

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
2.1	201	Cutting of Trees, including Cutting of Trunks , Branches and Removal of Stumps Cutting of trees, including cutting of trunks , branches and removal of stumps & roots, refilling, compaction of backfilling and stacking of serviceable material by manual means with all lifts and lead upto 1000 m as per MoRT&H Technical Specification Clause 201.		
	(I)	Girth above 300 mm to 600 mm	each	₹ 378.80
	(II)	Girth above 600 mm to 900 mm	each	₹ 629.70
	(III)	Girth above 900 mm to 1800 mm	each	₹ 1,294.90
	(IV)	Girth above 1800 mm	each	₹ 2,515.10
2.2	201	Clearing Grass and Removal of Rubbish Clearing grass and removal of rubbish up to a distance of 30 m outside the periphery of the area as per MoRT&H Technical Specification Clause 201.	hectare	₹ 28,638.70
2.3	201	Clearing and Grubbing Road Land Clearing and grubbing road land including uprooting wild vegetation, grass, bushes, shrubs, saplings and trees of girth upto 300 mm, removal of stumps of such trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, upto a lead of 1000 m including removal and disposal of top organic soil not exceeding 150 mm in thickness as per MoRT&H Technical Specification clause 201.		
	(I)	By Manual Means		
	(A)	In area of light jungle	hectare	₹ 86,289.20
	(B)	In area of thorny jungle	hectare	₹ 1,15,301.17
	(II)	By Mechanical Means		
	(A)	In area of non-thorny jungle	hectare	₹ 40,047.30
	(B)	In area of thorny jungle	hectare	₹ 48,856.10
2.4	202	Dismantling of Structures Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRT&H Technical Specification Clause 202.		
	(i)	Dismantling Lime / cement Concrete		

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(I) By Manual Means		
		A) Lime concrete / cement Concrete grade M-10 and below	cum	₹ 538.80
		B) Cement Concrete M-15 & M-20	cum	₹ 653.40
		C) Prestressed / Reinforced Cement Concrete grade M-20 & above	cum	₹ 1,824.00
		(II) By Mechanical Means		
		A) Cement Concrete grade M-15 & M-20	cum	₹ 606.60
		B) Prestressed / Reinforced Cement Concrete grade M-20 & above	cum	₹ 1,121.60
		(ii) Dismantling brick / tile work		
		A) In lime mortar	cum	₹ 309.70
		B) In cement mortar	cum	₹ 424.30
		C) Mud Mortar	cum	₹ 263.90
		D) Dry Brick Pitching or Brick Soling	cum	₹ 241.00
		(iii) Dismantling stone masonry		
		A) Rubble Stone Masonry in Lime Mortar	cum	₹ 355.60
		B) Rubble Stone Masonry in Cement Mortar	cum	₹ 424.30
		C) Rubble Stone Masonry in Mud Mortar	cum	₹ 309.70
		D) Dry Rubble Masonry	cum	₹ 286.80
		E) Dismantling Stone Pitching/Dry Stone Spalls	cum	₹ 263.90
		F) Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials	cum	₹ 309.70
		(iv) Dismantling Wood Work Wrought and Fixed in Frames of Trusses upto a height of 5 m above Plinth Level	cum	₹ 836.10
		(v) Dismantling Steel Work in all Types of Sections upto a height of 5 m above Plinth Level excluding Cutting of rivet		
		A) Including dismembering	t	₹ 2,224.20
		B) Excluding dismembering	t	₹ 1,584.10
		C) Extra over Items v.(A) and v.(B) for cutting rivets	each	₹ 16.50

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(vi) Scraping of bricks dismantled from brick work including stacking		
		(A) In Lime/Cement Mortar	1000 nos	₹ 2,004.70
		(B) In Mud Mortar	1000 nos	₹ 716.00
		(vii) Scraping of Stone obtained from Dismantled Stone Masonry		
		(A) In Cement or Lime Mortar	cum	₹ 804.10
		(B) In Mud Mortar	cum	₹ 170.70
		(viii) Scraping Plaster in Lime or Cement Mortar from Brick / Stone Masonry	sqm	₹ 22.90
		(ix) Removing all types of Hume pipes and stacking within a lead of 1000 m excluding Earthwork and Dismantling of Masonry Works		
		(A) Upto 600 mm dia Hume pipe	m	₹ 297.40
		(B) Above 600 mm to 900 mm dia Hume pipe	m	₹ 402.00
		(C) Above 900 mm dia Hume pipe	m	₹ 688.40

- Note : 1. The excavation of earth, dismantling of stone masonry work in head walls and protection works is not included which is to be measured and paid separately.
2. Credit for retrieved stone from masonry work may be taken as per actual availability.

2.5 202 Dismantling of Flexible Pavements

Dismantling of flexible pavements and disposal of dismantled materials with all lifts and upto a lead of 100 m, stacking serviceable materials and unserviceable materials separately as per MoRT&H Technical Specification Clause 202.

(I) By Manual Means

(A) Bituminous Courses	cum	₹ 1,001.00
(B) Granular Courses	cum	₹ 696.00

(II) By Mechanical Means

(A) Bituminous Courses	cum	₹ 318.60
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2.6 202 Dismantling of Cement Concrete Pavements as per MoRT&H Technical Specification Clause 202

Dismantling of cement concrete pavements by mechanical means using pneumatic tools, breaking to pieces not exceeding 0.02 cum in volume and stock piling at designated locations and disposal of dismantled materials with all lifts and upto a lead of 1000 m, stacking serviceable materials and unserviceable materials separately as per MoRT&H Technical Specification Clause 202.

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(A) upto full depth of concrete	cum	₹ 1,349.00
		(B) upto partial depth of concrete	cum	₹ 1,459.90
2.7	202	Dismantling of Guard Rails		
		Dismantling of Guard rails by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m, stacking serviceable materials and unserviceable materials separately as per MoRT&H Technical Specification Clause 202.	m	₹ 104.60
2.8	202	Dismantling of Kerb Stones		
		Dismantling of Kerb Stones by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m as per MoRT&H Technical Specification Clause 202.	m	₹ 16.10
2.9	202	Dismantling of Kerb Stone Channels		
		Dismantling of Kerb Stone channels by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m as per MoRT&H Technical Specification Clause 202.	m	₹ 24.40
2.10	202	Dismantling of Kilometre Stones		
		Dismantling of Kilometre Stones including cutting of earth, and disposal of dismantled material with all lifts and upto a lead of 1000 m and backfilling of pit as per MoRT&H Technical Specification Clause 202.		
		(A) 5th Km Stone	each	₹ 485.60
		(B) Ordinary Km Stone	each	₹ 323.70
		(C) 200 m Stone	each	₹ 64.70
2.11	202	Dismantling of Fencing		
		Dismantling of barbed wire fencing/ wire mesh fencing including posts, foundation concrete, backfilling of pit by manual means including disposal of dismantled material with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately as per MoRT&H Technical Specification Clause 202.	m	₹ 76.60
2.12	202	Dismantling of CI Water Pipe Line		
		Dismantling of CI water pipe line upto 600 mm dia including disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately under supervision of the concerned department but excluding earth excavation and dismantling of masonry works as per MoRT&H Technical Specification Clause 202.	m	₹ 186.00

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
2.13	202	Removal of Cement Concrete Pipe of Sewer Gutter Removal of Cement Concrete Pipe of Sewer Gutter upto 1500 mm dia under the supervision of the concerned department including disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately but excluding earth excavation and dismantling of masonry works as per MoRT&H Technical Specification Clause 202.	m	₹ 256.50
2.14	202	Removal of Telephone / Electric Poles and Lines Removal of telephone/ electric poles with wires including excavation and dismantling of foundation concrete and lines under the supervision of concerned department, disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately as per MoRT&H Technical Specification Clause 202.	each	₹ 255.70

Chapter - 3

Earthwork, Erosion Control and Drainage

(a) Preamble

1. *The rates have been analysed using mechanical means. Manual means for certain items have also been provided which can be used for areas inaccessible to machines and also for small jobs.*
2. *In the rate analysis of earthwork, compacted volume of earth has been considered.*
3. *Cutting of earth by dozer has been proposed where the earth can be utilised for filling for embankment within a lead upto 100 m.*
4. *Where lead for transporting of earth is more than 100 m, excavator and tipper have been provided.*
5. *The rate caters for disposal of unsuitable soil only upto 1 km. The cost of transportation beyond the initial lead of 1 km will be paid separately based on tonne-kilometerage.*
6. *The replacement of unsuitable soil shall be provided separately in the estimate. The rate analysis for removal of unsuitable soil does not provide for replacement by suitable soil.*
7. *Excavation in hard rock (requiring blasting / blasting prohibited / controlled blasting) has been considered in this SOR, though normally this type of hard rock is not generally found in Tripura.*
8. *For narrow and restricted areas, plate compactor has been proposed for compaction to achieve the desired density.*
9. *In case excavated rock is found suitable for incorporation in works, suitable credit for the available rock shall be given.*
10. *For excavation of structures refer to Chapter 12 dealing with items of foundation.*
11. *The possibility of using the blasted rock fragments for backfilling behind structures of backfilling of foundation pits or filling in medians / separators or use in service road shall be examined before proposing disposal of excavated rock.*
12. *Any work involved for crossing of water courses for irrigation purpose etc., will be priced under respective items like excavation, grubbing, clearing etc., for which rate analysis have separately been made.*
13. *Earth excavated from drains can be used in roadway berms. Hence carriage for disposal of same is not provided.*
14. *In case of rock fill embankment, it is assumed that material is available at site from rock cutting.*
15. *For widening of existing pavement less than 1.8 m, the rates for all items of this Chapter may be increased by 30 percent.*
16. *Different type of pucca road side drains with PCC M10 (using jhama aggregate) alongwith drawing may be taken from Chapter-3 for the ODR & Rural roads.*

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
3.1	300	Excavation in soil by manual means		
	(i)	Excavation in Roadway cutting in soil by using manual means including loading in truck and carrying of cut earth to embankment site with all lifts and lead upto 1000 metre as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 263.90
	(ii)	Excavation in Roadway cutting in soil by using manual means and carrying of cut earth to embankment site with all lifts and lead upto 50 metre as per MoR&TH Technical Specification clauses of section 300.	cum	₹ 214.80
3.2	300	Excavation in ordinary rock by manual means		
	(i)	Excavation in Roadway cutting in ordinary rock by using manual means including loading in truck and carrying of cut earth to embankment site with all lifts and lead upto 1000 metre as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 383.20
	(ii)	Excavation in Roadway cutting in ordinary rock by using manual means and carrying of cut earth to embankment site with all lifts and lead upto 50 metre as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 334.10
3.3	300	Excavation in Soil with Dozer with lead upto 100 metres.		
		Excavation for roadway in soil by mechanical means with Dozer including cutting and pushing the earth to site of embankment upto a distance of 100 m (average lead of 50 metres), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 131.00
3.4	300	Excavation in Ordinary Rock with Dozer with lead upto 100 metres		
		Excavation for roadway in ordinary rock by mechanical means with Dozer including cutting and pushing the earth to site of embankment upto a distance of 100 m (average lead of 50 metres), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 223.60
3.5	300	Excavation in Hard Rock (requiring blasting) with disposal upto 1000 metres.		
		Excavation for roadway in hard rock (requiring blasting) by drilling, blasting and breaking, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections loading and disposal of cut earth with all lifts and leads upto 1000 metres as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 1,745.50

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
<i>Note : 1 The quality and availability of rock shall be checked before affording credit.</i>				
<i>2 In case some rock is issued to the contractor at site, the item of carriage shall be reduced/restricted to that extent.</i>				
<i>3 Credit for useful materials received as per site conditions shall be taken into account. This has been assumed to be 50 per cent for the purpose of analysis.</i>				
3.6	300	Excavation in Soil using Hydraulic Excavator CK 90 and Tippers with Disposal upto 1000 metres. Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections and transporting to the embankment location with all lifts and lead upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 58.10
3.7	300	Excavation in Ordinary Rock using Hydraulic Excavator CK-90 and Tippers with Disposal upto 1000 metres. Excavation for roadwork in ordinary rock with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections and transporting to the embankment location with all lifts and lead upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 76.20
3.8	300	Excavation in hard rock (blasting prohibited) using Hydraulic Excavator CK 90 and Tippers with disposal upto 1000 m. Excavation for roadwork in hard rock (blasting prohibited) with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections and transporting to the embankment location with all lifts and lead upto 1000 m as per MoRT&H Technical Specification clauses of section 300.		
		A. By Mechanical Means	cum	₹ 1,970.50
		B. By Manual Means	cum	₹ 2,970.50
<i>Note :</i>				
<i>1 The quality and availability of rock shall be checked before affording credit.</i>				
<i>2 In case some rock is issued to the contractor at site, the item of carriage shall be restricted / reduced to that extent.</i>				
<i>3 Being small quantity, manual loading will be economical in this case and has been provided accordingly.</i>				

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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4 Credit for useful materials received at per site conditions shall be taken into account. This has been assumed to be 50 per cent for the purpose of analysis.

- 3.9 300 Excavation in Hard Rock (controlled blasting) with disposal upto 1000 metres.

Excavation for roadway in hard rock with controlled blasting by drilling, blasting and breaking, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections, loading and disposal of cut earth with all lifts and leads upto 1000 m as per MoRT&H Technical Specification clauses of section 300. cum

₹ 1,954.90

Note :

1 The quality and availability of rock shall be checked before affording credit.

2 In case some rock is issued to the contractor at site, the item of carriage shall be reduced / restricted to that extent.

3 Credit for useful materials received at per site conditions shall be taken into account. This has been assumed to be 50 per cent for the purpose of analysis.

- 3.10 300 Excavation in Marshy Soil

Excavation for roadway in marshy soil with hydraulic excavator 0.9 cum bucket capacity including cutting and loading in tippers and disposal with all lifts and lead upto 1000 m trimming of bottom and side slopes in accordance with requirements of lines, grades and cross-sections as per MoRT&H Technical Specification clauses of section 300.

cum

₹ 65.60

- 3.11 300 Removal of Unsuitable Soil with Disposal upto 1000 m

Removal of unsuitable soil including excavation, loading and disposal upto 1000 m lead with all lifts but excluding compaction ground supporting embankment/ subgrade, replacement by suitable soil, which shall be paid separately as per MoRT&H Technical Specification clauses of section 300.

cum

₹ 58.70

Note : This item does not include replacement of unsuitable soil by suitable soil. Replacement, where required, is to be provided and paid separately.

- 3.12 300 Presplitting of Rock excavation slopes

Carrying out excavation in hard rock to achieve a specified slope of the rock face by controlled use of explosives and blasting accessories in properly aligned and spaced drill holes, collection of the excavated rock by a 80 HP dozer, loading in tipper by a front end loader and disposal of the material with all lifts and leads upto 1000 m as per MoRT&H Technical Specification clauses of section 300.

sqm

₹ 200.70

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
3.13	300	Excavation for structures		
		Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work as per MoRT&H Technical Specification clauses of section 300.		
		i. Ordinary soil		
		A. By manual means (upto 3 m depth)	cum	₹ 458.20
		<i>Note</i> Cost of dewatering may be added where required upto 10 per cent of labour cost. Assessment for dewatering shall be made as per site conditions.		
		B. By mechanical means (upto 3 m depth)	cum	₹ 53.10
		<i>Note</i> Cost of dewatering upto 5 per cent of labour & machinery cost may be added, where required. Assessment for dewatering shall be made as per site conditions.		
		ii. Ordinary Rock (not requiring blasting)		
		A. By manual means (upto 3 m depth)	cum	₹ 572.80
		<i>Note</i> Cost of dewatering may be added where required upto 10 per cent of labour cost Assessment for dewatering shall be made as per site conditions.		
		B. By mechanical means (upto 3 m depth)	cum	₹ 68.50
		<i>Note</i> Cost of dewatering upto 5 per cent of labour & machinery cost may be added, where required. Assessment for dewatering shall be made as per site conditions.		
		iii. Hard Rock (requiring blasting)		
		A. By manual means (upto 3 m depth)	cum	₹ 903.90
		<i>Note</i> Cost of dewatering may be added where required upto 10 per cent of labour cost. Assessment for dewatering shall be made as per site conditions.		
		iv. Hard Rock (blasting prohibited)		
		A. By manual means (upto 3 m depth)	cum	₹ 617.40
		<i>Note</i> Cost of dewatering may be added where required upto 10 per cent of labour & machinery cost. Assessment for dewatering shall be made as per site conditions.		
		v. Marshy soil		
		A. By manual means (upto 3 m depth)	cum	₹ 736.20
		<i>Note</i> 1 Cost of dewatering @ 30 per cent of (a), may be added, where required Assessment for dewatering shall be made as per site conditions.		
		2 Shoring & strutting 20 per cent of (a), where required may be added.		

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		3 <i>It is assumed that Marshy Soil will be available upto 3 m depth only. For deeper excavation below 3 m depth, refer respective items as per site condition.</i>		
		B. By mechanical means (upto 3 m depth)	cum	₹ 234.20
	<i>Note</i>	1 <i>Cost of dewatering @ 20 per cent of labour & machinery cost may be added, where required.</i>		
		2 <i>Shoring & strutting @ 10 per cent of labour & machinery cost, where required may be added.</i>		
		3 <i>It is assumed that Marshy Soil will be available upto 3 m depth only. For deeper excavation below 3 m depth, refer analysis in item (i) to (iv) for ordinary soil</i>		
3.14	300	Scarifying Existing Granular Surface to a Depth of 50 mm by manual means Scarifying Existing Granular Surface by manual means to a Depth of 50 mm and disposal of scarified material with all lifts and leads upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	sqm	₹ 34.90
3.15	300	Scarifying Existing Bituminous Surface to a Depth of 150 mm by Mechanical Means Scarifying Existing bituminous Road Surface by mechanical means to a Depth of 150 mm and disposal of scarified material with all lifts and leads upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	sqm	₹ 5.80
3.16	300	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with all lifts, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 226.10
3.17	300	Construction of Embankment with Material deposited from Roadway Cutting Construction of Embankment with approved materials deposited at site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300.2 and as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 142.50
3.18	300	Construction of Subgrade and Earthen Shoulders Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts and leads, transporting to site , spreading, grading to required slope and compacted to meet requirement of Table 300.2 as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 225.90

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
3.19	300	Compacting Original Ground		
		(i) Compacting original ground supporting subgrade		
		Loosening of the ground upto a level of 500 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.2 for subgrade construction as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 86.70
		(ii) Compacting original ground supporting embankment		
		Loosening, Levelling and Compacting original ground supporting embankment to facilitate placement of first layer of embankment, scarified to a depth of 150 mm, mixed with water at OMC and then compacted by rolling so as to achieve minimum dry density as given in Tables 300.2 for embankment construction as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 42.50
3.20	300	Stripping, Storing and relaying of Top soil		
		Stripping, storing of top soil by road side at 15 m interval and re-application on embankment slopes, cut slopes and other areas in localities where the available embankment material is not conducive to plant growth as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 323.80
3.21	300	Stripping, Storing and Relaying Top Soil from Borrow Areas in Agricultural Fields		
		Stripping of top soil from borrow areas located in agriculture fields, storing at a suitable place, spreading and relaying after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels to the satisfaction of the farmer/land owners as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 78.60
3.22	300	Turfing with Sods		
		Furnishing and laying of the live sods of perennial turf forming grass on embankment slope , verges or other locations shown on the drawing or as directed by the Engineer including preparation of ground, fetching of sods and watering as per MoRT&H Technical Specification clauses of section 300.	sqm	₹ 51.10
3.23	300	Seeding and Mulching		
		Preparation of seed bed on previously laid top soil, furnishing and placing of seeds, fertilizer, mulching material, applying bituminous emulsion at the rate of 0.23 litres per sqm and laying and fixing jute netting, including watering for 3 months all as per MoRT&H Technical Specification clauses of section 300.	sqm	₹ 154.80

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
3.24	300	Surface Drains in Ordinary Soil		
		Construction of unlined surface drains of average cross-sectional area 0.4 sqm in ordinary soil to specified lines, grades, levels and dimensions as per MoRT&H Technical Specification clauses of section 300. Excavated material to be used in embankment with a lift upto 3 m and lead of 50 m (average lead 25 m).		
	(A)	Mechanical Means	m	₹ 76.80
	(B)	Manual Means	m	₹ 114.60
	Note:	Where lining of drain is provided, quantity shall be worked out based on approved design and drawing and priced on rate of cement concrete of approved grade or stone/brick masonry as the case may be.		
3.25	300	Surface Drains in Ordinary Rock		
		Construction of unlined surface drain of average cross-sectional area 0.4 sqm in ordinary rock to specified lines, grades, levels and dimensions as per approved design and MoRT&H Technical Specification clauses of section 300. Excavated material to be used in embankment at site.		
	(A)	Mechanical Means	m	₹ 155.50
	(B)	Manual Means	m	₹ 171.80
3.26	300	Surface Drains in Hard Rock		
		Rate per metre may be worked out based on quantity of hard rock as per design. For rate of hard rock cutting, refer relevant item in this chapter.		
3.27	300	Sub-Surface Drains with perforated pipe		
		Construction of subsurface drain with perforated pipe of 100 mm internal diameter of metal/ asbestos cement/ cement concrete/ PVC, closely jointed, perforations ranging from 3 mm to 6 mm depending upon size of material surrounding the pipe, with 150 mm bedding below the pipe and 300 mm cushion above the pipe, cross section of excavation 450 x 550 mm as per MoRT&H Technical Specification clauses of section 300. Excavated material to be utilised in roadway at site.	m	₹ 1,690.80
3.28	300	Aggregate Sub-Surface Drains		
		Construction of aggregate sub-surface drain 300 mm x 450 mm with aggregates conforming to table 300.4, as per MoRT&H Technical Specification clauses of section 300. (excavated material to be utilised in roadway)	m	₹ 790.90
3.29		Underground Drain at Edge of Pavement		

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Construction of an underground drain 1 m x 1 m (inside dimensions) lined with RCC M-20, 100 mm thick and covered with RCC slab 100 mm in thickness on urban roads as per MoRT&H Technical Specification.	m	₹ 6,724.60
3.30	300	Preparation and surface treatment of formation Preparation and surface treatment of formation by removing mud and slurry, watering to the extent needed to maintain the desired moisture content, trimming to the required line, grade, profile and rolling with 8-10 tonne smooth wheeled roller, complete as per MoRT&H Technical Specification clauses of section 300.	sqm	₹ 2.90
3.31	300	Construction of rock fill embankment Construction of rock fill embankment with broken hard rock fragments of size not exceeding 300 mm laid in layers not exceeding 500 mm thick including filling of surface voids with stone spalls, blinding top layer with granular material, rolled with vibratory road roller, all complete as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 78.10
EARTHWORK IN HILL ROADS				
3.32	300	Excavation in soil in hilly area by mechanical means (A) for disposal upto 1000 m Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 157.30
		(B) for disposal in the valley side. Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts in the barren valley side as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 99.50
3.33	300	Excavation in ordinary rock (not requiring blasting) in hilly area by mechanical means (A) for disposal upto 1000 m Excavation in ordinary rock (not requiring blasting) in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 240.30
		(B) for disposal in the valley side.		

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Excavation in ordinary rock (not requiring blasting) in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts in the barren valley side as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 158.90
3.34	300	Excavation in Hilly Area in hard rock (requiring blasting) with disposal upto 1000 m.		
		Excavation for roadway in Hilly Area in hard rock (requiring blasting) by drilling, blasting and breaking, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections loading and disposal of cut earth with all lifts and leads upto 1000 m as per MoRT&H Technical Specification clauses of section 300.	cum	₹ 335.30
3.35		<i>Work in Urban Roads</i>		
		<i>The cost of earth work in urban roads in habited area will be comparatively higher due to following reasons:</i>		
		a) <i>There is mixed traffic on urban roads like slow moving hand and animal driven carts, rickshaws, cycles, two / three wheeler apart from the usual vehicular traffic resulting into traffic jams. This causes loss of working time which may be in the range of 10 -15 per cent.</i>		
		b) <i>There is considerable disruption of traffic adversely affecting the efficiency of the working parties including machines due to congestion caused by pedestrian traffic, local road side vendors, parking of vehicles by the road side, encroachments by the shopkeepers and local shops who make use of the berms of the road in front of these shops and unauthorised conversion of road berms into mini local market The output of manpower and machines is substantially reduced due to factors mentioned above.</i>		
		c) <i>Cost of living in urban areas is comparatively more resulting into higher wages.</i>		
		d) <i>At times, work is executed during night time due to heavy traffic during day time. This involves extra expenditure by way of making arrangement for lighting and special transport for working parties due to odd hour.</i>		
		<i>In the light of above, the authorities engaged in preparing the cost estimates may exercise their judgment and cater for the additional cost to the extent of 2 to 3 per cent, keeping in view the severity of factors mentioned above. Supporting details for the extra cost based on the actual conditions in specific cases will have to give in justification.</i>		
3.36		Construction of Embankment with Flyash available from coal or lignite burning Thermal Plants as waste material.		

Chapter - 3 : Earth work, Erosion Control and Drainage

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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Construction of embankment with Flyash conforming to table 1 of IRC: SP: 58 - 2001 obtained from coal or lignite burning thermal power stations as waste material, spread and compacted in layer of 200 mm thickness each at OMC, all as specified in IRC: SP: 58-2001 and as per approved plans with all lifts and carriage upto 1000 m.

cum

₹ 172.30

- Note*
- 1 *As flyash is available free of cost as waste material from Thermal Plants, cost of material has not been added.*
 - 2 *The earth cover on sides and intermediate layers of earth sandwiching the flyash have not been included in this analysis. The same are required to be provided as per approved design and priced separately as embankment construction.*

Chapter - 4

Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

(a) Preamble

1. *Quantities of materials provided are approximate and are meant for the purpose of estimating only. Actual quantities shall be as per mix design.*
2. *For construction of sub-base , two alternatives as under have been provided.*
 - a. *Mix in place method.*
 - b. *Plant mix method.*
3. *Plant mix method has not been provided in the MoRT&H specification. It is actually being adopted by some contractors who are holding the mixing plants to get better quality of mix and better progress.*
4. *In the case of improvement of subgrade with lime stabilisation, soil is assumed to be available at the site and has not been provided for. Only lime has been catered. In the case of lime stabilisation of sub-base, soil has been provided to form the sub-base.*
5. *In the case of medians, separators and footpath, plate compactor has been catered for compaction due to restricted space.*
6. *It has been assumed in the case of crushed cement concrete sub-base/base that during the process of dismantling, 25% of aggregates will get segregated and only the remaining will have to be broken/crushed from dismantled concrete slab portions. Transportation of materials upto 1000 m has been catered from place of dismantling to work site.*
7. *Separate rate of penetration coat over top layer of crushed cement concrete base has been provided, as this item is optional.*
8. *While providing the rates of items in the cost estimate of DPR, detailed local investigation should be made keeping in view the location of crushing plants, brick kilns, local quarries and lead involved.*
9. *The rate analysis for crushing of aggregates has also been included in Chapter-1. The cost of procured aggregates and crushed aggregates by own crusher has been compared and the economic alternative adopted.*
10. *The quantities considered in the output are the compacted quantities. The quantities of aggregates provided in the rate analysis under the head material are the compacted quantities.*
11. *The following items has not been considered due to non availability of such materials in Tripura.*
 - a. *WBM with crushable screenings*
 - b. *Granular sub base with locally available materials such as Kankar, laterite, Dhandla.*
 - c. *WBM with crushed slag*
 - d. *Sub-base course using crushed slag*

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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4.1 401 Granular Sub-base with Well Graded Material (Table 400.1)

(A) By Mix in Place Method

Construction of granular sub-base by providing well graded material spreading in uniform layers 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 as per MoRT&H Technical Specification Clause 401.

(i)	For Grading I Material	cum	₹ 6,433.50
(ii)	For Grading II Material	cum	₹ 6,321.80
(iii)	For Grading III Material	cum	₹ 6,137.80

(B) Plant Mix Method

Construction of granular sub-base by providing well graded material, mixing in a mechanical mix plant at OMC, carriage of mixed material to work site upto lead of 1000 m spreading in uniform layers with motor grader on prepared surface and compacting with smooth wheel roller to achieve the desired density , complete as per MoRT&H Technical Specification Clause 401

(i)	For Grading I Material	cum	₹ 6,718.00
(ii)	For Grading II Material	cum	₹ 6,608.00
(iii)	For Grading III Material	cum	₹ 6,423.90

4.2 401 Granular Sub-base with Coarse Graded Material (Table 400.2)

Construction of granular sub-base by providing coarse graded material spreading in uniform layers 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 as per MoRT&H Technical Specification Clause 401.

(i)	For Grading I Material	cum	₹ 6,851.80
(ii)	For Grading II Material	cum	₹ 6,943.30
(iii)	For Grading III Material	cum	₹ 6,658.50

4.3 402 Lime Stabilisation for Improving Sub-grade

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Laying and spreading available soil in the sub-grade on a prepared surface, pulverising, mixing the spread soil in place with rotavator with 3 per cent slaked lime having minimum content of 70 per cent of CaO by weight, grading with motor grader and compacting with the road roller at OMC to the desired density to form a layer of improved sub grade as per MoRT&H Technical Specification Clause 402.		
		A. By Mechanical Means	cum	₹ 459.49
		B. By Manual Means	cum	₹ 511.86
4.4	402	Lime Treated Soil for Sub- Base		
		Providing, laying and spreading soil on a prepared sub grade, pulverising, mixing the spread soil in place with rotavator with 3 per cent slaked lime with minimum content of 70 per cent of CaO by weight, grading with motor grader and compacting with the road roller at OMC to achieve at least 98 per cent of the max dry density to form a layer of sub base as per MoRT&H Technical Specification Clause 402.	cum	₹ 571.00
4.5	403	Cement Treated Soil Sub Base/ Base		
		Providing, laying and spreading soil on a prepared sub grade, pulverising, adding the designed quantity of cement to the spread soil, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base as per MoRT&H Technical Specification Clause 403.	cum	₹ 982.30
4.6	403	Cement Treated Crushed Rock or combination as per clause 403 and table 400.4 in Sub base/ Base		
		Providing, laying and spreading Material on a prepared sub grade, adding the designed quantity of cement to the spread Material, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base as per MoRT&H Technical Specification Clause 403.		
		A. For Sub - Base Course.	cum	₹ 8,337.20
		B. For Base Course.	cum	₹ 7,913.20
4.7	404.3.1	Making 50 mm x 50 mm Furrows		
		Making 50 mm x 50 mm furrows, 25mm / 50mm deep, 450 to the center line of the road and at one metre interval in the existing thin bituminous wearing coarse including sweeping and disposal of excavated material within 1000 metres lead as per MoRT&H Technical Specification Clause 404.3.1.		

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(i) 25 mm deep furrow cutting	sqm	₹ 5.80
		(ii) 50 mm deep furrow cutting	sqm	₹ 11.60
4.8	404.3.2	Inverted Choke		
		Construction of inverted choke by providing, laying, spreading and compacting screening B type in uniform layer on a prepared surface with motor grader and compacting with power roller etc as per MoRT&H Technical Specification Clause 404.3.2.	cum	₹ 3,973.40
4.9	404	Water Bound Macadam Sub-Base / Base		
		Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with three wheel 80-100 kN static roller/ vibratory roller in stages to proper grade and camber, applying and brooming, stone screening and binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density as per MoRT&H Technical Specification Clause 404.		
		1) WBM Grading I		
		(A) By Manual Means	cum	₹ 7,798.00
		(B) By Mechanical Means	cum	₹ 7,506.90
		2) WBM Grading II		
		(A) By Manual Means	cum	₹ 8,276.30
		(B) By Mechanical Means	cum	₹ 7,987.00
		3) WBM Grading III		
		(A) By Manual Means	cum	₹ 8,412.90
		(B) By Mechanical Means	cum	₹ 8,120.80
4.10	405	Crushed Cement Concrete Sub-base / Base		
		Breaking and crushing of material obtained by breaking damaged cement concrete slabs to size range not exceeding 75 mm as specified in table 400.7 transporting the aggregates obtained from breaking of cement concrete slabs at a lead of 1000 m, laying and compacting the same as sub base/ base course, constructed as WBM as per clause 404 except the use of screening or binding Material as per MoRT&H Technical Specification Clause 405.	cum	₹ 391.90
4.11	506.3.8	Penetration Coat Over Top Layer of Crushed Cement Concrete Base		

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Spraying of bitumen over cleaned dry surface of crushed cement concrete base at the rate of 25 kg per 10 sqm by a bitumen pressure distributor, spreading of key aggregates at the rate of 0.15 cum per 10 sqm by a mechanical gritter and rolling the surface as per MoRT&H Technical Specification clause 506.3.8.	sqm	₹ 306.90
4.12	406	Wet Mix Macadam		
		Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver finisher in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density as per MoRT&H Technical Specification Clause 406.	cum	₹ 6,750.70
4.13	408	Construction of Median and Island with Soil Taken from Roadway Cutting		
		Construction of Median and Island above road level with approved material deposited at site from roadway cutting and excavation for drain and foundation of other structures with all leads and lifts, spread, graded and compacted with plate compactor as per MoRT&H Technical Specification Clause 408.	cum	₹ 266.00
4.14	408	Construction of Median and Island with Soil Taken from borrow pits.		
		Construction of median and Island above road level with approved material brought from borrow pits with all lifts and lead upto 1000 m, spread, sloped and compacted as per MoRT&H Technical Specification Clause 408.	cum	₹ 486.20
4.15		Construction of Shoulders		
		A. Earthen Shoulders The rate as applicable for Sub-grade construction may be adopted.		
		B. Hard Shoulders The rate as applicable for Sub-base and / or Base may be adopted as per approved design		
		C. Paved Shoulders The rates may be adopted as applicable for different layers of pavement depending upon approved design of paved shoulders.		
4.16	410	Footpaths and Separators		
		Construction of footpath/ separator by providing a 150 mm compacted granular sub base as per clause 401 and 25 mm thick cement concrete grade M15, over laid with pre-cast concrete tiles in cement mortar 1:3 including provision of all drainage arrangements but excluding kerb channel as per MoRT&H Technical Specification Clause 410.	sqm	₹ 1,978.60

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)

4.17	401	Granular Sub-base with Well Graded Material (using jhama brick aggregate) (Table 400.1)		
	(A)	By Mix in Place Method		
		Construction of granular sub-base by providing well graded material (Jhama Brick Aggregate, as per Table:- 400.1, Grading-I), spreading in uniform layers with tractor with attachments or motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, applying and brooming sand to fill up the interstices of coarse aggregate, watering and compacting with smooth wheel roller to achieve the desired density, complete as per MoRT&H Technical Specification Clause 401.		
		(i) For Grading- I Material (Jhama brick aggregate)	cum	₹ 4,756.50
4.18	404	Water Bound Macadam Sub-Base / Base using Jhama Brick Aggregate		
	1)	WBM Grading- 2		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with three wheel 80-100 kN static roller/ vibratory roller in stages to proper grade and camber, applying and brooming and binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading-2' as per MoRT&H Technical Specification Clause 404.		
	(A)	By Manual Means	cum	₹ 7,395.31
	(B)	By Mechanical Means	cum	₹ 7,104.20
	2)	WBM Grading- 3		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with three wheel 80-100 kN static roller / vibratory roller in stages to proper grade and camber, applying and brooming and binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading-3' as per MoRT&H Technical Specification Clause 404.		

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(A) By Manual Means	cum	₹ 7,352.60
		(B) By Mechanical Means	cum	₹ 7,061.50
4.19	404	Water Bound Macadam Sub-Base / Base using Jhama Brick Aggregate		
		1) WBM Grading- 1		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with three wheel 80-100 kN static roller/ vibratory roller in stages to proper grade and camber, applying and brooming and binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading-1' as per MoRT&H Technical Specification Clause 404.		
		(A) By Manual Means	cum	₹ 7,189.60
		(B) By Mechanical Means	cum	₹ 6,898.50
(Additional items using stone aggregates)				
4.20	407	Crusher Run Macadam Base (Providing crushed stone aggregate, depositing on a prepared surface by hauling vehicles, spreading and mixing with a motor grader, watering and compacting with a vibratory roller to clause 407 to form a layer of sub-base/Base) as per MoRT&H Technical Specification.		
		A. By Mix in Place Method		
		(i) For 53 mm maximum size	cum	₹ 6,125.70
		(ii) For 45 mm maximum size	cum	₹ 6,020.70
		B. By Mixing Plant		
		(i) For 53 mm maximum size	cum	₹ 6,427.70
		(ii) For 45 mm maximum size	cum	₹ 6,307.60
4.21	Suggestive	Lime, Fly ash stabilised soil sub-base (Construction of Sub-base using lime - fly ash admixture with granular soil, free from organic matter/ deleterious material or clayey silts and low plasticity clays having PI between 5 and 20 and liquid limit less than 25 and commercial dry lime, slaked at site or pre-slaked with CaO content not less than 50%, fly ash to conform to gradation as per clause 4.3 of IRC: 88-1984, lime + fly ash content ranging between 10 to 30%, the minimum un-confined compressive strength and CBR value after 28 days curing and 4 days soaking to be 7.5 kg/sqcm and 25% respectively, all as specified in IRC: 88-1984.)	cum	₹ 253.00

Chapter - 5

Bases and Surface Courses (Bituminous)

(a) Preamble

1. *Various alternatives for machines and materials have been provided. The one that suits a particular situation and design may be adopted.*
2. *The clauses of MoRT&H Specifications, which have been mentioned for each item, may be referred for detailed specifications and construction procedure. The item description in rate analysis and SOR mention only brief description.*
3. *The machinery and equipment included in various analysis are as per specifications of MoRT&H and are mandatory.*
4. *The outputs considered in analysis of rates for construction equipment are for compacted quantities of relevant items and not for loose quantities and materials are for un-compacted quantities for the procurement purpose.*
5. *In case of prime coat and tack coat, minimum quantities of binder indicated in specifications have been taken. Adjustment, plus or minus, can be made for the variation between this quantity and the actual quantity approved by the Engineer after preliminary trials.*
6. *The items of bituminous works required under maintenance have been added in the chapter of Maintenance.*
7. *Prime coat and tack coat, wherever provided, are required to be measured and paid separately.*
8. *Cleaning of surface is a part of the item of prime coat and tack coat. As such cleaning of surface has not been provided for bituminous courses as the same is already catered in prime / tack coat. However, for those cases where such coats are not required to be done, cleaning of surface shall be included and paid.*
9. *It is presumed that tack coat, where required, will be provided immediately preceding the bituminous layer.*
10. *Rolling of bituminous courses is required to be done as per MoRT&H specifications. Provision in the analysis has been made accordingly. It has been observed during actual practice at work sites, that the availability of road roller is generally inadequate. As compaction is the key to good construction, this point is being specifically highlighted to ensure that adequate number of road rollers as per provision in the rate analysis are deployed at site.*
11. *Spreading of bituminous materials shall be done by mechanical means except in areas where a mechanical paver cannot have access.*
12. *The source of all materials to be used on the project must be investigated properly and exclusively approved by the Engineer-in-charge.*
13. *Quantities of materials taken in the analysis are for the purpose of cost estimate only. The actual quantity shall be as per job mix formula.*
14. *Choice of bitumen shall be made as per the guidelines given in appendix-4 of MoRT&H Specifications.*
15. *The guidelines given vide Annexure - A to clause 501 of MoRT&H Specifications in regard to protection of environment shall be followed for a particular situation.*
16. *Where the proposed aggregates fail to pass the stripping value test, an approved adhesion agent shall be added to the binder as per clause 510.2.4 with the approval of the Engineer and the cost of adhesion agent shall be born by the contractor and not be paid separately.*

17. *Rate analysis has been given for use of Bitumen of Viscosity Grade ('VG-30', 'VG-10') complying with Indian Standard Specifications for "Paving Bitumen" IS 73 : 2013 & also bitumen emulsions.*

18. *The approximate proportions by weight of different aggregates and bitumen (or by volume in unavoidable cases) necessary to produce the intended mix satisfying the job requirements and meeting the designated specifications are for estimating purpose only. The actual quantities should be worked out in the laboratory for particular aggregates and bitumen approved by the Engineer-in-charge.*

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
5.1	502	Prime Coat Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.6 kg/sqm using mechanical means as per MoRT&H Technical Specification Clause 502.	sqm	₹ 52.50
5.2	503	Tack Coat Providing and applying tack coat with bitumen emulsion (RS-1) using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous / granular surface cleaned with Hydraulic broom as per MoRT&H Technical Specification Clause 503.	sqm	₹ 17.30
5.3	504	Bituminous Macadam Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction as per MoRT&H Technical Specification Clause 504.		
		A. Grading I <i>(For layer thickness 80 - 100 mm)</i>		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 15,492.80
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 15,411.00
		B. Grading II <i>(For layer thickness 50 - 75 mm)</i>		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 15,727.60
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 15,653.00

- Note:*
- 1 Although the rollers are required only for 3 hours as per norms of output, but the same have to be available at site for six hours as the hot mix plant and paver will take six hours for mixing and paving the output of 451 t considered in these analysis. To cater for the idle period of these rollers, their usage rates have been multiplied by a factor of 0.65
 - 2 Quantity of bitumen has been taken for analysis purpose. The actual quantity will depend upon job mix formula.
 - 3 Labour for traffic control, watch and ward and other miscellaneous duties at site, including sundries have been included in administrative overheads of the contractor.
 - 4 If the BM will have to be laid over freshly laid tack coat, provision of Hydraulic broom and 2 mazdoor for the same have to be deleted as the same has been included in the cost of tack coat.
 - 5 Analysis is based on 1000 m lead mixed material. Cost of additional cartage may be added as per site requirements.

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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5.4 504 Bituminous Penetration Macadam

Construction of penetration macadam over prepared Base by providing a layer of compacted crushed coarse aggregate using chips spreader with alternate applications of bituminous binder and key aggregates and rolling with vibratory roller to achieve the desired degree of compaction as per MoRT&H Technical Specification Clause 504.

A. 50 mm thick

- | | | | |
|-----|---|-----|----------|
| i. | With Viscosity Graded Bitumen of VG-30. | sqm | ₹ 847.00 |
| ii. | With Viscosity Graded Bitumen of VG-10. | sqm | ₹ 841.40 |

B. 75 mm thick

- | | | | |
|-----|---|-----|------------|
| i. | With Viscosity Graded Bitumen of VG-30. | sqm | ₹ 1,168.50 |
| ii. | With Viscosity Graded Bitumen of VG-10. | sqm | ₹ 1,160.80 |

Note :- 2 tippers and 2 rollers will be needed to match the capacity of chip spreader and front end loader.

5.5 506 Built-Up Spray Grout

Providing, laying and rolling of built-up spray grout layer over prepared base consisting of two layer composite construction of compacted crushed coarse aggregates using motor grader for aggregates. Key stone chips spreader may be used with application of bituminous binder after each layer and with key aggregates placed on top of the second layer to serve as a base, conforming to line, grades and cross section-specified, the compacted layer thickness being 75 mm as per MoRT&H Technical Specification Clause 506.

- | | | | |
|-----|---|-----|----------|
| I. | With Viscosity Graded Bitumen of VG-30. | sqm | ₹ 888.60 |
| II. | With Viscosity Graded Bitumen of VG-10. | sqm | ₹ 885.20 |

Note :- 2 tippers and 2 rollers will be needed to match the capacity of chip spreader and front end loader.

5.6 505 Dense Graded Bituminous Macadam

Providing and laying dense graded bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.0 to 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 505 complete in all respects.

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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A. Grading I		<i>(For layer thickness 80 - 100 mm)</i>		
	i.	With Viscosity Graded Bitumen of VG-30.	cum	₹ 18,281.80
	ii.	With Viscosity Graded Bitumen of VG-10.	cum	₹ 18,171.30
B. Grading II		<i>(For layer thickness 50 - 75 mm)</i>		
	i.	With Viscosity Graded Bitumen of VG-30.	cum	₹ 18,652.60
	ii.	With Viscosity Graded Bitumen of VG-10.	cum	₹ 18,542.00

Note: 1 Although the rollers are required only for 3 hours as per norms of output, but the same have to be available at site for six hours as the hot mix plant and paver will take six hours for mixing and paving the output of 450t considered in these analysis. To cater for the idle period of these rollers, their usage rates have been multiplied by a factor of 0.65

2 Quantity of bitumen has been taken for analysis purpose. The actual quantity will depend upon job mix formula.

3 Labour for traffic control, watch and ward and other miscellaneous duties at site, including sundries have been included in administrative overheads of the contractor.

4 As DBM is laid over freshly laid tack coat, provision of mechanical broom and 2 mazdoors has been deleted as the same has been included in the cost of tack coat.

5 The individual density for each size of aggregates to be used for construction i.e. 37.5-25 mm, 25-10 mm etc. should be found in the laboratory and accordingly the quantities should be ammended for use in field. The average density of 1.5 tonne/cum is only a reference density in this analysis.

6 The individual percentage of aggregates should be calculated from the total weight of dry aggregates i.e.. excluding the weight of bitumen. The weight of filler will also be 2 per cent by weight of dry aggregates.

7 Analysis is based on 1000 m lead mixed material. Cost of additional cartage may be added as per site requirements.

5.7 507 Semi-Dense Bituminous Concrete

Providing and laying semi-dense bituminous concrete with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5.0 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 507 complete in all respects.

A. Grading I

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 19,305.40
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 19,188.40
		B. Grading II		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 19,113.10
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 18,996.10
		<i>Note: 1 Although the rollers are required only for 3 hours as per norms of output, but the same have to be available at site for six hours as the hot mix plant and paver will take six hours for mixing and paving the output of 450t considered in these analysis. To cater for the idle period of these rollers, their usage rates have been multiplied by a factor of 0.65</i>		
		<i>2 Quantity of bitumen has been taken for analysis purpose. The actual quantity will depend upon job mix formula.</i>		
		<i>3 Labour for traffic control, watch and ward and other miscellaneous duties at site, including sundries have been included in administrative overheads of the contractor.</i>		
		<i>4 As SDBC is laid over freshly laid tack coat, provision of mechanical broom and 2 mazdoors has been deleted as the same has been included in the cost of tack coat.</i>		
		<i>5 Analysis is based on 1000 m lead of mixed material. Cost of additional cartage may be added as per site requirements.</i>		
5.8	507	Bituminous Concrete		
		A. Providing and laying bituminous concrete with higher capacity batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder @ 5.20 Percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects.		
		Grading I <i>(For layer thickness 50 mm)</i>		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 20,933.00
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 20,794.90
		B. Providing and laying bituminous concrete with higher capacity batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder @ 5.40 Percent of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORTH specification clause No. 507 complete in all respects.		
		B. Grading II <i>(For layer thickness 30 - 40 mm)</i>		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 21,523.40

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 21,380.00
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- Note:*
- 1 Although the rollers are required only for 3 hours as per norms of output, but the same have to be available at site for six hours as the hot mix plant and paver will take six hours for mixing and paving the output of 450 t considered in these analysis. To cater for the idle period of these rollers, their usage rates have been multiplied by a factor of 0.65.
 - 2 Quantity of bitumen has been taken for analysis purpose. The actual quantity will depend upon job mix formula.
 - 3 Labour for traffic control, watch and ward and other miscellaneous duties at site, including sundries have been included in administrative overheads of the contractor.
 - 4 If BC is laid over freshly laid tack coat, provision of mechanical broom and 2 mazdoors should be deleted as the same has been included in the cost of tack coat.
 - 5 Analysis is based on 1000 m lead of mixed material. Cost of additional cartage may be added as per site requirements.
 - 6 The individual density for each size of aggregates to be used for construction i.e. 37.5-25 mm, 25-10 mm etc. should be found in the laboratory and accordingly the quantities should be ammended for use in field. The average density of 1.5 tonne/cum is only a reference density in this analysis.
 - 7 The individual percentage of aggregates should be calculated from the total weight of dry aggregates i.e. excluding the weight of bitumen. The weight of filler will also be 2 per cent by weight of dry aggregates.

5.9 509 Surface Dressing

Providing and laying surface dressing as wearing course in single coat using crushed stone aggregates of specified size on a layer of bituminous binder laid on prepared surface and rolling with 8-10 tonne smooth wheeled steel roller as per MoRT&H Technical Specification Clause 509.

Case - I : 19 mm nominal chipping size

(I) Bitumen of VG-30	sqm	₹ 196.40
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(II) Bitumen of VG-10	sqm	₹ 195.10
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Case - II : 13 mm nominal chipping size

(I) Bitumen of VG-30	sqm	₹ 154.30
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(II) Bitumen of VG-10	sqm	₹ 153.20
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- Note :-*
- 1 Where the proposed aggregate fails to pass the stripping test, an approved adhesion agent may be added to the binder as per clause 510.2.4. with the approval of the Engineer and the cost of adhesion agent shall be born by the contractor and not be paid separately. Alternatively, chips may be pre-coated as per clause 510.2.5 without any extra payment to contractors.
 - 2 Input for the second coat, where required, will be the same as per the 1st coat mentioned above.

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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5.10 510 Open - Graded Premix Surfacing

Providing, laying and rolling of open - graded premix surfacing of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using Viscosity grade bitumen or cut-back or emulsion to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 tonne capacity, finished to required level and grades.as per MoRT&H Technical Specification Clause 510.

Case - I : Mechanical method using Viscosity grade bitumen and HMP of appropriate capacity not less than 75 tonne / hour.

(I) Bitumen of VG-30 sqm ₹ 311.50

(II) Bitumen of VG-10 sqm ₹ 309.90

Case - II : Open-graded premix surfacing using cationic bitumen emulsion. sqm ₹ 347.50

Note :- 1 If a premix sand seal coat of 'B' type is proposed, the same is required to be provided over the open graded premix carpet immediately on the same day. As the same HMP and other machines will be used for laying of premix sand seal coat, out of 6 effective working hours, 4.00 hours may be utilised for laying of premix carpet and balance 2.00 hours for the seal coat. The rate for the premix sand seal coat under clause 513 (case II) has been worked out accordingly by utilising the HMP for 2.00 hours for the purpose of seal coat. In case type 'A' seal coat is proposed, HMP can be worked for six hours for the premix carpet as type 'A' seal coat does not require the use of HMP for which necessary deduction may be made.

2 Analysis is based on 1000 m lead mixed material. Cost of additional cartage may be added as per site requirements.

5.11 508 Close - Graded Premix Surfacing / Mixed seal surfacing.

Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.09 mm (Type-A) or 13.2 mm to 0.09 mm (Type-B) aggregates using Viscosity grade bitumen to the required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a Smooth wheeled roller 8-10 tonne capacity, and finishing to required level and grade as per MoRT&H Technical Specification Clause 508.

Case - I : Mechanical method using Viscosity grade bitumen and HMP of appropriate capacity not less than 75 tonne / hour.

A. Type - A

(I) Bitumen of VG-30 sqm ₹ 379.60

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(II) Bitumen of VG-10	sqm	₹ 377.10
		B. Type - B		
		(I) Bitumen of VG-30	sqm	₹ 349.40
		(II) Bitumen of VG-10	sqm	₹ 347.30
5.12	511	Seal Coat		
		Case - I : Type - A		
		Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A seal coats as per MoRT&H Technical Specification Clause 511.		
		(I) Bitumen of VG-30	sqm	₹ 140.20
		(II) Bitumen of VG-10	sqm	₹ 139.10
		Case II : Type - B		
		Providing and laying of premix seal coat Type - B with HMP of appropriate capacity not less than 75 tonnes/ hours using crushed stone chipping 6.7 mm size and Viscosity grade bitumen of suitable grade as per MoRT&H Technical Specification Clause 511.		
		(I) Bitumen of VG-30	sqm	₹ 100.00
		(II) Bitumen of VG-10	sqm	₹ 99.20
		<i>Note :- Since seal coat is required to be provided over the premix carpet on the same day, out of the 6 working hours of the HMP, 4.00 hours are proposed to be utilised for the premix carpet and the balance 2.00 hours for the seal coat. Hence 2.00 hours have been considered for this case. This may be linked to rate analysis worked out under clause 511.</i>		
5.13	516	Mastic asphalt		
		Providing and laying mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500.29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping 13.2 mm nominal size at the rate of 0.005 cum per sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of the surfaces is not less than 100° C, protruding 1 mm to 4 mm over mastic surface, all complete as per MoRT&H Technical Specification Clause 516.		
		i. 25 mm thick	sqm	₹ 1,056.50
		ii. 40 mm thick	sqm	₹ 1,647.90

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		iii. 50 mm thick	sqm	₹ 2,040.00
		<i>Note :-</i>		
		1 Where tack coat is required to be provided before laying mastic asphalt, the same is required to be measured and paid separately		
		2 The quantities of binder, filler and aggregates are for estimating purpose. Exact quantities shall be as per mix design.		
		3 This rate analysis is based on for a specific case and is meant for estimating purposes only. Actual design is required to be done for each case.		
5.14	512	Slurry Seal		
		Providing and laying slurry seal consisting of a mixture of fine aggregates, portland cement filler, bituminous emulsion and water on a road surface including cleaning of surface, mixing of slurry seal in a suitable mobile plant, laying and compacting to provide even riding surface as per MoRT&H Technical Specification Clause 512.		
		Case - I : 5 mm thick	sqm	₹ 140.90
		Case - II : 3 mm thick	sqm	₹ 95.20
		Case - III : 1.5 mm thick	sqm	₹ 55.90
5.15	519	Recycling of Bituminous Pavement with Central Recycling Plant		
		Recycling pavement by cold milling of existing bituminous layers, planning the surface after cold milling, reclaiming excavated material to the extent of 30 per cent of the required quantity, hauling and stock piling the reclaimed material near the central recycling plant after carrying out necessary checks and evaluation, adding fresh material including rejuvenators as required, mixing in a hot mix plant, transporting and laying at site and compacting to the required grade, level and thickness, all as specified in MoRT&H Technical Specification Clause 519.		
			cum	₹ 15,164.80
5.16	513	Fog seal		
		Providing and applying low viscosity bitumen emulsion for sealing cracks less than 3 mm wide or incipient fretting or disintegration in an existing bituminous surfacing as per MoRT&H Technical Specification Clause 513.		
		i) Without blinding	sqm	₹ 64.90
		ii) With blinding	sqm	₹ 72.90
5.17	518	Bituminous Cold Mix (Including Gravel Emulsion)		
		Providing, laying and rolling of bituminous cold mix on prepared base consisting of a mixture of unheated mineral aggregate and emulsified or cutback bitumen, including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finishing to specified grades and levels as per MoRT&H Technical Specification Clause 518.		

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Case - I : Using bitumen emulsion and 9.5 mm or 13.2 mm size aggregate	cum	₹ 22,277.40
		Case - II : Using bitumen emulsion and 19 mm or 26.5 mm size aggregate	cum	₹ 21,991.10
		Case - III : Using cut back bitumen and 9.5 mm or 13.2 mm size aggregate	cum	₹ 17,298.10
		Case - IV : Using cut back bitumen and 19 mm or 26.5 mm size aggregate	cum	₹ 16,965.40

- Note :-*
- 1 Density of aggregates has been assumed 1.5 gms/cc
 - 2 Tack coat where provided will be measured and paid separately.
 - 3 Though the rollers are required only for 3.5 hours each as per norms of output, but these are required to be available at site for 6 hours as the drum mix plant and the paver would take 6 hours for mixing and paving. To cater for the idle period, their usage rates have been multiplied by a factor of 0.65
 - 4 Analysis is based on 1000 m lead mixed material. Cost of additional cartage may be added as per site requirements.

5.18 506 Sand Asphalt Base Course

Providing, laying and rolling sand-asphalt base course composed of sand, mineral filler and bituminous binder on a prepared sub-grade or sub-base to the lines, levels, grades and cross sections as per the drawings including mixing in a plant of suitable type and capacity, transporting, laying, compacting and finishing. as per MoRT&H Technical Specification Clause 506.

cum ₹ 17,695.00

5.19 519 Recipe Cold Mixes

Providing and laying of premix of crushed stone aggregates and emulsion binder, mixed in a batch type cold mixing plant, laid over prepared surface, by paver finisher, rolled with a pneumatic tyred roller initially and finished with a smooth steel wheel roller, all as per MoRT&H specification clause 519.

Case - I : 75 mm thickness sqm ₹ 1,247.70

Case - II : 40 mm thickness sqm ₹ 841.80

Case - II : 25 mm thickness sqm ₹ 585.50

Chapter - 5 : Bases and Surface Courses (Bituminous)

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
5.20	517	Crack Prevention Courses		
		(i) Stress absorbing membrane (SAM) crack width less than 6 mm		
		Providing and laying of a stress absorbing membrane over a cracked road surface, with crack width below 6 mm after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 9 kg per 10 sqm and spreading 5.6 mm crushed stone aggregates @ 0.11 cum per 10 sqm with hydraulic chip spreader, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	sqm	₹ 142.30
		(ii) Stress absorbing membrane (SAM) with crack width 6 mm to 9 mm		
		Providing and laying of a stress absorbing membrane over a cracked road surface, with crack width 6 to 9 mm after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 11 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	sqm	₹ 164.50
		(iii) Stress absorbing membrane (SAM) crack width above 9 mm and cracked area above 50 per cent		
		Providing and laying a single coat of a stress absorbing membrane over a cracked road surface, with crack width above 9 mm and cracked area above 50 per cent after cleaning with a mechanical broom, using modified binder complying with clause 521, sprayed at the rate of 15 kg per 10 sqm and spreading 11.2 mm crushed stone aggregates @ 0.12 cum per 10 sqm, sweeping the surface for uniform spread of aggregates and surface finished to conform to clause 902.	sqm	₹ 212.60
		(iv) Case - IV : Bitumen impregnated geotextile		
		Providing and laying a bitumen impregnated geotextile layer after cleaning the road surface, geotextile conforming to requirements of clause 703.3, laid over a tack coat with 1.05 kg per sqm of paving grade bitumen and constructed to the requirement of clause 703.4.5	sqm	₹ 184.50

Chapter - 6

Cement Concrete Pavement

(a) Preamble

1. *High capacity batch mix plants of 75 cum / hour (effective output) has been considered in the rate analysis of cement concrete pavement works.*
2. *While tippers have been provided for transportation of dry lean cement concrete and rolled cement concrete, transit mixers have been considered in the rate analysis of cement concrete pavement works.*
3. *Super plasticizer admixture as per IS : 9103 has been provided to improve workability with reduced water cement ratio .*
4. *Cement of 43 grade has been catered for the cement concrete pavement i.e., for pavement quality concrete to get higher strength. However, for dry lean concrete, cement of 33 grade may be preferred.*
5. *While a slip from paver has been catered for the top layer of cement concrete pavement, a mechanical paver finisher has been provided for dry lean and rolled cement concrete.*
6. *Analysis has been made for 1000 m lead. This will vary from project to project and is required to be ascertained at site to provide the cost of carriage of the mix to the work site.*
7. *Materials provided in the rate analysis are for estimating purpose . Exact quantity of materials will be determined from the job mix formula.*
8. *Fibre Reinforced Concrete for pavements*

Fibre Reinforced Concrete for pavements has not been considered in this analysis of rates, because in India, it is still on an experimental and research stage.

Chapter - 6 : Cement Concrete Pavement

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
6.1	601	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 15:1, 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 as per MoRT&H specification clause 601.	cum	₹ 8,083.30
6.2	602	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 (minimum), coarse and fine aggregate conforming to IS 383, 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 and as per MoRT&H specification clause 602.	cum	₹ 11,960.50
6.3	600	Rolled Cement Concrete Sub-Base		
		Construction of rolled cement concrete base course with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm with minimum, aggregate cement ratio 15:1 and minimum cement content of 200 kg/cum, aggregate gradation to be as per table 600-4 after blending, mixing in batching plant at optimum moisture content, transporting to site, laying with a paver with electronic sensor, compacting with 8-10 tonnes smooth wheeled vibratory roller to achieve, the designed flexural strength, finishing and curing as per MoRT&H specification clause 600.	cum	₹ 8,573.40

6.4 Transition Section between Rigid and Flexible Pavement

- Note :-*
- 1 *Due to change in the properties of materials and type of construction, a gradual change over from rigid pavement to flexible pavement is desirable to avoid any damage at the butting joint. After provision of an expansion joint in the cement concrete slab, the thickness of slab should be tapered to 15 cm over a length of 3 m towards the flexible pavement. The deficiency of thickness caused due to tapering of the slab should be made up by the asphaltic layers.*
 - 2 *The quantities of items should be worked out based on the approved design and drawings and priced as per rates given under respective clauses for cement concrete and asphaltic work.*

Chapter - 6 : Cement Concrete Pavement

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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6.5 Suggestive Cement - Flyash Concrete Pavement.

Construction reinforced-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exceeding 25 mm, replacing cement by fly ash to the extent of 15 per cent and sand by 10 per cent, 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.

cum ₹ 11,218.30

6.6 Suggestive Construction of Base/Sub-Base of Pavement with Lean Concrete - Flyash.

Construction of Base/sub-base using cement, sand, fly ash and coarse aggregates proportioned as per table 4 of IRC: 74/1979 and with water content ratio, slump and compressive strength as defined in the said table, mix prepared in a batching and mixing plant and compacted with a vibratory roller 8-10 tonnes capacity within the time limit laid down vide clause 7.6.3 of IRC: 74-1979, construction joints properly formed at the end of day's work, cured for 14 days, all as specified in IRC: 74-1979 and as per approved plans.

cum ₹ 6,661.70

Chapter - 7

Geosynthetic Reinforced Earth

(a) Preamble

1. *The specifications for geosynthetics which includes geotextiles, geogrids, geonets, geomembranes and geocomposites shall be as per section 700 of MoRT&H specifications.*
2. *Use of geosynthetics is a specialised job and the same is executed as per manufacture's design and recommendation.*
3. *So, proper & actual analysis of rates of the items required for execution may be done after having the design and recommendation from the manufacturers.*

Chapter - 7 : Geosynthetics and Reinforced Earth

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
7.1	700	Laying of a geotextile 120 gsm non woven membrane, 100% polyester of thickness 1 to 1.25 mm between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the pitching with cement concrete blocks as well as to allow free movement of water without creating any uplift head on the pitching as per drawing and MoRT&H Technical specifications clause 700, 2504 bonded to the membrane with intermittent touch by heating the membrane by Butane Torch as per manufactures recommendation.	sqm	₹ 133.00
7.2	3100	Reinforced Earth Retaining Wall (Reinforced earth retaining walls have four main components as under: (a) Excavation for foundation, foundation concrete and cement concrete grooved seating in the foundation for facing elements (facia material). (b) Facia material and its placement. (c) Assembling, joining with facing elements and laying of the reinforcing elements. (d) Earthfill with granular material which is to be retained by the wall.)		
		(i) Facing elements of RCC	sqm	₹ 2,654.10
		(ii) Assembling, joining and laying of reinforcing elements.		
		A. With reinforcing element of steel / Aluminium strips / polymeric strips.		
		Type 1. Galvanised carbon steel strips	m	₹ 266.30
		Type 2. Aluminium Strips	m	₹ 288.30
		Type 3. Stainless steel strips	m	₹ 427.60
		B. With reinforcing elements of synthetic geogrids	sqm	₹ 160.90
7.3	702	Sub-Surface Drain with Geotextiles		
		Construction of sub surface drain 200 mm dia using geotextiles treated with carbon black with physical properties as given in clause 702.2.3 formed in to a stable network and a planar geocomposite structure, joints wrapped with geotextile to prevent ingress of soil, all as per clause 702 and approved drawings including excavation and backfilling.	m	₹ 831.00
7.4	702.4	Narrow Filter Sub-Surface Drain		
		Construction of a narrow filter sub-surface drain consisting of porous or perforated pipe laid in narrow trench surrounded by a geotextile filter fabric, with a minimum of 450 mm overlap of fabric and installed as per clause 702.3 and 309.3.5 including excavation and backfilling.	m	₹ 651.00

Chapter - 7 : Geosynthetics and Reinforced Earth

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
7.5	703	Laying Paving Fabric Beneath a Pavement Overlay Providing and laying paving fabric with physical requirements as per table 704-2 over a tack coat of paving grade Bitumen, laid at the rate of 1 kg per sqm over thoroughly cleaned and repaired surface to provide a water resistant membrane and crack retarding layer. Paving fabric to be free of wrinkling and folding and to be laid before cooling of tack coat, brooming and rolling of surface with pneumatic roller to maximise paving fabric contact with pavement surface.	sqm	₹ 168.60
7.6	704	Laying Boulder Apron in Crates of Synthetic Geogrids Providing, preparing and laying of geogrid crated apron 1 m x 5 m, 600 mm thick including excavation and backfilling with baffles at 1 metre interval, made with geogrids having characteristics as per clause 704.2, joining sides with connectors/ring staples, top corners to be tie tensioned, placing of suitable cross interval ties in layers of 300 mm connecting opposite side with lateral braces and tied with polymer braids to avoid bulging, constructed as per clause 704.3. filled with stone with minimum size of 200 mm and specific gravity not less than 2.65, packed with stone spalls, keyed to the foundation recess in case of sloping ground and laid over a layer of geotextile to prevent migration of fines, all as per clause 704 and laid as per clause 2503.3 and approved design.	cum	₹ 1,652.30

Chapter - 8

Traffic Signs, Markings & Other Road Appurtenances

(a) Preamble

- 1 *Kerb stone laying and road marking has been provided for laying by mechanical means.*
- 2 *Backfilling of foundation of boundary pillars has been proposed with stone spalls, if available locally from the road way cutting, tightly packed and compacted.*
- 3 *The item pertaining to road traffic signals has not been analysed as these are specialised work and rates can be obtained from firms having specialisation for design and installation of this work.*
- 4 *For metal beam crash barrier, a 'W' shaped beam of size 311 x 83 mm flange width made with structural steel corrugated plate 3.0 mm thick and having a length of 4.5 m has been provided, over a channel post of 150 x 75 x 5 mm with a spacer of channel section 150 x 75 x 5 mm, 330 m long.*
- 5 *Printing of letters and signs is required to be measured and paid separately. A separate rate analysis for lettering has been prepared and included in this chapter for this purpose.*
- 6 *Two supports have been provided for direction and place identification signs where size is more than 0.9 sqm. Only one support is provided for size upto 0.9 sqm.*
- 7 *The traffic signs proposed are of retro-reflectorised type made of encapsulated lens type reflective sheeting fixed over aluminium sheeting as per clause 801.3 and installation.*
- 8 *The size, location of traffic signs shall be as per IRC : 67.*
- 9 *The analysis for rigid, semi-rigid crash barriers have been included.*
- 10 *Provision has been made for a crane for installation of overhead signs.*
- 11 *Separate rate analysis have been made for tubular steel railing with RCC posts and MS steel posts.*
- 12 *The rate for the message display board for gantry mounted variable message sign is required to be ascertained from the market, this being a commercially produced item by specialised firms.*
- 13 *In the case of road signs and direction boards, the depth of foundation and quantity of cement concrete provided in the rate analysis are indicative. These may be suitably increased in areas of higher wind velocities like coastal areas and the areas with high velocity of wind.*
- 14 *Ducts for Utility Services along and across the expressway / Highway :*

The running metre cost of duct along the road including inspection chambers (where applicable) or across the road will depend upon the approved design. The various item involved are earth work, plain cement concrete, brick / stone masonry, reinforced cement concrete, form work, steel reinforcement, laying of pipe line (where duct is of pipe) and cast iron / RCC cover for the inspection chamber. The rate for these items are available under respective clauses which is applied and running metre cost of duct is worked out for analysis purpose only. The rates of items may vary or may be worked out as per approved design and drawing for particular situation. In case cast iron cover for the inspection chamber, the rate can be ascertained from the market for the size provided in the design and approved drawings.

15 *Noise Barriers*

Noise barrier can be provided in the form of a brick wall of a suitable height as per the site requirement and approved design. The items involved for the construction of this barrier like earthwork, brick masonry, plain cement concrete, etc. are available in the related chapters, which can be applied to arrive at the cost of noise barrier based on the design adopted.

Alternatively, wherever space permits, cluster of trees, shrubs and plants can be grown by the road side 6 m away from the edge of the roadway. This will intercept the annoying sound waves and fumes from road vehicles.

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
8.1	409	Cast in Situ Cement Concrete M 20 Kerb		
		Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-10 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine, foundation concrete laid manually, all complete as per drawings & MoRT&H technical specifications Clauses 409.		
	A.	Using Concrete Mixer	m	₹ 512.40
	B.	Using Batching Plant, Transit Mixer and Concrete Pump	m	₹ 546.70
8.2	409	Cast in Situ Cement Concrete M 20 Kerb with Channel		
		Construction of cement concrete kerb with channel with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M10 grade foundation 150 mm thick, kerb channel 300 mm wide, 50 mm thick in PCC M20 grade, sloped towards the kerb, kerb stone with channel laid with kerb laying machine, foundation concrete laid manually, all complete as per drawings & MoRT&H technical specifications Clauses 409.		
	A.	Using Concrete Mixer	m	₹ 884.70
	B.	Using Batching Plant, Transit Mixer and Concrete Pump	m	₹ 925.90
8.3	801	Printing New Letters and Figures of any Shade		
		Printing new letter and figures of any shade with synthetic enamel paint black or any other approved colour to give an even shade as per drawings and MoRT&H Technical Specification Clause 801.		
	i)	Hindi	per cm height per letter	₹ 1.30
	ii)	English and Roman	per cm height per letter	₹ 0.80
8.4	801	Retro-reflectorised Traffic Signs		
		Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of high intensity grade shetting vide MoRT&H technical specification Clause 801.3, fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per drawings and MoRT&H Technical Specification Clause 801.		
	i)	with 900 mm equilateral triangle	each	₹ 3,587.90

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		ii) with 600 mm equilateral triangle	each	₹ 3,339.50
		iii) with 600 mm circular	each	₹ 3,502.10
		iv) with 800 x 600 mm rectangular	each	₹ 3,991.40
		v) with 600 x 450 mm rectangular	each	₹ 3,485.70
		vi) with 600 x 600 mm square	each	₹ 3,624.60
		vii) with 900 mm octagon	each	₹ 4,003.00
8.5	801	Direction and Place Identification Signs upto 0.9 sqm Size Board. Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 450 x 450 x 600 mm, 600 mm below ground level as per approved drawing and MoRT&H Technical Specification Clause 801.	each	₹ 4,652.20
<i>Note :- 1 Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been analysed separately.</i>				
8.6	801	Direction and Place Identification Signs more than 0.9 sqm Size Board. Providing and erecting direction and place identification retro-reflectorised sign as per IRC :67 made of high intensity grade sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 x 450 x 600 mm, 600 mm below ground level as per approved drawing and MoRT&H Technical Specification Clause 801.	each	₹ 8,724.20
<i>Note :- 1 Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been analysed separately.</i>				
8.7	802	Overhead Signs Providing and erecting overhead signs with a corrosion resistant 2 mm thick aluminium alloy sheet reflectorised with high intensity retro-reflective sheeting of encapsulated lense type with vertical and lateral clearance given in clause 802.2 and 802.3 and installed as per clause 802.7 over a designed support system of aluminium alloy or galvanised steel trestles and trusses of sections and type as per structural design requirements and approved plans and MoRT&H Technical Specification Clause 802.		

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		A. Truss and Vertical support	t	₹ 1,14,571.60
		B. Aluminium Alloy Plate for Over Head Sign	sqm	₹ 1,914.30
<i>Note :-</i>				
	1	<i>The cost of excavation and foundation concrete for fixing of vertical support system to be worked out separately as per the approved drawing/design and to be included in the estimate.</i>		
	2	<i>Lettering and arrow marks on sign board to be provided separately as per actual requirement. Rates for these items have been included separately in this chapter.</i>		
8.8	803	Painting Two Coats on New Concrete Surfaces		
		Providing and painting two coats with synthetic enamel paint in all shades on new plastered concrete surfaces as per MoRT&H Technical Specification Clause 803.	sqm	₹ 96.80
8.9	803	Painting on Steel Surfaces		
		Providing and applying two coats of ready mix paint of approved brand on steel surface after through cleaning of surface to give an even shade as per MoRT&H Technical Specification Clause 803.	sqm	₹ 81.70
8.10	803	Painting on Wood Surfaces		
		Providing and applying two coats of ready mix paint of approved brand on wood surface after thorough cleaning of surface to give an even shade as per MoRT&H Technical Specification Clause 803.	sqm	₹ 89.50
8.11	803	Painting Lines, Dashes, Arrows etc on Roads in Two Coats on New Work		
		Painting lines, dashes, arrows etc on roads in two coats on new work with ready mixed road marking paint conforming to IS:164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control as per MoRT&H Technical Specification Clause 803.		
		i) Over 10 cm in width	sqm	₹ 157.60
		ii) upto 10 cm in width	sqm	₹ 132.70
8.12	803	Painting Lines, Dashes, Arrows etc on Roads in Two Coats on old Work		
		Painting lines, dashes, arrows etc on roads in two coats on old work with ready mixed road marking paint conforming to IS:164 on bituminous surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control as per MoRT&H Technical Specification Clause 803.		
		i) Over 10 cm in width	sqm	₹ 120.50

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		ii) upto 10 cm in width	sqm	₹ 111.10
8.13	803	Road marking strips (retro-reflective) of specified shade/ colour using Hot Applied Thermoplastic material with Reflectorising Glass Beads on Bituminous Surface Providing and applying 2.5 mm thick road marking strips (retro-reflective) of specified shade/ colour using hot thermoplastic material including reflectorising glass beads @ 250 gms per sqm area by fully/ semi automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater including cost of cleaning the road surface of all dirt, seals, oil, grease and foreign material etc, thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform and free from streaks and holes as per MoRT&H Technical Specification Clause 803.	sqm	₹ 721.90
<i>Note :-</i>	1	<i>A sealing primer may be applied in advance on cement concrete pavement to ensure proper bonding. Any laitance and/or curing compound to be removed where paint is required to be applied on concrete surface.</i>		
	2	<i>Cost of Painter & machine operator is already included in hire charges of paint applicator machine.</i>		
8.14	805	Kilometre Stone Reinforced cement concrete M 15 grade kilometre stone of standard design as per IRC:8, fixing in position including painting and printing, etc. as per drawing and MoRT&H Technical Specification Clause 805.		
		i) 5th Kilometre Stone(precast)	each	₹ 5,807.00
		ii) Ordinary Kilometre Stone(precast)	each	₹ 3,634.10
		iii) Hectometre Stone(precast)	each	₹ 931.00
8.15	806	Road Delineators Providing and installation of delineators (road way indicators, hazard markers, object markers), 80-100 cm high above ground level, painted black and white in 15 cm wide strips, fitted with 80 x 100 mm rectangular or 75 mm dia circular reflectorised panels at the top, buried or pressed into the ground and conforming to IRC-79 and the drawings and as per MoRT&H Technical Specification Clause 806.	each	₹ 607.90

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
8.16	807	Boundary Pillar Reinforced cement concrete M15 grade boundary pillars of standard design as per IRC:25-1967, fixed in position including finishing and lettering but excluding painting	nos	₹ 1,548.80
8.17	811	Reinforced Cement Concrete Crash Barrier Provision of an Reinforced cement concrete crash barrier at the edges of the road, approaches to bridge structures and medians, constructed with M-20 grade concrete with TMT reinforcement conforming to IRC:21 and dowel bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, all as specified as per MoRT&H Technical Specification Clause 811.	m	₹ 6,100.30
8.18	811	Metal Beam Crash Barrier A. Type - A, "W" : Metal Beam Crash Barrier Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long complete as per MoRT&H Technical Specification Clause 811.	m	₹ 4,278.30
		B. Type - B, "THRIE" : Metal Beam Crash Barrier Providing and erecting a "Thrie" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 85 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 2 m high with 1.15 m below ground level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a space of channel section 150 x 75 x 5 mm, 546 mm long complete as per MoRT&H Technical Specification Clause 811.	m	₹ 5,417.20
8.19	804	Road Markers/Road Stud with Lense Reflector Providing and fixing of road stud 100 x 100 mm, die-cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973.	nos	₹ 195.10

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
8.20		Traffic Cone Provision of red fluorescent with white reflective sleeve traffic cone made of low density polyethylene (LDPE) material with a square base of 390 x 390 x 35 mm and a height of 770 mm, 4 kg in weight, placed at 1.5 m interval, all as per BS 873.	nos	₹ 582.30
8.21		Drum Delineator in Construction Zone Provision of metal drum/empty bitumen drum delineator, 300 mm in diameter, 800 mm high, filled with earth for stability, painted in circumferential strips of alternate black and white 100 mm wide fitted with reflectors 3 Nos of 7.5 cm dia, all as per IRC:SP:55-2001.	nos	₹ 901.20
8.22	808	G.I Barbed Wire Fencing 1.2 Metre High Providing and fixing 1.2 metres high GI barbed wire fencing with 1.8 m angle iron posts 40 mm x 40 mm x 6 mm placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per MoRT&H Technical Specification clause 808.	m	₹ 403.20
8.23	808	G.I Barbed Wire Fencing 1.8 Metre High Providing and fixing 1.8 metres high GI barbed wire fencing with 2.4 m angle iron posts 50 mm x 50 mm x 6 mm placed every 3 metres center to center founded in M15 grade cement concrete, 0.6 metre below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 12 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc complete as per MoRT&H Technical Specification clause 808.	m	₹ 659.70
8.24		Fencing With Welded Steel Wire Fabric 75 mm x 50 mm Providing 1.20 metre high fencing with angle iron posts 50 mm x 50 mm x 6 mm at 3 metre center to center with 0.40 metre embedded in M15 grade cement concrete, corner, end and every 10th post to be strutted, provided with welded steel wire fabric of 75 mm x 50 mm mesh or 75 mm x 25 mm mesh and fixed to iron posts by flat iron 50 x 5 mm and bolts etc. complete in all respects.	m	₹ 966.30
8.25	809	Tubular Steel Railing on Medium Weight Steel Channel (ISMC series) 100 mm x 50 mm		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		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.	m	₹ 2,642.60
8.26	809	Tubular Steel Railing on Precast RCC Posts, 1.2 m High Above Ground Level		
		Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M20 grade RCC vertical posts 1.8 metres high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 metres centre to, complete as per approved drawing.	m	₹ 2,188.00
8.27		Flexible Crash Barrier, Wire Rope Safety Barrier		
		Providing and erecting a wire rope safety barrier with vertical posts of medium weight RS Joist (ISMB series) 100 mm x 75 mm (11.50 kg/m), 1.50 m long 0.85 m above ground and 0.65 m below ground level, split at the bottom for better grip, embedded in M 15 grade cement concrete 450 x 450 x 450 mm, 1.50 m center to center and with 4 horizontal steel wire rope 40 mm dia and anchored at terminal posts 15 m apart. Terminal post to be embedded in M 15 grade cement concrete foundation 2400 x 450 x 900 mm (depth), strengthened by a strut of RS joist 100 x 75 mm, 2 m long at 450 inclination and a tie 100 x 8 mm, 1.50 m long at the bottom, all embedded in foundation concrete as per approved design and drawing, rate excluding excavation and cement concrete.	m	₹ 3,244.60
8.28		Anti-Glare Devices in Median		
	A.	Plantation		
		Plantation of shrubs and plants of approved species in the median. apart from cutting off glare from vehicle coming from opposite direction, these plants provide a pleasant environment and are eco-friendly. The rate for this item is available in the chapter 11 on horticulture.		
	B.	Anti-glare screen with 25 mm steel pipe framework fixed with circular and rectangular vans		
		Providing and erecting an anti - glare screen with 25 mm dia vertical pipes fabricated and framed in the form of panels of one metre length and 1.75 metre height fixed with circular vane 250 mm dia at top and rectangular vane 600 x 300 mm at the middle, made out of steel sheet of 3 mm thickness, end vertical pipes of the panel made larger for embedding in foundation concrete, applying 2 coats of paint on all exposed surfaces, all as per approved design and drawings.	m	₹ 3,483.20
	C.	Anti-glare screen with rectangular vane of MS sheet		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Providing and erecting anti - glare screen with rectangular vanes of size 750 x 500 mm made from MS sheet, 3 mm thick and fixed on MS angle 50 x 50 x 6 mm at an angle of 450 to the direction of flow of traffic, 1.5 m center to center, top edge of the screen 1.75 m above ground level, vertical post firmly embedded in M-15 cement concrete foundation 0.60 m below ground level, applying 2 coats of paint on exposed faces, all complete as per approved desian and drawinas.	m	₹ 1,258.60
8.29		Street Lighting		
		Providing and erecting street light mounted on a steel circular hollow pole of standard specifications for street lighting, 9 m high spaced 40 m apart, 1.8 m overhang on both sides if fixed in the median and on one side if fixed on the footpath, fitted with sodium vapour lamp and fixed firmly in concrete foundation.		
	(i)	For Fixing in Median	each	₹ 17,780.40
	(ii)	For fixing in Footpath	each	₹ 17,688.90
8.30		Lighting on Bridges		
		Providing and fixing lighting on bridges, mounted on steel hollow circular poles of standard specifications, 5 m high fixed on parapets with cement concrete, 20 m apart and fitted with sodium vapour lamp.	each	₹ 12,496.40
8.31		Cable Duct Across the Road		
		Providing and laying of a reinforced cement concrete pipe duct, 300 mm dia, across the road (new construction), extending from drain to drain in cuts and toe of slope to toe of slope in fills, constructing head walls at both ends, providing a minimum fill of granular material over top and sides of RCC pipe as per IRC:98-1997, bedded on a 0.3 m thick layer of granular material free of rock pieces, outer to outer distance of pipe at least half dia of pipe subject to minimum 450 mm in case of double and triple row ducts, joints to be made leak proof, invert level of duct to be above higher than ground level to prevent entry of water and dirt, all as per IRC: 98 - 1997 and approved drawings.		
	(i)	Single row for one utility service	m	₹ 3,436.30
	(ii)	Double row for two utility services	m	₹ 6,244.70
	(iii)	Triple Row for three utility services	m	₹ 9,081.20
		(The rates of above items may vary or may be worked out as per approved design and drawing for particular situation. Inspection chamber at both ends is the responsibility of the agency who is laying the duct. In case cast iron cover for the inspection chamber, the rate can be ascertained from the market for the size provided in the design and approved drawings.)		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
8.32		Gantry Mounted Variable Message Sign Board		
		Providing and erecting gantry mounted variable message sign board electronically operated capable of flashing the desired message over a designed support system of aluminium alloy or galvanised steel, erected as per approved design and drawings and with lateral clearance as per clause 802.3.		
		(i) Gantry Support System	tonne	₹ 1,10,607.00
		(ii) Message Display (Message display board 6 sqm electronically operated with complete electronic fitments for flashing the pre-determined messages.)		
		(This is a specialised commercial product and the lumpsum rate including erection at site is required to be ascertained from the market and included in the rate analysis. The size of the board will vary depending upon specific location.)		
		(The rate for the gantry mounted variable sign would be the addition of cost of gantry support system as per approved design determined at (i) above and the cost of message display board as ascertained from the market at (ii) above)		
8.33		Traffic Impact Attenuators at Abutments and Piers		
		A. With Scrap Tyres		
		Provision and installation of traffic attenuators at abutment/pier of flyovers bridges using scrap tyres of size 100 x 20 retrieved from trucks laid in 2 rows and 4 tiers, one above the other and tied with 20 mm wire rope as per approved design and drawings.	sqm	₹ 2,744.40
		B. Using Plastic/Steel Barrel, Filled with Sand		
		Provision and installation of traffic impact attenuator at abutment/pier of flyovers bridges using plastic/steel barrels 0.60 m dia and 1.0 m in height, filled with sand in three rows and tied with 20 mm steel wire rope as per approved design and drawings.	sqm	₹ 1,662.60
8.34		Roadside Amenities		
		A. Rest Areas		
		(Providing plainly furnished accommodation for rest rooms, dormitories, restaurants, stalls, shops, petrol pump, telephone booth, first aid room, traffic aid post, police assistance booth, including electricity, toilet and sewerage system. Pricing may be done based on current plinth area rates approved by PWD/CPWD/MES for a particular zone. Area is required to be assessed for specific location as per actual site conditions)		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		<p>B. Parking areas and Bus Laybys for Trucks, Buses and Light vehicles</p> <p>(Pricing of parking areas may be done for the quantities of various items based on the approved dimensions and pavement design for a particular terrain and soil. Rates for items may be from respective chapters.)</p> <p>C. Lawn (Providing a lawn planted with grass and its maintenance)</p> <p>(Pricing of lawn may be done as per rates given in the chapter on horticulture for the quantities as per approved dimensions in the drawings)</p>		
8.35		<p>Rumble Strips</p> <p>Provision of 15 nos rumble strips covered with premix bituminous carpet, 15-20 mm high at center, 250 mm wide placed at 1 m center to center at approved locations to control speed, marked with white strips of road marking paint.</p> <p>(The rate per sqm of premix carpet and road marking may be adopted from chapter 5 & 8 respectively for the quantities calculated from approved drawings)</p>	sqm	
8.36		<p>Safety Devices and Signs in Construction Zones</p> <p>Provision and fixing of traffic signs for limited period at suitable locations in construction zone comprising of warning zone, approach transition zone, working zone and terminal transition zone with a minimum distance of 60 cm from the edge of the kerb in case of kerbed roads and 2 to 3 m from the edge of the carriageway in case of un-kerbed roads, the bottom edge of the lowest sign plate to be not less than 2 m above the road level, fixed on 60 mm x 60 mm x 6 mm angle iron post, founded and installed as per approved design and drawings, removed and disposed of after completion of construction work, all as per IRC:SP:55-2001.</p> <p>(The rate for traffic signs are already worked out and given elsewhere in this chapter. The same may be adopted.)</p>	each	
8.37		<p>Portable Barricade in Construction Zone</p> <p>Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5 m in length fitted on a 'A' frame made with 45 x 45 x 5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150 mm in width at an angle of 45°, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001.</p>	each	₹ 4,187.10

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
8.38		Permanent Type Barricade in Construction Zone		
	(i)	With steel components Construction of a permanent type barricade made of steel components, 1.5 m high from road level, fitted with 3 horizontal rails 200 mm wide and 4 m long on 50 x 50 x 5 mm angle iron vertical support, painted with yellow and white strips, 150 mm in width at an angle of 45°, complete as per IRC:SP:55-2001.	each	₹ 6,598.50
	(ii)	With bricks Construction of a permanent type barricade made with brick work in mud mortar, 1.5 m high, 4 m long, 600 mm thick, plastered with cement mortar 1:6, painted with yellow and white strips.	each	₹ 32,734.60
8.39	811	Road Traffic Signals electrically operated Since it is a ready made item commercially produced and erected by specialised firm in the electrical and electronic field, rate may be taken based on market enquiry from firms specialised in this field and ISI certified for the approved design and drawings.		
8.40		Items Related to Underpass/ Subway/ Overhead Bridge/ Overhead Foot Bridge The items involved for underpass/ subway/ overhead bridge/ overhead foot bridge are earthwork, plain cement concrete, plastering, painting, information sign etc. The rates for these items are available in respective chapters which can be adopted for the quantities derived from the approved designs and drawings		
8.41		Traffic Control System and Communication System Providing a traffic control centre and communication system including telecommunication facilities and related accessories, CCTV, radar, vehicle detection camera, central computer system. (These are specialised item of telecommunication system and are the commercial products. The designer is required to contact the manufacturers to ascertain market prices. In case of civil works required to be executed for these installations, pricing may be done as per rates in relevant chapters for quantities derived as per approved design and drawing.)		

Chapter - 8 : Traffic Signs, Markings & Other Road Appurtenances

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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8.42 801 Object Hazard Marking Traffic Signs

Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of high intensity grade sheeting vide MoRT&H technical specification Clause 801.3, fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per IRC guideline/ MoRT&H Technical Specification Clause 801.

(i) 900 mm x 300 mm rectangular object hazard marking traffic signs

each ₹ 3,485.50

8.43 801 Road Safety Convex Mirror

Providing and fixing pole mounting (50 mm dia steel pole of standard height) 800 mm dia strong unbreakable highly reflective road safety convex mirror body made up of polycarbonate having large viewing angle from standard distance (minimum 6 m) firmly fixed to the ground by means of properly designed foundation with M-15 grade cement concrete 450mm x 450mm x 600 mm as per IRC guideline/ MoRT&H Technical Specification Clause 801.

each ₹ 6,519.50

8.44 Suggestive Permanent Type Barricade in Construction Zone

Construction of a permanent type barricade made of wooden components, 1.5 m high from road level, fitted with 3 horizontal planks 200 mm wide and 3.66 m long on 100 x 100mm wooden vertical post, painted with yellow and white strips, 150 mm in width at an angle of 45°, complete as per IRC:SP:55-2001.

B. With wooden components

each ₹ 6,232.40

Chapter - 9

Pipe Culverts

(a) Preamble

1. *Pipe culverts of sizes 1200, 1000 mm dia in single row and double row which are generally used on roads, have been included. Providing and laying of pipe has been included in the rate analysis. Items of auxiliary works as excavation, bedding, backfilling, concrete and masonry shall be analysed under the respective section and paid for separately.*
2. *Analysis has been given for NP3 spun/ hume pipes only, because NP4 pipes are not generally manufactured in this area.*
3. *Cost of any river training and protection work like stone pitching, apron, rivetment, curtain wall etc. has been analysed under the respective item in Chapter 15 of bridge section.*
4. *The joining of pipes is proposed by collar joints.*
5. *The height of filling above the top of the pipe shall not be less than 600 mm.*
6. *The choice between first class bedding and cement cradle bedding will depend on particular situations and the approved design.*
7. *Head walls and other ancillary works shall be costed under respective chapters.*
8. *Backfilling upto 300 mm above top of the pipe shall be carefully done and the soil thoroughly rammed, compacted in layers not exceeding 150 mm.*

Chapter - 9 : Pipe Culverts

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
9.1	2100	PCC 1:3:6 in Foundation Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days as per drawings & MoRT&H technical specifications Clauses 2100.	cum	₹ 9,561.10
9.2	2900	Providing and laying Reinforced Cement Concrete Pipe NP3 / prestressed concrete pipe on first class bedding in single Row Providing and Laying reinforced cement concrete pipe NP3 / prestressed concrete pipe with collar for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRT&H Technical specification Clause 2900.		
	(A)	1200 mm dia	m	₹ 19,964.30
	(B)	1000 mm dia	m	₹ 15,663.20
<i>Note :-</i>	1	<i>In case of cement concrete bedding, quantity of PCC M15 is to be calculated as per design and priced separately and added .</i>		
	2	<i>The rate analysis does not include excavation, cement /masonry works in head walls, backfilling, protection works and parapet walls. The same are to be calculated as per approved design and drawings and priced separately on rates available under respective sections.</i>		
9.3	2900	Providing and laying Reinforced Cement Concrete Pipe NP3 / prestressed concrete pipe on first class bedding in double row Providing and Laying reinforced cement concrete pipe NP3 / prestressed concrete pipe with collar for culverts on first class bedding of granular material in double row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRT&H Technical specification Clause 2900.		
	(A)	1200 mm dia	m	₹ 41,933.90
	(B)	1000 mm dia	m	₹ 33,101.00
<i>Note :-</i>	1	<i>In case of cement craddle bedding, quantity of PCC M15 is to be calculated as per design and priced separately and added .</i>		
	2	<i>The rate analysis does not include excavation, cement /masonry works in head walls, backfilling, protection works and parapet walls. The same are to be calculated as per approved design and drawings and priced separately on rates available under respective sections.</i>		

Chapter - 10

Maintenance of Roads

(a) Preamble

1. *In the case of rain cuts, it has been assumed that some material cut by rain, approximately 25 percent will be available at site which can be retrieved and re-used and the balance 75 percent is required to be provided as fresh material.*
2. *For making up earthen shoulders, it has been assumed that on an average 150 mm filling will be required. Similarly, for striping of excess soil from shoulder, an average depth of 75 mm has been assumed.*
3. *In the case of choking of drain, it has been assumed that half the depth of drain has been filled with earth / debris, which requires clearance.*
4. *During the process of landslide clearance on hill roads, it has been assumed that earth will be disposed off by the dozer on the valley side. In case there is any objection to this arrangement due to particular site conditions, resources like loader and tipper will have to be provided for disposal of earth / debris for the lead involved.*
5. *Pot-hole repair and patchwork are provided to be done by mechanical / manual means.*
6. *The items like slurry seal, fog seal, crack prevention courses, surface dressing for maintenance works has already been included in chapter - 5 and are not been repeated in this chapter.*
7. *The cost of other items like repair of ruts and undulation maintenance earthen shoulders, cross drainage works, minor and major bridges and miscellaneous items like turfing, painting and lettering on km stones, repair to signs, footpath, street lighting, railing, deviders, separators and under passes for pedestrians has been given in the "Report of the Committee on Norms of Maintenance of Roads in India" published by IRC in January' 2001 which may be referred for guidance.*
8. *The repair items related to bridges have been given in chapter - 16.*
9. *Items related with snow clearance has not been considered because the same is not applicable for this State.*

Chapter - 10 : Maintenance of Roads

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
10.1	3002	Restoration of Rain Cuts Restoration of rain cuts with soil , moorum gravel or a mixture of these, clearing the loose soil, benching for 300 mm width laying fresh material in layers not exceeding 250 mm and compaction with plate compactor or power rammer to restore the original alignment, level and slopes as per drawings and MoRT&H technical specification Clause 3002.	cum	₹ 298.10
10.2	3003	Maintenance of Earthen shoulder (filling with fresh selected soil) Making up loss of material / irregularities on shoulders to the design level by adding fresh approved selected soil and compacting it with appropriate equipment at OMC upto a lead of 1000 m as per MoRT&H technical specification Clause 3003.	sqm	₹ 66.40
10.3	3003	Maintenance of Earthen shoulder (Stripping of excess soil) Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor at OMC as per drawing and MoRT&H technical specification Clause 3003.	sqm	₹ 19.10
10.4	3004	Filling Pot-holes and Patch Repairs with open-Graded Premix surfacing, 20mm. Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 511, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per MoRT&H technical specification Clause 3004.2.	sqm	₹ 349.80
10.5	3004	Filling Pot-holes and Patch Repairs with Bituminous concrete, 40mm. Removal of all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 503, back filling the pot holes with hot bituminous material as per clause 511, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per MoRT&H technical specification Clause 3004.2.		
		A. Grading - I (19 mm nominal size)	sqm	₹ 860.70
		B. Grading - II (13 mm nominal size)	sqm	₹ 865.20
10.6	3004.3.3	Crack Filling		

Chapter - 10 : Maintenance of Roads

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Filling of crack using slow - curing bitumen emulsion and applying crusher dust in case crack are wider than 3 mm as per MoRT&H technical specification Clause 3004.3.3	m	₹ 6.90
10.7	3004	Dusting		
		Applying crusher dust to areas of road where bleeding of excess bitumen has occurred as per MoRT&H technical specification Clause 3004.4	sqm	₹ 6.30
10.8	3004.3.2	Fog seal		
	3004.3.4	Crack Prevention Courses		
	3005	Slurry Seal		
	3005	Surface Dressing for Maintenance Works.		
		<i>These items have already been included in chapter 5.</i>		
10.9	3005	Repair of Joint Grooves with Epoxy Mortar		
		Repair of spalled joint grooves of contraction joints, longitudinal joints and expansion joints in concrete pavements using epoxy mortar or epoxy concrete as per MoRT&H technical specification Clause 3005.1	m	₹ 657.50
		<i>Note :- The constituents of epoxy mortar / epoxy concrete will be as per the instruction and manual of the manufacturer.</i>		
10.10	3005.2	Repair of old Joints Sealant		
		Removal of existing sealant and resealing of contraction, longitudinal or expansion joints in concrete pavement with fresh sealant material as per MoRT&H technical specification Clause 3005.2	m	₹ 41.50
10.11	3000	Hill Side Drain Clearance		
		Removal of earth from the choked hill side drain and disposing it on the valley side manually as per MoRT&H technical specification Clause 3000.	m	₹ 57.30
10.12	3000	Land Slide Clearance in soil		
		Clearance of land slides in soil and ordinary rock by a bulldozer D 80 A-12, 180 HP and disposal of the same on the valley side as per MoRT&H technical specification Clause 3000.	cum	₹ 68.20
10.13	3000	Landslide Clearance in Hard Rock Requiring Blasting		
		Clearing of land slide in hard rock requiring blasting for 50 per cent of the boulders and disposal of the same on the valley side as per MoRT&H technical specification Clause 3005.2	cum	₹ 139.70

Note :- Credit for the rock if found acceptable as construction material shall be afforded.

Chapter - 11

Horticulture

(a) Preamble

- 1 *The items of turving with sods and seeding and mulching have been included in the chapter - 3 for earthwork.*
- 2 *Analysis of rates for wrought iron and mild steel welded work has been included to cater for any miscellaneous work in connection with horticulture, fencing and traffic sign.*
- 3 *In the rate analysis of some items, the quantities of sub-items involved in that analysis, like excavation for foundation, foundation concrete, painting, lettering etc. have been given. The rates for such items may be taken from the relevant chapters where the same have already been analysed.*
- 4 *As grass and plantation need more care and supervision, one mate has been provided for every 10 mazdoors in case of horticulture.*

Chapter - 11 : Horticulture

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
11.1	307	Spreading of Sludge / Farm Yard Manure / good Earth		
		Spreading of sludge/ farm yard manure/ good earth in required thickness (cost of sludge, farm yard manure or/ and good earth to be paid for separately) MoRT&H technical specifications Clauses 307.	cum	₹ 80.80
11.2	307	Grassing with 'Doobs' Grass		
		Grassing with 'Doobs' grass including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for moving including supplying good earth if needed as per MoRT&H technical specifications Clauses 307.		
		i. In rows 150 mm apart in all direction	sqm	₹ 15.20
		ii. In rows 75 mm apart in all direction	sqm	₹ 19.30
		iii. In rows 50 mm apart in all direction	sqm	₹ 23.40
11.3	307	Planting and Maintaining of Flowering Plants and Shrubs		
		a. Planting flowering plants and shrubs in central verge (200 plants and 800 shrubs in two rows in one km length of road where width of verge is 3 m and above) as per MoRT&H technical specifications Clauses 307.	km	₹ 77,599.10
		b. Maintenance of flowering plants and shrubs in central verge for one year	km	₹ 2,92,684.90
11.4		Wrought Iron and Mild Steel Welded Work		
		Wrought iron and mild steel welded work (using angles, square bars, tees and channel in grills, grating frames, gates and tree guards of any size and design etc. including cost of screens and welding rods or bolts and nuts complete fixed in position but without the cost of excavation and concrete for fixing which will be paid separately as per MoRT&H technical specifications Clauses and as directed.	kg	₹ 119.30
11.5	307	Planting and Maintaining of Permanent Hedges		
		A. Planting permanent hedges including digging of trenches		
		Planting permanent hedges including digging of trenches, 60 cm wide and 45 cm deep, refilling the excavated earth mixed with farmyard manure, supplied at the rate of 4.65 cum per 100 metres and supplying and planting hedge plants at 30 cm apart	m	₹ 367.60
		B. Maintenance of hedge for one year	m	₹ 294.00
11.6	307	Planting of Trees and their Maintenance for one Year		

Chapter - 11 : Horticulture

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Planting of trees by the road side (Avenue trees) in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge manure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year.	nos	₹ 1,437.50
11.7		Making Tree Guard 53 cm dia and 1.3 m High as per Design from Empty Bitumen Drums Making tree guard 53 cm dia and 1.3 m high as per design from empty bitumen drum, slit suitably to permit sun and air including providing and fixing 2 nos MS sheet rings 50 x 0.5 mm with rivets, complete in all respect.	nos	₹ 665.20
11.8		Making Tree Guard 53 cm dia and 2 Metre High as per Design from Empty Bitumen Drums Making tree guard 53 cm dia and 2 metres high as per design from empty bitumen drums, slit suitably to permit sun and air including providing and fixing four legs 40 cm long of 30 x 3 mm MS riveted to tree guard and providing and fixing 2 nos MS sheet rings 50 x 0.5 mm with rivets complete in all respects.	nos	₹ 1,128.20
11.9		Tree Guard with MS Iron Providing and fixing MS iron tree guard 60 cm dia and 2 metre high above ground level formed of 4 Nos (25 x 6 mm) and 8 Nos (25 x 3 mm) vertical MS riveted to 3 Nos (25 x 6 mm) iron rings in two halves, bolted together with 8 mm dia and 30 mm long bolts including painting two coats with paint of approved brand over a coat of priming, complete in all respects.	nos	₹ 3,029.40
11.10		Tree Guard with MS Angle Iron and Steel Wire Providing and fixing tree guard 0.60 metre square, 2.00 metre high fabricated with MS angle iron 30 x 30 x 3 mm, MS iron 25 x 3 mm and steel wire 3 mm dia welded and fabricated as per design in two halves bolted together.	nos	₹ 4,045.70
11.11		Compensatory Afforestation Planting trees as compensatory afforestation at the rate of 290 trees per hectare at a spacing of 6 m by grubbing and leveling the ground upto a depth of 150 mm, digging holes 0.9 m dia, 1 m deep, mixing farm yard/sludge manure with soil, planting of sapling 2 m high with 25 cm dia stem, backfilling the hole and watering.	Hectare	₹ 1,54,283.70
11.12	307	Making Lawns including Ploughing and Dragging with 'Swagha' Breaking of Clod Making lawns including ploughing and breaking of clod, removal of rubbish, dressing and supplying doobs grass roots and planting at 15 cm apart, including supplying and spreading of farm yard manure at rate of 0.18 cum per 100 sqm	sqm	₹ 15.70

Chapter - 11 : Horticulture

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
11.13	307	Maintenance of Lawns or Turfing of Slopes		
		Maintenance of lawns or Turfing of slopes (rough grassing) for a period of one year including watering etc.	sqm	₹ 271.00
11.14	307	Turfing Lawns with Fine Grassing including Ploughing, Dressing		
		Turfing lawns with fine grassing including ploughing, dressing including breaking of clods, removal of rubbish, dressing and supplying doobs grass roots at 10 cm apart, including supplying and spreading of farm yard manure at rate of 0.6 cum per 100 sqm.	sqm	₹ 24.90
11.15	307	Maintenance of Lawns with Fine Grassing for the First Year		
		Maintenance of lawns with fine grassing for the first year including watering etc	sqm	₹ 230.60
11.16	308	Renovation Lawns including, Weeding, Forking the Ground, Top Dressing with Forked Soil		
		Renovation lawns including, weeding, forking the ground, top dressing with forked soil, watering and maintenance the lawns, for 30 days or more, till the grass forms a thick lawn, free from weeds, and fit for moving and disposal of rubbish as directed, including supplying good earth, if needed but excluding the cost of well decayed farm yard manure.	sqm	₹ 24.40
11.17	308	Supply at Site Well Decayed Farm Yard Manure		
		Supply at site of work well decayed farm yard manure, from any available source, approved by the engineer in charge including screening and stacking.	cum	₹ 762.00
11.18		Half Brick Circular Tree Guard, in 2nd Class Brick, internal diameter 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground		
		Half brick circular tree guard, in 2nd class brick, internal diameter 1.25 metres, and height 1.2 metres, above ground and 0.20 metre below ground, bottom two courses laid dry, and top three courses in cement mortar 1:6 (1 cement 6 sand) and the intermediate courses being in dry honey comb masonry, as per design complete.	each	₹ 3,755.30
11.19		Edging with 2nd Class Bricks, Laid Dry Lengthwise		
		Edging with 2nd class bricks, laid dry lengthwise, including excavation, refilling, consolidation, with a hand packing and spreading nearly surplus earth within a lead of 50 metres.	m	₹ 78.00

Chapter - 12

Foundation

(a) Preamble

- 1 *Excavation for structures has been provided both by manual and mechanical means. The rate relevant to a particular situation may be adopted.*
- 2 *The earth excavated from foundation has been proposed to be backfilled in the foundation trenches and balance quality utilised for road work locally except for marshy soil where disposal has been provided.*
- 3 *For excavation in marshy soil, extra provision of labour for filling with carted earth has been provided in a separate item. Cost of carted earth has been worked out separately if the same is not available from the adjoining area.*
- 4 *The rock surface for foundations is to be prepared which has been analysed accordingly.*
- 5 *In case of rocks, excavation has been considered upto a depth of 3 m only.*
- 6 *Embedding of foundation in soft and hard rocks has been provided as required by the specifications.*
- 7 *Dewatering of rain water is part of the overhead. Dewatering may be provided in excavation for foundation on percentage basis as per site condition and decision of the Engineer-in-Charge.*
- 8 *Mixing of cement concrete has been considered both by using concrete mixer with weight batching facility fitted with water measuring device and batching plant. The rate can be adopted depending upon availability of equipment and as approved by the Engineer.*
- 9 *The coarse for cement concrete shall be as per IS : 383. Fine aggregate for cement concrete shall be obtained from the approved selected quarry.*
- 10 *Description of items has been given very briefly. Relevant clauses of MoRT&H Specifications may be referred for detailed specification.*
- 11 *The rate analysis for sinking of well foundation has been analysed with unit as Cum. Sinking of Well for twin D type has also been included.*
- 12 *Pneumatic sinking is a specialised job. All safety precaution as per IS:4138 are required to be taken. Medical supervision for such works is considered very essential. Depth of pneumatic has been restricted to 30 m below normal water level.*
- 13 *Pile driving rigs including vibratory hammers are assumed to be self contained with power units and necessary accessories required for driving.*
- 14 *The quantity of concrete which is required to be stripped off upto a minimum height of 600 mm above the designed top level of the pile has been taken into account in the rate analysis.*
- 15 *Rate analysis for various type of piles like bored cast-in-situ, driven precast RCC pile and driven steel piles of H section have been included. If the steel casing in case of driven pile is required to be retained, the same is required to be priced separately.*
- 16 *The amount indicated for testing of piles are taken with an escalation @ 10% based on the rate of base year 2017-2018.*
- 17 *The levelling course below the pile cap is proposed with M 15 grade concrete.*
- 18 *Steel reinforcement for cement concrete works are required to be provided separately. The rate for the same has been analysed.*

- 19 *Appendix-4 of IRC : 78-2000 may be referred regarding precautions to be taken during sinking of wells.*
- 20 *In case of blasting during sinking of wells the inner face of the curb is required to be protected with the steel plates of thickness not less than 10 mm upto top level of well curb. For height above top of the curb, the thickness of steel plate may be reduced to 6 mm. This extra height of steel lining should be limited to 3 m.*
- 21 *The concrete mix used in bottom plug shall have a minimum cement content of 363 Kg / cum and a slump of about 150 mm - 200 mm to permit easy flow of concrete through tremie to fill up all cavities.*
- 22 *Necessary safety precautions shall be taken for excavation on open foundations for which guidance may be taken from IS : 3764.*
- 23 *A levelling course of 100 mm thickness in M 10 (1:3:6) shall be provided before laying open foundations.*
- 24 *In the case of open foundation, dewatering shall not be permitted from the placing of concrete upto 24 hours after placement.*
- 25 *In case of open foundation in rock, the trenches around the footing shall be filled up with concrete of M 15 grade upto a level of 0.6 m of hard rock and 1.5 m of soft rock above the foundation level. The portion above this may be filled up by boulders grouted with cement.*
- 26 *When there are two or more compartments in a well, the lower edge of the cutting edge of the middle stems of such wells shall be kept about 300 mm above that of outer stems to prevent rocking.*
- 27 *The well curb shall be in RCC of mix not leaner than M 25 grade with minimum steel reinforcement of 72 kg/ cum excluding bond rods.*
- 28 *The top of the bottom plug shall be at least 300 mm above top of curb.*
- 29 *No dewatering shall be carried out within 7 days of casting of bottom plug.*
- 30 *In case of cement concrete piles, the minimum grade of concrete shall be M 35 with minimum cement content of 400 kg / cum.*
- 31 *The top of the pile shall project 50 mm into the pile cap and reinforcement of pile shall be fully anchored in pile cap.*
- 32 *The minimum thickness of pile cap should be atleast 0.6 m or 1.5 times the diameter of the pile whichever is more.*
- 33 *Guidance for piles is to be obtained from IS : 2911.*
- 34 *Concrete in driven cast-in-situ piles shall be cast upto a height of 600 mm above the designed top level of pile, which shall be stripped off to obtain sound concrete either before final set or after 3 days.*
- 35 *The provision of Coarse sand has not been kept, because the same is not available in the State of Tripura.*
- 36 *Rates of all materials used in the analysis are at the place of origin as mentioned in the materials sheet which is excluding the loading,unloading and haulage.*
- 37 *Consumption of Bricks has been considered as per the sizes of the available bricks in Tripura.*

- 38 *Additional items by using jhama brick aggregates (i.e. locally available materials) have also been considered in Plain Cement Concrete.*
- 39 *All rates for concreting work are inclusive of necessary Formwork as per section 1500 of the MoRT&H specification.*
- 40 *Sand can be either coarse or fine as required/ available. Here, provision of coarse sand has not been considered up to RCC Grade M 35 only due to non-availability of coarse sand in Tripura. However, if design of concrete dictates for use of coarse sand, then separate analysis may be taken as per site condition.*
- 41 *The analysis has been made considering 1 Km lead from the Batching plant. If lead is more than necessary haulage of the concrete may be added.*

Chapter - 12 : Foundation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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12.1 304 Excavation for Structures

Earthwork in excavation for structures as per drawing and MoRT&H technical specifications Clause 304 including setting out, construction of shoring & bracing, removal of stumps & other deleterious material and disposal upto a lead of 50 m, dressing of sides & bottom and backfilling in trenches with excavated suitable material.

I Ordinary Soil

A. By Manual Means

(i)	Upto 3 m depth	cum	₹ 458.20
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- Note*
- 1 *Cost of dewatering may be added, when required, up to 10 per cent labour cost. Assesment for dewatering shall be made as per site conditions.*
 - 2 *The cost of shoring & shuttering, where needed, may be added @ 3 per cent on cost of excavation for open foundation.*
 - 3 *The excavated earth if found suitable can be used partly for backfilling in trenches and partly for road work. Hence cost of disposal has not been added except for marshy soil. This note is common to all cases of item 12.1 excluding marshy soil*

(ii)	3 m to 6 m depth	cum	₹ 544.10
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- Note*
- 1 *Cost of dewatering may be added, when required, up to 15 per cent labour cost.*
 - 2 *The cost of shoring & shuttering, where needed, may be added @ 10 per cent on cost of excavation for open foundation.*

(iii)	above 6 m depth	cum	₹ 687.30
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- Note*
- 1 *Cost of dewatering may be added, when required, up to 20 per cent labour cost.*
 - 2 *The cost of shoring & shuttering, where needed, may be added @ 15 per cent on cost of excavation for open foundation.*

B. By Mechanical Means

(i)	Upto 3 m depth	cum	₹ 66.40
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- Note*
- 1 *Cost of dewatering may be added, when required, up to 5 per cent labour cost. Assesment for dewatering shall be made as per site conditions.*
 - 2 *The cost of shoring & shuttering, where needed, may be added @ 3 per cent on cost of excavation for open foundation.*
 - 3 *The excavated earth if found suitable can be used partly for backfilling in trenches and partly for road work. Hence cost of disposal has not been added except for marshy soil. This note is common to all cases of item 12.1 excluding marshy soil*

(ii)	3 m to 6 m depth	cum	₹ 75.90
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Chapter - 12 : Foundation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
<i>Note</i>	1	<i>Cost of dewatering may be added, when required, up to 7.5 per cent labour cost.</i>		
	2	<i>The cost of shoring & shuttering, where needed, may be added @ 10 per cent on cost of excavation for open foundation.</i>		
		(iii) above 6 m depth	cum	₹ 88.60
<i>Note</i>	1	<i>Cost of dewatering may be added, when required, up to 10 per cent of labour cost.</i>		
	2	<i>The cost of shoring & shuttering, where needed, may be added @ 15 per cent on cost of excavation for open foundation.</i>		
	3	<i>Labour provided for excavation by mechanical means includes that required for trimming of bottom and side slopes.</i>		
II		Ordinary rock (not requiring blasting)		
		A. By Manual Means		
		(i) Upto 3 m depth	cum	₹ 572.80
<i>Note</i>	1	<i>Cost of dewatering may be added, when required, up to 10 per cent labour cost. Assesment for dewatering shall be made as per site conditions.</i>		
	2	<i>The cost of shoring & shuttering, where needed, may be added @ 3 per cent on cost of excavation for open foundation.</i>		
		B. By Mechanical Means		
		(i) Upto 3 m depth	cum	₹ 82.20
<i>Note</i>	1	<i>Cost of dewatering may be added, when required, up to 10 per cent labour cost. Assesment for dewatering shall be made as per site conditions.</i>		
	2	<i>The cost of shoring & shuttering, where needed, may be added @ 3 per cent on cost of excavation for open foundation.</i>		
	3	<i>In case of rock, foundation beyond 3 m is not dug and hence not included.</i>		
III		Hard rock (required blasting)		
		A. By Manual Means		
		Upto 3 m depth	cum	₹ 917.70
<i>Note</i>	1	<i>Cost of dewatering @ 10 per cent may be added, where required. Assessment for dewatering shall be made as per site condition.</i>		
	2	<i>In case of rock, foundation beyond 3 m is not dug and hence not included.</i>		
IV		Hard rock (blasting prohibited)		
		A. By Mechanical Means		

Chapter - 12 : Foundation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Upto 3 m depth including 1.5 m depth in hard rock	cum	₹ 617.40
<i>Note</i>	1	<i>Cost of dewatering upto 10 per cent may be added, where required. Assessment for dewatering shall be made as per site conditions.</i>		
	2	<i>In case of rock, foundation beyond 3 m is not dug and hence not included.</i>		
	V	Marshy soil		
		A. By Manual Means	cum	₹ 672.40
<i>Note</i>	1	<i>Cost of dewatering @ 30 per cent of (a) may be added.</i>		
	2	<i>Shoring & shutting @ 15 per cent of (a) may be added where required.</i>		
	3	<i>Since marshy soil cannot be used in filling in trenches, it shall be removed & replaced by approved quality of soil. The labour cost includes labour input for disposal of marshy soil excavated pit with a lead upto 50 m.</i>		
	4	<i>Marshy soil is generally available upto 3 m depth. The rate has, therefore, been done upto 3 m depth of excavation. For deeper excavation refer analysis in item 12.1.</i>		
		B. By Mechanical Means	cum	₹ 285.00
<i>Note :-</i>	1	<i>Cost of dewatering @ 30 per cent of (a) may be added.</i>		
	2	<i>Shoring & shutting @ 15 per cent of (a) may be added where required.</i>		
	3	<i>Since marshy soil cannot be used in filling in trenches, it shall be removed & replaced by approved quality of soil. The labour cost includes labour input for disposal of marshy soil excavated pit with a lead upto 50 m.</i>		
	4	<i>Marshy soil is generally available upto 3 m depth. The rate has, therefore, been done upto 3 m depth of excavation. For deeper excavation refer analysis in item 12.1.</i>		
	VI	Backfilling in Marshy Foundation Pits		
		A. By Manual Means	cum	₹ 1,120.70
12.2	304	Filling Annular Space Around Footing in Rock		
		Lean cement concrete 1:3:6 nominal mix. Rate may be taken as per item 12.4.		
12.3	304	Sand Filling in foundation trenches as per drawing & MoRT&H technical specification clause 304.	cum	₹ 1,168.00
12.4	2100	PCC 1:3:6 in Foundation		
		Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days as per drawings & MoRT&H technical specifications Clauses 2100. (including centering, shuttering, staging etc. but excluding reinforcement)	cum	₹ 9,561.10

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
12.5	1300	Brick masonry work in cement mortar in foundation completed excluding pointing & plastering as per drawing & MoRT&H technical specifications Clauses 1300.		
	I	Brick masonry in 1:2 cement mortar	cum	₹ 9,952.60
	II	Brick masonry in 1:3 cement mortar	cum	₹ 9,610.40
	III	Brick masonry in 1:4 cement mortar	cum	₹ 9,377.30
	IV	Brick masonry in 1:6 cement mortar	cum	₹ 9,157.60
12.6	1500, 1700, 2100	Plain / Reinforced cement concrete in open foundation as per drawings & MoRT&H technical specifications Clauses 1500, 1700, 2100. (including centering, shuttering, staging etc. but excluding reinforcement)		
	A.	PCC Grade M 15	cum	₹ 10,018.10
	B.	PCC Grade M 20	cum	₹ 10,724.40
	C.	RCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 10,802.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 10,587.20
	D.	PCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,248.20
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,037.40
	E.	RCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,291.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,118.00
	F.	PCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,280.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,064.50
	G.	RCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,338.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,125.90
	H.	RCC Grade M 35		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Case - I : Using Concrete Mixer	cum	₹ 11,435.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,226.20
		<i>Note :- Where ever concrete is carried out using batching plant, transit mixer, concrete pump, Admixtures @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.</i>		
12.7	1200	Providing and Constructing Temporary Island 16 m diameter for Construction of Well Foundation for 8 m dia. Well.		
	A.	Assuming depth of water 1.0 m and height of island to be 1.25 m.	no	₹ 26,576.00
	B.	Assuming depth of water 4.0 m and height of island to be 4.5 m.	no	₹ 5,34,553.00
		<i>Note :- For other well diameters rate can be worked out on the basis of cross-sectional area of well. The diameter of the island shall be in the conformity with clause 1203.2 of MoRT&H specifications.</i>		
	C.	Providing and constructing one span service road to reach island location from one pier location to another pier location	m	₹ 2,327.50
12.8	1200 & 1900	Providing and Laying Cutting Edge of Mild Steel weighing 40 kg per metre for Well Foundation complete as per drawings & MoRT&H technical specifications Clauses 1200 & 1900	t	₹ 1,19,302.20
12.9	1200, 1500, 1700	Plain / Reinforced cement concrete in well foundation as per drawings & MoRT&H technical specifications Clauses 1200, 1500, 1700. (including centering, shuttering, staging etc. but excluding reinforcement)		
	A.	Well Curb		
	i)	RCC M 20 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 12,465.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,217.20
	ii)	RCC M 25 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 13,109.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,859.50
	iii)	RCC M 35 Grade		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Case - I : Using Concrete Mixer	cum	₹ 13,322.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 13,079.20
		B. Well Steining		
		i) PCC M 15 Grade	cum	₹ 10,596.40
		ii) PCC M 20 Grade	cum	₹ 11,343.20
		iii) RCC M 20 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 11,426.90
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,199.10
		iv) PCC M 25 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 11,927.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,702.70
		v) RCC M 25 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 12,017.20
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,787.90
		vi) PCC M 30 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 11,989.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,760.00
		vii) RCC M 30 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 12,051.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,825.10
		viii) RCC M 35 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 12,212.40
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,989.30
		ix) RCC M 40 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 13,986.91
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 13,679.00

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
C. Bottom Plug				
i)		PCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 11,497.20
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 10,995.60
ii)		PCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,804.50
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 11,299.50
iii)		PCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,864.80
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 11,363.20
iv)		PCC Grade M 35		
		Case - I : Using Concrete Mixer	cum	₹ 12,005.50
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 11,500.60
D. Intermediate plug				
i)		PCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 11,004.50
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 10,524.30
ii)		PCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,298.60
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 10,815.30
iii)		PCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,356.30
		Case - II : With Batching Plant, Transit Mixer and Crane / Concrete Pump	cum	₹ 10,876.20
E. Top Plug				
i)		PCC Grade M 15	cum	₹ 9,632.80
ii)		PCC Grade M 20	cum	₹ 10,311.92

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		iii) PCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 10,841.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 10,638.50
		iv) PCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 10,921.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 10,690.40
		F. Well Cap		
		i) RCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 10,742.90
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 10,609.70
		ii) RCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,332.90
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,245.70
		iii) RCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,338.70
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,224.70
		iv) RCC Grade M 35		
		Case - I : Using Concrete Mixer	cum	₹ 11,435.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,326.20
		v) RCC M 40 Grade		
		Case - I : Using Concrete Mixer	cum	₹ 12,992.20
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,808.60
12.10	1200	Sinking of wells of circular shape in all kinds of soil, through all kinds of stratas and category, with or without water by all methods, other than pneumatic sinking including construction of cofferdams, wherever necessary including dressing for laying the well curbs, removal of underground snags, if any, such as logs, isolated boulders etc. encountered during sinking including use of Kentledge including supports, loading and unloading of weight etc.as per drawing and technical specification and removal of earths etc. with all lifts and lead upto 1000 m as per MoRT&H technical specification section 1200.		
		(i) Depth below bed level upto 5 m	cum	₹ 478.90

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		(ii) Depth beyond 5 m upto 10 m	cum	₹ 775.00
		(iii) Depth beyond 10 m upto 15 m	cum	₹ 1,151.00
		(iv) Depth beyond 15 m upto 20 m	cum	₹ 1,687.00
		(v) Depth beyond 20 m upto 30 m	cum	*
		* Add @ 7.5 percent of cost for every additional metre depth of sinking over the rate of sinking for the previous metre.		
12.11	1200	Sinking of twin D type wells in all kinds of soil, through all strata and category, with or without water by all methods, other than pneumatic sinking including construction of cofferdams, wherever necessary including dressing for laying the well curbs, removal of underground snags, if any, such as logs, isolated boulders etc. encountered during sinking including use of Kentledge including supports, loading and unloading of weight etc.as per drawing and technical specification and removal of earths etc. with all lifts and lead upto 1000 m as per MoRT&H technical specification section 1200.		
		(i) Depth below bed level upto 5 m	cum	₹ 546.50
		(ii) Depth beyond 5 m upto 10 m	cum	₹ 876.30
		(iii) Depth beyond 10 m upto 15 m	cum	₹ 1,304.80
		(iv) Depth beyond 15 m upto 20 m	cum	₹ 1,914.60
		(iv) Depth beyond 20 m upto 30 m	cum	*
		* Add @ 7.5 percent of cost for every additional metre depth of sinking over the rate of sinking for the previous metre.		
12.12	1200	Sand Filling in Wells complete as per Drawing & MoRT&H technical specifications Clauses 1200.	cum	₹ 1,168.00
12.13	1200 & 1900	Providing Steel Liner 10 mm thick for Curbs and 6 mm thick for Steining of Wells including Fabricating and Setting out as per Detailed Drawing & MoRT&H technical specifications Clauses 1200 & 1900	t	₹ 1,21,347.80
12.14	1100, 1700	Bored Cast-in-Situ M-35 grade RCC pile excluding reinforcement complete as per Detailed Drawing & MoRT&H technical specifications Clauses 1100, 1700 and removal of excavated earth with all lifts and lead upto 1000 m		
	A.	750 mm dia	m	₹ 9,006.30
	B.	1000 mm dia	m	₹ 15,057.10
	C.	1200 mm dia	m	₹ 19,896.20

Chapter - 12 : Foundation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
12.15	1100, 1700	Driven Cast-in-place vertical M-35 grade RCC pile excluding reinforcement complete as per Detailed Drawing & MoRT&H technical specifications Clauses 1100, 1700.		
	A.	750 mm dia	m	₹ 7,172.30
	B.	1000 mm dia	m	₹ 11,952.40
	C.	1200 mm dia	m	₹ 17,358.90
	<i>Note :-</i>	<i>1</i> The quantity of concrete required to be removed above the designed top level of concrete, if any, will be provided for in the rate analysis.		
		<i>2</i> In case steel lining is included in the design for driven cast-in-situ pile and is planned to be retained, the same may be included in the rate analysis. In case the temporary steel casing used during casting is planned to be removed, an additional cost @ 0.50 per cent of cost of concrete may be provided to cover its usage.		
12.16	1100, 1700	Driven precast vertical M-35 grade RCC pile excluding reinforcement complete as per Detailed Drawing & MoRT&H technical specifications Clauses 1100, 1700.		
	A.	500 mm dia	m	₹ 3,198.40
	B.	750 mm dia	m	₹ 5,914.70
	C.	1000 mm dia	m	₹ 10,043.90
	<i>Note :-</i>	The quantity of concrete required to be removed above the designed top level of concrete, if any, will be provided for in the rate analysis.		
12.17	1100, 1700	Driven precast vertical M-35 grade RCC pile excluding reinforcement complete as per detailed Drawing & MoRT&H technical specifications Clauses 1100, 1700.		
	A.	300 mm x 300 mm	m	₹ 1,990.10
	B.	500 mm x 500 mm	m	₹ 3,687.10
	C.	750 mm x 750 mm	m	₹ 7,458.00
	<i>Note :-</i>	The quantity of concrete required to be removed above the designed top level of concrete, if any, will be provided for in the rate analysis.		
12.18	1100, 1900	Driven vertical steel piles complete as per detailed Drawing & MoRT&H technical specifications Clauses 1100, 1900.		
	A.	400 x 250 mmH section steel column (ISHB Series)	m	₹ 7,616.80
	B.	450 x 250 mmH section steel column (ISHB Series)	m	₹ 8,596.10

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
12.19	1100	Pile load test on single vertical pile in accordance with IS : 2911 (Part - IV)		
	a.	Initial and routine load test	t	₹ 900.00
	b.	Lateral load test	t	₹ 14,500.00
12.20	1100, 1500, 1700	Reinforced cement concrete in pile cap complete as per drawings & MoRT&H technical specifications Clauses 1100, 1500, 1700. (including centering shuttering, staging etc. but excluding reinforcement)		
	i)	RCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 10,782.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 10,590.00
	ii)	RCC Grade M 25		
		Case - I : Using Concrete Mixer	cum	₹ 11,360.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,167.50
	iii)	RCC Grade M 30		
		Case - I : Using Concrete Mixer	cum	₹ 11,433.20
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,240.50
	iv)	RCC Grade M 35		
		Case - I : Using Concrete Mixer	cum	₹ 11,585.80
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,393.20
12.21	1100, 1700	Levelling Course for Pile cap		
		Providing and laying of PCC M15 levelling course 100 mm thick below the pile cap. (including centering, shuttering, staging etc. but excluding reinforcement)		
		Case - I : Using Concrete Mixer	cum	₹ 9,632.80
12.22	1600	Supplying, fitting & placing uncoated Mild steel reinforcement in foundation complete as per drawings & MoRT&H technical specifications Clauses 1600.	t	₹ 89,082.40
12.23	1100, 1700	Bored Cast-in-Situ M-30 grade RCC pile excluding reinforcement complete as per Detailed Drawing & MoRT&H technical specifications Clauses 1100, 1700 and removal of excavated earth with all lifts and lead upto 1000 m.		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
	A.	750 mm dia	m	₹ 8,944.20
	B.	1000 mm dia	m	₹ 14,946.70
	C.	1200 mm dia	m	₹ 19,737.20
12.24	1600	Supplying, fitting & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar reinforcement in foundation complete as per drawings & MoRT&H technical specifications Clauses 1600.	t	₹ 91,240.90

ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)

12.25	2100	PCC 1:3:6 (using jhama brick aggregate) in Foundation		
		Plain cement concrete 1:3:6 nominal mix in foundation (using jhama brick aggregate) 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days as per drawings & MoRT&H technical specifications Clauses 2100. (including centering, shuttering, staging etc. but excluding reinforcement)	cum	₹ 8,479.80
12.26	1500, 1700, 2100	Plain / Reinforced cement concrete (using jhama brick aggregate) in open foundation as per drawings & MoRT&H technical specifications Clauses 1500, 1700, 2100. (including centering, shuttering, staging etc. but excluding reinforcement)		
	A.	PCC Grade M 15 (using jhama brick aggregate)	cum	₹ 9,133.10
	B.	PCC Grade M 20 (using jhama brick aggregate)	cum	₹ 9,938.60
12.27	1200, 1500, 1700	Plain / Reinforced cement concrete (using jhama brick aggregate) in well foundation as per drawings & MoRT&H technical specifications Clauses 1200, 1500, 1700. (including centering, shuttering, staging etc. but excluding reinforcement)		
	A.	Well Steining		
	i)	PCC M 15 Grade (using jhama brick aggregate)	cum	₹ 9,660.50
	ii)	PCC M 20 Grade (using jhama brick aggregate)	cum	₹ 10,512.70
	B.	Intermediate Plug		
	i)	PCC Grade M 20 (using jhama brick aggregate)		
		Case - I : Using Concrete Mixer	cum	₹ 10,245.10
	C.	Top Plug		
	i)	PCC Grade M 15 (using jhama brick aggregate)	cum	₹ 8,781.80
	ii)	PCC Grade M 20 (using jhama brick aggregate)	cum	₹ 9,556.40

Chapter - 13

Sub-structure

(a) Preamble

- 1 *Although, Substructures are generally constructed in cement concrete, the rate analysis for brick masonry in cement mortar 1:3, 1:4 have also been included which can be adopted if permitted by design. Stone masonry is not considered, because the same is not available in this state.*
- 2 *The cost of formwork will vary with the height of the substructure. Provision has been made accordingly.*
- 3 *As the higher grade of concrete is costlier, the provision made for formwork on percentage basis has been suitably adjusted to make it compatible with other grades.*
- 4 *Bridge bearing, being commercial items produced by specialised firms with imported technology and parts, the rates for the same are required to be ascertained from the market for the approved design and technical specifications.*
- 5 *Filter media & backfilling behind abutment are required to be provided as per guidelines in IRC:78-2000.*
- 6 *Weep holes shall be provided as per clause 2706 of MoRT&H specifications.*
- 7 *In case of roller cum rocker bearings, only full circular rollers are to be provided.*
- 8 *All bearings shall be set truly level so as to have full & even seating.*
- 9 *For elastomeric bearings, the concrete surface shall be leveled such that the variation is not more than 1.5 mm from a straight edge placed in any direction across the area.*
- 10 *The bearing should be procured only from those manufacturers who have been pre-qualified by MoRT&H.*
- 11 *The bottoms of girders resting on the bearing shall be plane and truly horizontal.*
- 12 *For spans in grade, the bearing shall be placed horizontal by using sole plates for suitably designed RCC pedestals.*
- 13 *Consumption of Bricks has been considered as per the sizes of the available bricks in Tripura.*
- 14 *Additional items by using jhama brick aggregates (i.e. locally available materials) have also been considered in Plain Cement Concrete.*
- 15 *All rates for concreting work are inclusive of necessary Formwork as per section 1500 of the MoRT&H specification.*
- 16 *The analysis has been made considering 1 Km lead from the Batching plant. If lead is more than necessary haulage of the concrete may be added.*
- 17 *Coarse sand has not been considered in this chapter, as the same is not available in Tripura. Fine sand (As per IS : 383 and conforming to Clause 602.2.4 as per MoRT&H specification) is considered analysis purpose only. However, if design of concrete dictates for use of coarse sand, then separate analysis may be taken as per site condition.*

Chapter - 13 : Sub-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
13.1	1300, 2200	Brick masonry work in cement mortar in substructure complete excluding pointing & plastering, as per drawing & MoRT&H technical specification Clauses 1300, 2200.		
	I	In 1:3 cement mortar	cum	₹ 10,208.90
	II	In 1:4 cement mortar	cum	₹ 9,961.90
13.2	1300, 2200	Pointing with cement mortar on brickwork in substructure as per drawing & MoRT&H technical specification Clauses 1300, 2200.		
	I	In 1:3 cement mortar	sqm	₹ 96.40
	II	In 1:4 cement mortar	sqm	₹ 93.50
13.3	1300, 2200	Plastering with cement mortar 15 mm thick on brickwork in substructure as per MoRT&H technical specification Clauses 1300 & 2200		
	I	In 1:3 cement mortar	sqm	₹ 253.10
	II	In 1:4 cement mortar	sqm	₹ 229.60
13.4	1500, 1700, 2200	Plain/reinforced cement concrete in substructure complete including formwork as per drawings & MoRT&H technical specification Clauses 1500, 1700, 2200. (including centering, shuttering, staging etc. but excluding reinforcement)		
	i)	PCC M 15 Grade (upto 5 m height)	cum	₹ 10,596.40
	ii)	PCC M 20 Grade (upto 5 m height)	cum	₹ 11,343.20
	iii)	PCC M 25 Grade		
	a.	upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 11,927.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,702.70
	b.	For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,387.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,153.70
	c.	For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,968.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,724.00

Chapter - 13 : Sub-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		iv) PCC M 30 Grade		
		a. upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 11,989.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,760.00
		b. For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,451.40
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,213.30
		c. For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 13,035.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,786.30
		v) RCC M 20 Grade		
		a. upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 11,426.90
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,199.10
		b. For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 11,867.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,630.80
		c. For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,424.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,176.50
		vi) RCC M 25 Grade		
		a. upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 12,017.20
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,787.90
		b. For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,358.00

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,122.10
	c.	For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 13,066.00
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,816.60
vii)		RCC M 30 Grade		
	a.	upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 12,051.30
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,825.10
	b.	For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,411.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,178.10
	c.	For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,926.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,684.00
viii)		RCC M 35 Grade		
	a.	upto 5 m height		
		Case - I : Using Concrete Mixer	cum	₹ 12,212.40
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 11,989.30
	b.	For height above 5 m upto 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,496.00
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,267.70
	c.	For height above 10 m		
		Case - I : Using Concrete Mixer	cum	₹ 12,921.80
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump	cum	₹ 12,685.80

Chapter - 13 : Sub-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
13.5	1600 & 2200	Supplying, fitting & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar reinforcement in substructure complete as per drawings & MoRT&H technical specification Clauses 1600, 2200.	t	₹ 91,483.20
13.6	1600 & 2200	Supplying, fitting & placing MS bar reinforcement in substructure complete as per drawings & MoRT&H technical specification Clauses 1600, 2200.	t	₹ 89,082.40
13.7	2706, 2200	Providing weep holes in brick masonry/ stone masonry, plain/ reinforced concrete abutment, wing wall, return wall with 100 mm dia AC pipe or uPVC pipe (110 mm OD of 6.0 Kg/cm ² pressure) extending through the full width of the structures with slope of 1(V):20(H) towards drawing face complete as per drawing and MoRT&H technical specification clauses 2706, 2200.	m	₹ 392.70
13.8	710.1.4 of IRC:78 & 2200	Backfilling behind abutment, wing wall & return wall complete as per drawings, clause 710.1.4 of IRC:78 & MoRT&H technical specification Clause 2200.		
	I)	Granular material	cum	₹ 4,339.50
	II)	Sandy material	cum	₹ 1,592.10
13.9	710.1.4 of IRC:78 & 2200	Providing and laying of Filter media with granular materials/ stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRT&H specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and clause 710.1.4 of IRC:78 & MoRT&H technical specification Clause 2200.	cum	₹ 4,718.10
13.10	2000, 2200	Supplying, fitting and fixing in position true to line and level elastomeric bearing conforming to IRC: 83 (Part-II) section IX and clause 2005 of MoRTH specifications complete including all accessories as per drawing and Technical Specifications.	cubic centimetre	₹ 1.60
13.11	2000, 2200	Supplying, fitting and fixing in position true to line and level POT-PTFE bearing consisting of a metal piston supported by a disc or unreinforced elastomer confined within a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel mating surface, complete assembly to be of cast steel/fabricated structural steel, metal and elastomer elements to be as per IRC: 83 part-I & II respectively and other parts conforming to BS: 5400, section 9.1 & 9.2 and clause 2006 of MoRTH Specifications complete as per drawing and approved Technical Specifications.	tonne capacity	₹ 314.60

Chapter - 13 : Sub-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)
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13.12	1500, 1700, 2200	Plain/reinforced cement concrete (using jhama brick aggregate) in substructure complete including formwork as per drawings & MoRT&H technical specification Clauses 1500, 1700, 2200. (including centering, shuttering, staging etc. but excluding reinforcement)		
	i)	PCC M 15 Grade (using jhama brick aggregate) Case - I : Using Concrete Mixer (upto 5 m height)	cum	₹ 10,099.70
	ii)	PCC M 20 Grade (using jhama brick aggregate) Case - I : Using Concrete Mixer (upto 5 m height)	cum	₹ 10,990.60
13.13	2504.2.2	Providing & laying filter media with jhama brick aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil & bigger size towards the wall & providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and MoRT&H technical specification clause 2504.2.2	cum	₹ 4,444.90
OTHER ADDITIONAL ITEMS				
13.14	2000, 1000 & 2200	Supplying, fitting and fixing in position true to line and level cast steel rocker bearing conforming to IRC: 83(Pt.-1) section IX and clause 2003 of MoRT&H specifications complete including all accessories as per drawing and Technical Specifications.	tonne capacity	₹ 658.00
13.15	2000, 1000 & 2200	Supplying, fitting and fixing in position true to line and level forged steel roller bearing conforming to IRC: 83 (Pt.-1) section IX and clause 2003 of MoRT&H specifications complete including all accessories as per drawing and Technical Specifications.	tonne capacity	₹ 578.00
13.16	2000 & 2200	Supplying, fitting and fixing in position true to line and level sliding plate bearing with PTFE surface sliding on stainless steel complete including all accessories as per drawing and Technical Specifications and BS: 5400, section 9.1 & 9.2 (for PTFE) and clause 2004 of MoRT&H Specifications.	tonne capacity	₹ 378.00
13.17	2000 & 2200	Supplying, fitting and fixing in position true to line and level sliding plate bearing with stainless steel plate sliding on stainless steel plate with mild steel matrix complete including all accessories as per drawing and Technical Specifications.	tonne capacity	₹ 336.00

Chapter - 14

Super-structure

(a) Preamble

- 1 *The rate for the wearing coat has been analysed as under :*
 - a. *Cement concrete wearing coat.*
 - b. *Ashphaltic concrete wearing coat.*
 - c. *Bitumen mastic wearing coat.*

The item may be selected as per approved design. In case the thickness of wearing coat is different from that analysed, the rate for the desired thickness may be worked out on pro-rata basis.
- 2 *The rate analysis has been done both for RCC Railing and M.S. Railing, which can be adopted as per approved design.*
- 3 *The length of drainage spout has been provided in such a way that it is connected to the drainage system on the ground in case of flyovers and there is no splashing of water on the structure in case of bridges.*
- 4 *The rate for anti-corrosive treatment is required to be ascertained from firms specialised in this work. In this connection Circular No.RW/NH-34041/44/91-S&R dated. 21.3.2000 of the Ministry of Road Transport and Highways may be referred for further details.*
- 5 *Expansion joints involving movements exceeding 40 mm are specialised readymade items commercially produced by reputed firms with imported technology and parts. The rates for such joints are required to be ascertained from the firms prequalified by the Department.*
- 6 *The rate analysis for precast and pretensioned girders has also been included.*
- 7 *The rate analysis for prestressed cement concrete of M35 to M55 grade has also been included which can be adopted for bridges with innovative design / construction.*
- 8 *MoRT&H letter No. RW/NH-34059/1/96 S&R dated.30.11.2000 and subsequent corrigendum dated 25.01.2001 may be referred for detailed specifications and provisions for various types of expansion joints.*
- 9 *Supply of new type of expansion joint may be obtained on the basis of competitive bidding from amongst the suppliers pre-qualified by the Ministry of Road Transport and Highways. Further a warranty of 10 years of trouble free performance may be insisted from the suppliers.*
- 10 *For bridges having wide deck / span length more than 120 m or / and involving complex movements / rotations in different directions / planes, provision of special type of modular expansion joints such as swivel joints are required for which specialised in this field may be consulted. Such cases require prior approval of the Ministry.*
- 11 *The cost of formwork will vary with the height of the substructure. Provision has been made accordingly.*
- 12 *The analysis has been made considering 1 km lead from the Batching plant. If lead is more than necessary haulage of the concrete may be added.*
- 13 *Where ever concrete is carried out using batching plant, transit mixer, concrete pump, admixtures conforming IS: 9103 @ 0.4 per cent of weight of cement may be added for achieving desired slump of concrete.*

- 14 *Cement provided for various components of the super structure is for estimating purpose only. Actual quantity of cement will be as per approved mix design. Similarly, the provision for coarse and fine aggregates is for estimating purpose and the exact quantity shall be as per the mix design.*
- 15 *The items like needle and surface vibrators are part of minor T & P which is already covered under the overhead charges. As such these items have not been added separately in the rate analysis.*
- 16 *Sand can be either coarse or fine as required/ available. Here, provision of coarse sand has not been considered only due to non-availability of coarse sand in Tripura. However, if design of concrete dictates for use of coarse sand, then separate analysis may be taken as per site condition. (Note:- Provision of coarse sand has been considered in the analysis of all items of PSC Grade M 40 and above which is to be arranged from outside the state.)*

Chapter - 14 : Super-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
14.1	1500, 1700, 2100	Plain/ Reinforced cement concrete in superstructure including all formworks required as per drawings & MoRT&H technical specifications Clauses 1500, 1700, 2100. (including centering, shuttering, staging etc. but excluding reinforcement)		
		A. RCC Grade M 20		
		Case - I : Using Concrete Mixer		
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 12,395.70
		b. Height 5 m to 10 m	cum	₹ 12,912.20
		c. Height above 10 m	cum	₹ 13,428.70
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 12,912.20
		b. Height 5 m to 10 m	cum	₹ 13,428.70
		c. Height above 10 m	cum	₹ 13,945.10
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump		
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 12,145.20
		b. Height 5 m to 10 m	cum	₹ 12,651.20
		c. Height above 10 m	cum	₹ 13,157.30
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 12,651.20
		b. Height 5 m to 10 m	cum	₹ 13,157.30
		c. Height above 10 m	cum	₹ 13,663.30
		B. RCC Grade M 25		
		Case - I : Using Concrete Mixer		
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 13,062.00
		b. Height 5 m to 10 m	cum	₹ 13,606.30
		c. Height above 10 m	cum	₹ 14,150.50
		ii) For T-beam & slab superstructure		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		a. Height upto 5 m	cum	₹ 13,606.30
		b. Height 5 m to 10 m	cum	₹ 14,150.50
		c. Height above 10 m	cum	₹ 14,694.80
Case - II : With Batching Plant, Transit Mixer and Concrete Pump				
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 12,820.30
		b. Height 5 m to 10 m	cum	₹ 13,354.50
		c. Height above 10 m	cum	₹ 13,888.70
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 13,354.50
		b. Height 5 m to 10 m	cum	₹ 13,888.70
		c. Height above 10 m	cum	₹ 14,422.90
C. RCC Grade M 30				
Case - I : Using Concrete Mixer				
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 13,192.10
		b. Height 5 m to 10 m	cum	₹ 13,741.80
		c. Height above 10 m	cum	₹ 14,291.40
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 13,741.80
		b. Height 5 m to 10 m	cum	₹ 14,291.40
		c. Height above 10 m	cum	₹ 14,841.10
Case - II : With Batching Plant, Transit Mixer and Concrete Pump				
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 12,910.60
		b. Height 5 m to 10 m	cum	₹ 13,448.60
		c. Height above 10 m	cum	₹ 13,986.50
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 13,448.60

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		b. Height 5 m to 10 m	cum	₹ 13,986.50
		c. Height above 10 m	cum	₹ 14,524.50
D.		RCC / PSC Grade M 35		
		Case - I : Using Concrete Mixer		
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 13,145.50
		b. Height 5 m to 10 m	cum	₹ 13,702.50
		c. Height above 10 m	cum	₹ 14,259.50
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 13,702.50
		b. Height 5 m to 10 m	cum	₹ 14,259.50
		c. Height above 10 m	cum	₹ 14,816.50
		iii) For Box girder and balanced cantilever		
		a. Height upto 5 m	cum	₹ 15,373.50
		b. Height 5 m to 10 m	cum	₹ 16,487.50
		c. Height above 10 m	cum	₹ 17,601.60
		Case - II : With Batching Plant, Transit Mixer and Concrete Pump		
		i) For solid slab superstructure		
		a. Height upto 5 m	cum	₹ 12,863.50
		b. Height 5 m to 10 m	cum	₹ 13,408.50
		c. Height above 10 m	cum	₹ 13,953.60
		ii) For T-beam & slab superstructure		
		a. Height upto 5 m	cum	₹ 13,408.50
		b. Height 5 m to 10 m	cum	₹ 13,953.60
		c. Height above 10 m	cum	₹ 14,498.70
		iii) For Box girder and balanced cantilever		
		a. Height upto 5 m	cum	₹ 15,043.70
		b. Height 5 m to 10 m	cum	₹ 16,133.80
		c. Height above 10 m	cum	₹ 17,224.00

Chapter - 14 : Super-structure

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
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E. PSC Grade M 40

Case - I : Using Concrete Mixer

i)	For solid slab superstructure			
a.	Height upto 5 m	cum	₹ 15,290.90	
b.	Height 5 m to 10 m	cum	₹ 15,928.00	
c.	Height above 10 m	cum	₹ 16,565.10	
ii)	For T-beam & slab superstructure			
a.	Height upto 5 m	cum	₹ 15,928.00	
b.	Height 5 m to 10 m	cum	₹ 16,565.10	
c.	Height above 10 m	cum	₹ 17,202.20	

Case - II : With Batching Plant, Transit Mixer and Concrete Pump

i)	For solid slab / voided slab superstructure			
a.	Height upto 5 m	cum	₹ 14,689.00	
b.	Height 5 m to 10 m	cum	₹ 15,311.50	
c.	Height above 10 m	cum	₹ 15,933.90	
ii)	For T-beam & slab including launching of precast by launching truss upto 40 m span			
a.	Height upto 5 m	cum	₹ 15,311.50	
b.	Height 5 m to 10 m	cum	₹ 15,933.90	
c.	Height above 10 m	cum	₹ 16,556.30	
iii)	For cast-in-situ Box girder, segmental construction and balanced cantilever			
a.	Height upto 5 m	cum	₹ 17,178.70	
b.	Height 5 m to 10 m	cum	₹ 18,423.50	
c.	Height above 10 m	cum	₹ 19,668.40	

F. PSC Grade M 45

Using Batching Plant, Transit Mixer and Concrete Pump

i)	For solid slab / voided slab superstructure			
a.	Height upto 5 m	cum	₹ 14,838.40	
b.	Height 5 m to 10 m	cum	₹ 15,478.00	

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		c. Height above 10 m	cum	₹ 16,117.50
		ii) For T-beam & slab including launching of precast by launching truss upto 40 m span		
		a. Height upto 5 m	cum	₹ 15,478.00
		b. Height 5 m to 10 m	cum	₹ 16,117.50
		c. Height above 10 m	cum	₹ 16,757.10
		iii) For cast-in-situ Box girder, segmental construction and balanced cantilever		
		a. Height upto 5 m	cum	₹ 17,396.70
		b. Height 5 m to 10 m	cum	₹ 18,675.90
		c. Height above 10 m	cum	₹ 19,955.10
		G. PSC Grade M 50		
		Using Batching Plant, Transit Mixer and Concrete Pump		
		i) For cast-in-situ Box girder, segmental construction and balanced cantilever		
		a. Height upto 5 m	cum	₹ 17,599.90
		b. Height 5 m to 10 m	cum	₹ 18,903.60
		c. Height above 10 m	cum	₹ 20,207.30
		H. PSC Grade M 55		
		Using Batching Plant, Transit Mixer and Concrete Pump		
		i) For cast-in-situ Box girder, segmental construction and balanced cantilever		
		a. Height upto 5 m	cum	₹ 18,118.60
		b. Height 5 m to 10 m	cum	₹ 19,460.80
		c. Height above 10 m	cum	₹ 20,802.90
14.2	1600	Supplying, fitting & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar reinforcement in superstructure complete as per drawings & MoRT&H technical specification Clauses 1600.	t	₹ 93,234.90
14.3	1800	High tensile steel wires/strands including all accessories for stressing, stressing operations and grouting complete as per drawings & MoRT&H technical specification Clauses 1800.	t	₹ 1,91,305.90

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
14.4	2702	Providing and laying Cement concrete wearing coat M-30 grade including all formworks & required reinforcement complete as per drawings & MoRT&H technical specification Clauses 2702.(including centering, shuttering, staging etc. but excluding reinforcement)	cum	₹ 18,069.00
14.5	516, 2702	Mastic asphalt wearing course Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab excluding prime coat with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 9.5 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 100 degree C, protruding 1 mm to 4 mm over mastic surface, all complete as per MoRT&H Technical Specification Clause 516, 2702.	sqm	₹ 612.40
<i>Note :- 1</i>		<i>The rates for 6 mm or any other thickness may be worked out on pro-rata basis.</i>		
<i>2</i>		<i>Where tack coat is required to be provided before laying mastic asphalt, the same is required to be measured and paid separately.</i>		
14.6	2703, 1500, 1600, 1700	Construction of precast RCC railing of M 30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolerance of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, complete as per approved drawings (No. SD / 202), including all formworks required and MoRT&H Technical Specification Clause 2703, 1500, 1600, 1700. (including centering, shuttering, staging etc. and reinforcement)	m	₹ 2,797.50
14.7	2703, 1500, 1600, 1700	Construction of RCC railing of M 30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolerance of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequate space between vertical post for expansion, complete as per approved drawings (No. SD / 202), including all formworks required and MoRT&H Technical Specification Clause 2703, 1500, 1600, 1700. (including centering, shuttering, staging etc. and reinforcement)	m	₹ 2,729.90
14.8	2703.2 & 1900	Providing, fitting and fixing mild steel railing complete as per drawing and Technical Specification as per approved drawings and MoRT&H Technical Specification Clause 2703.2 & 1900.	m	₹ 4,287.20

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Sl. No.	Ref. to MoRT&H Spec.	Description	Unit	Rate
14.9	2705	Providing and placing in position drainage Spouts complete as per drawing (SD/205) and MoRT&H Technical Specification Clause 515, 2705.	no	₹ 8,420.30
14.10	2700	PCC M15 Grade leveling course below approach slab complete including all formworks required as per drawings and MoRT&H Technical Specification Clause 2700.	cum	₹ 9,633.10
14.11	2704, 1500, 1600, 1700	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawings and MoRT&H Technical Specification Clause 2704, 1500, 1600, 1700.		
	A.	RCC M 30 Grade	cum	₹ 15,836.60
	B.	RCC M 25 Grade	cum	₹ 15,805.00
14.12	1600	Providing anti-corrosive treatment to Twisted steel/deformed bar reinforcement with Fusion Bonded Epoxy Coating (FBEC).	t	
		<i>To be taken as per the prevailing market rates.</i>		
		<i>Contractors generally do not have expertise for this item . The job is therefore, got done from specialised firms who have the expertise in the field of construction chemicals. The prevailing rate in the market is required to be ascertained from the market and added in the cost estimate. Detailed guidelines in this regard have been issued by MoRT&H vide their circular no. RW/NH-34041/44/91-S&R dated 21.3.2000.</i>		
14.13	1800, 2300	Precast -pretensioned Girders Providing, precasting, transportation and placing in position precast pretensioned concrete girders as per drawings and MoRT&H Technical Specification Clause 1800, 2300. (including centering, shuttering, staging etc. but excluding reinforcement)	cum	₹ 37,907.10
14.14	800	Crash Barriers <i>The rate analysis for rigid crash barrier in reinforced cement concrete, semi-rigid crash barrier with metal beam and flexible crash barrier with wire ropes have been made and included in chapter-8 on Traffic and Transportation.</i>		
14.15	800	Painting on concrete surface Providing and applying 2 coats of water based cement paint to unplastered concrete surface after cleaning the surface of dirt, dust, oil, grease, efflorescence and applying paint @ of 1 litre for 2 sqm as per drawings and MoRT&H Technical Specification Clause 800.	sqm	₹ 80.50
14.16	2604	Burried Joint		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Providing and laying a burried expansion joint, expansion gap being 20 mm, covered with 12 mm thick, 200 mm wide galvanised weldable structural steel plate as per IS: 2062, placed symmetrical to centre line of the joint, resting freely over the top surface of the deck concrete, welding of 8 mm dia. 100 mm long galvanised nails spaced 300 mm c/c along the centre line of the plate, all as per drawings and MoRT&H Technical Specification Clause 2604.	m	₹ 1,804.30
14.17	2605	Filler Joint		
	i)	Providing & fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawings and MoRT&H Technical Specification Clause 2605.	m	₹ 5,540.10
	ii)	Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawings and MoRT&H Technical Specification Clause 2605.	m	₹ 273.70
	iii)	Providing and fixing in position 20 mm thick premoulded joint filler in expansion joint for fixed ends of simply supported spans not exceeding 10 m to cater for a horizontal movement upto 20 mm, covered with sealant complete as per drawings and MoRT&H Technical Specification Clause 2605.	m	₹ 360.10
	iv)	Providing and filling joint sealing compound as per drawings and technical specifications with sand and 6 per cent bitumen by weight as per drawings and MoRT&H Technical Specification Clause 2605.	m	₹ 37.70

Note:- For arriving at the final rate of filler joints per m length and per cm depth of joint filling compound, the rates at Sl. No. i), ii), iii) & iv) shall be added.

14.18 2600 Asphaltic plug Joint

Providing and laying of asphaltic plug joint to provide for horizontal movement of 25 mm and vertical movement of 2 mm, depth of joint varying from 75 mm to 100 mm, width varying from 500 mm to 750 mm (in traffic direction), covered with a closure plate of 200 mm x 6 mm of weldable structural steel conforming to IS: 2062, asphaltic plug to consist of bitumen binder, carefully selected single size aggregate of 12.5 mm nominal size and a heat resistant foam caulking / backer rod, all as per drawings and MoRT&H Technical Specification Clause 2605.

m ₹ 1,850.00

14.19 2606 Elastomeric Slab seal Expansion Joint

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Providing and laying of an elastomeric slab steel expansion joint, catering to right or skew (less than 20 deg.), moderately curved with maximum horizontal movement upto 50 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/ supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation as per drawings and MoRT&H Technical Specification Clause 2606.	m	₹ 30,987.20
14.20	2600	Compression Seal Joint		
		Providing and laying of compression seal joint consisting of steel armoured nosing at two edges of the joint gap suitably anchored to the deck concrete and a preformed chloroprene elastomer or closed cell foam joint sealer compressed and fixed into the joint gap with special adhesive binder to cater for a horizontal movement upto 40 mm and vertical movement of 3 mm as per drawings and MoRT&H Technical Specification Clause 2600.	m	₹ 33,053.60
<i>Note:-</i>		<ol style="list-style-type: none"> 1 <i>The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i> 2 <i>The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</i> 3 <i>The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</i> 		
14.21	2607	Strip Seal Expansion Joint		
		Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer / supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation as per drawings and MoRT&H Technical Specification Clause 2607.	m	₹ 18,114.70
<i>Note:-</i>		<ol style="list-style-type: none"> 1 <i>The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i> 2 <i>The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</i> 		
14.22	2600	Modular Strip / Box Seal Joint		
		Providing and laying of a modular strip / Box seal expansion joint including anchorage catering to a horizontal movement beyond 70 mm and upto 140 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer / supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation as per drawings and MoRT&H Technical Specification Clause 2600.	m	₹ 16,670.50

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
<i>Note:-</i>				
	1	<i>The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i>		
	2	<i>The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</i>		
	3	<i>The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</i>		
14.23	2600	Modular Strip / Box Seal Joint		
		Providing and laying of a modular strip box seal expansion joint catering to a horizontal movement beyond 140 mm and upto 210 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation as per drawings and MoRT&H Technical Specification Clause 2600.	m	₹ 20,237.80
<i>Note:-</i>				
	1	<i>The installation shall be done by the manufacturer or his authorised representative to the satisfaction of the Engineer.</i>		
	2	<i>The concreting for joining the expansion joint assembly with the deck has not been included in this analysis as the same is catered in the quantities of RCC deck.</i>		
	3	<i>The anchoring bars of the expansion joint assembly shall be welded to the main reinforcement of the deck.</i>		
14.24	1500, 1700, 2100	Providing and laying reinforced cement concrete in superstructure in footpath slab at all heights including all formworks required as per drawings & MoRT&H technical specifications Clauses 1500, 1700, 2100.		
		A. RCC Grade M 20		
		Case - I : Using Concrete Mixer	cum	₹ 10,742.90
14.25	1900	Supply and fabrication of mild steel of IS:2062 structural steel work at fabricators workshop comprising of main truss, cross girders, deck stringers, wind bracings, kerb channel, jacking beams, connecting plates and other members and delivered at bridge site in undamaged condition including straightening, descaling, degreasing, cutting to size and shape, drilling, welding and grinding, supply of all MS/HTS shop or site bolts, nuts & washers, holding down bolts and nuts etc., trial assembling at workshop, one priming coat of shop paint with red lead paint conforming to IS-102 with all labour, material, cost of paints, consumables, stacking in protected condition etc. complete as per MoRT&H technical specification Clause 1900 and as directed by the Engineer-in-Charge.	t	₹ 1,15,687.20

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
14.26	1900	Taking delivery of fabricated steel work leading to and at site as necessary, assembling and erection of fabricated steel structure to proper line, level and camber as per approved drawings complete in all respect including transportation and handling in and around site, as per approved drawing and specifications including supply of all fasteners, painting of all exposed surfaces of steel work after erection with one site coat of red lead primer paint conforming to IS-102 and two coats aluminium paint conforming to IS-2339 including all labour, consumables and other materials, machinery, tools and tackles complete as per MoRT&H technical specification Clause no. 1900 and as directed by the Engineer-in-Charge.	t	₹ 35,901.20

Chapter - 15

River Training and Protection Works

(a) Preamble

1 *Three types of aprons on the river bed as under have been catered :-*

- a. *Boulder apron laid dry.*
- b. *Boulder apron laid in wire crates.*
- c. *Apron laid in cement concrete blocks in M 15.*

But in this state the boulders are not available economically. Hence boulder aprons may not be used in large scale except special cases, where the boulders are available nearby.

2 *Toe wall for toe protection of pitching is considered in nominal mix cement concrete M 15 only. The toe wall in dry rubble masonry has not been considered.*

3 *Flooring is considered rubble stone laid with Cement Mortar, in nominal mix cement concrete M 15 blocks, in dry rubble stone.*

4 *Curtain Walls is considered in nominal mix cement concrete M 15 only. Curtain Walls of rubble stone masonry laid with Cement Mortar has not been considered.*

5 *The rate analysis for gabion structures comprising of brick bats laid in wire crates have been included. Such structures are suited as retaining structures and for erosion control in river training works especially for situations where some settlement of foundation is anticipated. These structures can adjust in minor settlements, being flexible structures, without losing their functional requirement. The rate analysis for gabion structures comprising of stone boulders is also done, though the same is not economically available in this state.*

Chapter - 15 : River Training and Protection Works

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
15.1	2503	Boulder apron laid dry without wire crates. Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 40 kg each complete as per drawing and MoRT&H Technical specifications clause 2503.	cum	₹ 5,754.00
Note :- Nominal excavation required for preparation of bed has been taken into account while making provision for labour.				
15.2	2503	Boulder Apron Laid in Wire Crates Providing and laying of boulder apron laid in wire crates made with 4mm dia GI wire conforming to IS: 280 & IS:4826 in 100 mm x 100 mm mesh (weaved diagonally) including 10 per cent extra for laps and joints laid with stone boulders weighing not less than 40 kg each as per drawing and MoRT&H Technical specifications clause 2503.	cum	₹ 6,705.40
15.3	2503	i. Cement concrete blocks (size 0.5 x 0.5 x 0.5 m) Providing and laying of apron with cement concrete blocks of size 0.5 x 0.5 x 0.5 m cast in-situ and made with nominal mix of M 15 grade cement concrete with a minimum cement content of 250 kg/cum as per IRC: 21-2000 as per drawings & MoRT&H technical specifications Clauses 2503.	cum	₹ 10,218.50
		ii. Ist class brick blocks in CM 1:6 (size 0.5 x 0.5 x 0.5 m) Providing and laying of apron with Ist class brick blocks in CM 1:6 of size 0.5 x 0.5 x 0.5 m cast in-situ as per drawings & MoRT&H technical specifications Clauses 2503.	cum	₹ 9,340.80
15.4	2504	Providing and laying pitching on slopes laid over prepared filter media in front of toe of embankment complete as per drawing and MoRT&H Technical specifications clause 2504.		
		A. Stone / Boulder	cum	₹ 5,754.00
		B. Cement Concrete Blocks of size 0.3 x 0.3 x 0.3 m cast in cement concrete of Grade M 15 with nominal surface reinforcement.	cum	₹ 10,318.60
15.5	2504	Providing and laying Filter material underneath pitching in slopes complete as per drawing and MoRT&H Technical specifications clause 2504.	cum	₹ 4,964.90
15.6	700, 2504	Geotextile Filter		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		Laying of a geotextile 120 gsm non woven membrane, 100% polyester of thickness 1 to 1.25 mm between pitching and embankment slopes on which pitching is laid to prevent escape of the embankment material through the voids of the stone pitching/cement concrete blocks as well as to allow free movement of water without creating any uplift head on the pitching as per drawing and MoRT&H Technical specifications clause 700, 2504.	sqm	₹ 115.00
15.7	2504	Toe Protection		
		<i>A toe wall for toe protection can either be in brick masonry in case of pitching with bricks in wire crates or it can be in PCC M 15 nominal mix if cement concert block have been used for pitching. Rates for toe wall can be adopted from respective clauses depending upon approved design. The rate for excavation for foundation, brick work and PCC M 15 have been analysed and given in respective chapters.</i>		
15.8	2505	Providing and laying Flooring complete as per drawing and Technical specifications laid over 100 mm thick cement concrete bedding as per drawing and MoRT&H Technical specifications clause 2505.		
	A.	Rubble stone laid in cement mortar 1:3, 300 mm thick	sqm	₹ 3,239.80
	B.	Cement Concrete Blocks of size 0.3 x 0.3 x 0.3 m cast in cement concrete of Grade M 15	sqm	₹ 3,877.80
15.9	2506	Dry rubble flooring		
		Construction of dry rubble flooring at cross drainage works for relatively less important works.	cum	₹ 5,811.50
15.10	2507.2	Curtain wall complete as per drawing and Technical specification		
		<i>Curtain wall can either be in brick masonry or in PCC M 15 nominal mix . Rates for Curtain wall can be adopted from respective clauses depending upon approved design. The rate for excavation for foundation, brick work and PCC M 15 have been analysed and given in respective chapters.</i>		
15.11	2507.2	Flexible Apron		
		Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall as per drawing and MoRT&H Technical specifications clause 2507.2.	cum	₹ 5,888.50
15.12	2503.3	Gabian Structure for Retaining Earth		

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
		<p>Providing and construction of a gabian structure for retaining earth with segments of wire crates of size 7 m x 3 m x 0.6 m each divided into 1.5 m compartments by cross netting, made from 4 mm galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be tied with 4 mm galvanised steel wire as per drawing and MoRT&H Technical specifications clause 2503.3.</p>	cum	₹ 7,005.90
15.13	2503.3	<p>Gabian Structure for Erosion Control, River Training Works and Protection works</p>		
		<p>Providing and constructing gabian structures for erosion control, river training works and protection works with wire crates of size 2 m x 1 m x 0.3 m each divided into 1m compartments by cross netting, made from 4 mm galvanised steel wire @ 32 kg per 10 sqm having minimum tensile strength of 300 Mpa conforming to IS:280 and galvanizing coating conforming to IS:4826, woven into mesh with double twist, mesh size not exceeding 100 mm x 100 mm, filled with boulders with least dimension of 200 mm, all loose ends to be securely tied with 4 mm galvanised steel wire. as per drawing and MoRT&H Technical specifications clause 2503.3.</p>	cum	₹ 8,983.60

Chapter - 16

Repair and Rehabilitation

(a) Preamble

- 1 *Removal of cement concrete wearing coat and asphaltic wearing coat has been proposed with pneumatic breakers.*
- 2 *The rate for external prestressing has been analysed for three different spans of 25, 50, 100 m.*
- 3 *Sealing of cracks has been proposed with cement grout, cement mortar 1:1 grout, and epoxy grout by injecting with grout pump through nipples.*
- 4 *Bonding of new concrete with old concrete is proposed with epoxy resin.*
- 5 *The repair and replacement of following structures has been included :-*
 - a. *Bridge bearings.*
 - b. *Expansion joints.*
 - c. *Concrete railing.*
 - d. *Mild steel railing.*
 - e. *Crash barrier.*

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Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
16.1	2809	Removal of existing cement concrete wearing coat including its disposal complete as per Technical Specification without causing any detrimental effect to any part of the bridge structure and removal of dismantled material with all lifts and lead upto 1000 m as per drawing and MoRT&H Technical specifications clause 2809.		
		thickness 75 mm.	sqm	₹ 125.70
16.2	2809	Removal of existing 12 mm thick mastic asphalt laid over asphaltic wearing coat comprising of 50 mm thick asphaltic concrete including disposal with all lift and lead upto 1000 m as per drawing and MoRT&H Technical specifications clause 2809.	sqm	₹ 95.20
16.3	2807	Guniting concrete surface with cement mortar applied with compressor after cleaning surface and spraying with epoxy complete as per drawing and MoRT&H Technical specifications clause 2807.		
		thickness 25 mm.	sqm	₹ 1,734.90
16.4	2800	Providing and inserting 15 mm dia GI nipples of required length with approved fixing compound after drilling holes for grouting including subsequent cutting/removal and sealing of the hole as necessary of nipples after completion of grouting with Cement/Epoxy as per drawing and MoRT&H Technical specifications clause 2800.	no	₹ 192.10
16.5	2806	Sealing of cracks/porous concrete by injection process through nipples/Grouting complete as per drawing and MoRT&H Technical specifications clause 2806.		
	A.	Cement grout	kg	₹ 181.90
	B.	Cement Mortar (1:1) grout	kg	₹ 177.00
16.6	2800	Patching of damaged concrete surface with polymer concrete and curing compounds, initiator and promoter, available in present formulations, to be applied as per instructions of manufacturer and as approved by the Engineer as per drawing and MoRT&H Technical specifications clause 2807.		
		thickness of 25 mm	sqm	₹ 1,666.80
<i>Note :- This item is a proprietary item available in market as pre-packed polymer concrete and is required to be applied as per instructions of the manufacturer.</i>				
16.7	2803	Providing and sealing of crack/ porous concrete with Epoxy resin by injection through nipples complete as per drawing and MoRT&H Technical specifications clause 2803.	kg	₹ 1,242.50

Chapter - 16 : Repair and Rehabilitation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
16.8	2804	Providing and applying epoxy mortar over leached, honey combed and spalled concrete surface and exposed steel reinforcement complete as per drawing and MoRT&H Technical specifications clause 2804.		
		Average thickness of 10 mm	sqm	₹ 455.70
16.9	2807	Removal of defective concrete, cleaning the surface thoroughly, applying the shotcrete mixture mechanically with compressed air under pressure, comprising of cement, sand, coarse aggregates, water and quick setting compound in the proportion as per clause 2807.1., sand and coarse aggregates conforming to IS: 383 and table 1 of IS: 9012 respectively, water cement ratio ranging from 0.35 to 0.50, density of gunite not less than 2000 kg/cum, strength not less than 25 Mpa and workmanship conforming to MoRT&H Technical specifications clause 2807.6.		
		Average thickness of 40 mm	sqm	₹ 387.20
16.10	2800	Applying pre-packed cement based polymer mortar of strength 45 Mpa at 28 days for replacement of spalled concrete as per drawing and MoRT&H Technical specifications clause 2800.		
		thickness of 10 mm	sqm	₹ 180.20
16.11	2805	Epoxy bonding of new concrete to old concrete as per drawing and MoRT&H Technical specifications clause 2805.		
			sqm	₹ 878.00
16.12	2810	Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and MoRT&H Technical specifications clause 2810.		
		Span 25 m	t	₹ 4,74,326.40
16.13	2810	Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and MoRT&H Technical specifications clause 2810.		
		Span 50 m	t	₹ 4,22,647.10
16.14	2810	Providing external prestressing with high tensile steel wires/strands including drilling for passage of prestressing steel, all accessories for stressing and stressing operation and grouting complete as per drawing and MoRT&H Technical specifications clause 2810.		
		Span 100 m	t	₹ 3,98,036.80

Chapter - 16 : Repair and Rehabilitation

Sl. No.	Ref. to MORT&H Spec.	Description	Unit	Rate
16.15	2808	Replacement of Bearings complete as per drawing and MoRT&H Technical specifications clause 2808.	no	₹ 7,305.80
<i>Note :-</i>	1	<i>This rate is exclusive of the cost of bearing. Actual cost of bearing may be added as per the type and design.</i>		
16.16	2808	Rectification of Bearings complete as per drawing and MoRT&H Technical specifications clause 2808.	no	₹ 7,305.80
<i>Note :-</i>	1	<i>This rate is exclusive of the cost of the parts of bearing. Actual cost of the parts of bearing may be added as per the type and design.</i>		
16.17		Replacement of expansion joints as per drawing and MoRT&H Technical specifications clause 2808.	m	₹ 4,404.30
<i>Note :-</i>	1	<i>This rate is exclusive of the cost of the expansion joint.</i>		
	2	<i>The rate for the installation of new expansion joints may be taken from the chapter on superstructure. Broken concrete will have to be replaced which has been included in this analysis.</i>		
16.18		Replacement of Damaged Concrete Railing.	m	₹ 323.70
<i>Note :-</i>		<i>The rate for the provision of new railing may be adopted from the chapter on superstructure.</i>		
16.19		Replacement of Crash Barrier.	m	₹ 610.10
<i>Note :-</i>		<i>The rate for the construction of new crash barrier may be adopted from chapter 8 on Traffic and Transportation.</i>		
16.20		Replacement of Damaged Mild Steel Railing	m	₹ 266.40
<i>Note :-</i>		<i>The rate for the construction of new steel railing may be adopted from chapter on superstructure.</i>		
16.21		Repair of Crash Barrier		
		Repair of concrete crash barrier with cement concert of M-30 grade by cutting and trimming the damaged portion to a regular shape, cleaning the area to be repaired thoroughly, applying cement concert after erection of proper form work.	m	₹ 387.10
<i>Note :-</i>		<i>It is assumed that damage is to the extent of 10 per cent of the volume of concrete. This will require 0.30 cum of concrete.</i>		
16.22		Repair of RCC Railing		
		Repair of RCC railing to bring it to the original shape.	m	₹ 256.40
<i>Note :-</i>		<i>It is assumed that damage is to the extent of 10 per cent of the volume of concrete. This will require 0.10 cum of concrete and 0.013T of steel.</i>		
16.23		Repair of steel Railing		
		Repair of steel railing to bring it to the original shape.	m	₹ 378.10

PART - II

Roads and Bridge works for ODRs and Rural Roads

Chapter - 1

*Loading, Unloading, Carriage, Crushing of Materials and Setting Out**(a) Preamble*

- 1 *The rate analysis of loading and unloading of various items include stacking.*
- 2 *The rate analysis of loading and unloading has been given both by manual and mechanical means. Means of loading / unloading appropriate to the work and site is to be adopted.*
- 3 *The rate analysis for haulage of materials has been made in terms of tonne - kilometer(t.km) for ease of adoption depending upon the lead in km and load in tonnes.*
- 4 *The cost for carriage will vary depending upon the riding surface of the road. Provision has accordingly been made considering surfaced roads, unsurfaced gravel roads and katcha tracks.*
- 5 *Analysis of carriage of materials is exclusive of the loading, unloading and stacking and this has to be added as applicable.*
- 6 *Carriage of materials if done by boats shall be paid at the same rates as given for carriage of materials by road.*
- 7 *Setting Out*

The annalysis of rate per km. shall account for the following:

- | | |
|--------------------------------|-----------------------|
| <i>(i) Reference benchmark</i> | <i>1 (one) no.</i> |
| <i>(ii) Working benchmark</i> | <i>4 nos. per km.</i> |

and near all drainage structure and bridges

- (iii) Reference Pillars/Burjees @ 50 m interval on both sites of the formation width*
- (iv) The marking of centre line, setting out curves and recording of levels, etc. by the surveyor will be incidental to the work and no extra payment shall be made for the same.*

Chapter - 1 : Loading, Unloading, Carriage, Crushing of Materials and Setting Out

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
1.1		Loading and unloading of Lime, Aggregate, Stone Boulder, Brick Aggregate, Kankar, Building Rubbish, Crushed Slag, Stone for Masonry Work by Manual Means.		
	(i)	Loading of Lime, Aggregate, Stone Boulder, Brick Aggregate, Kankar, Building Rubbish, Crushed slag, Stone for masonry Work by Manual Means including a lead upto 30 m.	cum	₹ 105.60
	(ii)	Loading of Earth, Sand, Moorum, Manure, Flyash by manual means including a lead upto 30 m.	cum	₹ 52.80
	(iii)	Unloading of Lime, Aggregate, Stone Boulder, Brick Aggregate, Kankar, Building Rubbish, Crushed slag, Stone for masonry Work by Manual Means including a lead upto 30 m.	cum	₹ 52.80
	(iv)	Unloading of Earth, Sand, Moorum, Manure, Flyash by manual means including a lead upto 30 m.	cum	₹ 30.80
1.2		Loading and unloading of Lime, Aggregate, Stone Boulder, Brick Aggregate, Kankar, Building Rubbish, Crushed Slag, Stone for Masonry Work by Mechanical Means.		
	(i)	Loading of Lime, Aggregate, Stone Boulder, Brick Aggregate, Kankar, Building Rubbish, Crushed slag, Stone for masonry Work by Mechanical Means including a lead upto 30 m.	cum	₹ 48.70
	(ii)	Loading of Earth, Sand, Moorum, Manure, Flyash by mechanical means including a lead upto 30 m.	cum	₹ 24.60
	(iii)	Unloading of Earth, Sand, Lime, Moorum, Aggregate, Stone Boulder, Brick aggregate, Kankar, Building Rubbish, Manure, Crushed Slag, Flyash, Stone for Masonry Work by Mechanical means	cum	₹ 7.70
1.3		Loading, Unloading and Stacking of Bricks by Manual Means		
	(i)	Loading of Bricks by manual means including a lead upto 30 m	1000 nos	₹ 168.70
	(ii)	Unloading and Stacking of Bricks by manual means including a lead upto 30 m	1000 nos	₹ 168.70
1.4		Loading, Unloading of Cement by Manual Means		
	(i)	Loading of Cement by manual means including a lead upto 30 m	t	₹ 144.80
	(ii)	Unloading of Cement by manual means including a lead upto 30 m	t	₹ 144.80

Chapter - 1 : Loading, Unloading, Carriage, Crushing of Materials and Setting Out

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
1.5		Loading, Unloading of Structural Steel and Steel Bars by Manual Means		
	(i)	Loading of Structural Steel,Steel Bars by Manual Means including a lead upto 30 m	t	₹ 161.90
	(ii)	Unloading of Structural Steel,Steel Bars by manual means including a lead upto 30 m	t	₹ 161.90
1.6		Loading, Unloading of Bitumen Drums by Manual Means		
	(i)	Loading of Bitumen Drums by manual means including a lead upto 30 m	t	₹ 165.00
	(ii)	Unloading of Bitumen Drums by manual means including a lead upto 30 m	t	₹ 142.40
1.7	100	Loading and Unloading of Timber by Manual Means.		
	(i)	Loading of Timber by manual means including a lead upto 30 m	t	₹ 232.30
	(ii)	Unloading of Timber by manual means including a lead upto 30 m	t	₹ 232.30
1.8		Loading and Unloading of C.C.Blocks, Kerb etc.		
	(i)	Loading with care C.C. Blocks, km. Stone, 200 m. stone, Boundary Pillar, Kerb, Channel, Bond Stone, etc. by manual means including a lead upto 30 m	cum	₹ 368.90
	(ii)	Unloading with care C.C. Blocks, km. Stone,200 m. stone, Boundary Pillar, Kerb, Channel, Bond Stone, etc. by manual means including a lead upto 30 m	cum	₹ 368.90
1.9		Loading and Unloading of Hume Pipes		
	(i)	Loading of RCC Hume Pipes by mechanical means including a lead upto 30 m		
	(A)	1000/ 1200 mm. dia Hume pipe	per pipe	₹ 119.93
	(B)	900 / 750 mm. dia Hume pipe	per pipe	₹ 71.96
	(C)	600 / 450 mm. dia Hume pipe	per pipe	₹ 51.40
	(ii)	Unloading of RCC Hume pipe by manual means including a lead upto 30 m		
	(A)	1000 / 1200 mm. dia RCC Hume pipes	per pipe	₹ 368.90
	(B)	900 / 750 mm. dia RCC Hume pipes	per pipe	₹ 307.40
	(C)	600 / 450 mm. dia RCC Hume pipes	per pipe	₹ 230.60
	(iii)	Unloading of RCC Hume Pipes by mechanical means including a lead upto 30 m		

Chapter - 1 : Loading, Unloading, Carriage, Crushing of Materials and Setting Out

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(A) 1000/ 1200 mm. dia Hume pipe	per pipe	₹ 119.90
		(B) 900 / 750 mm. dia Hume pipe	per pipe	₹ 72.00
		(C) 600 / 450 mm. dia Hume pipe	per pipe	₹ 51.40
1.10		Haulage excluding Loading & Unloading		
		Haulage of materials by tipper / truck excluding cost of loading, unloading and stacking.		
		Case - I : Surfaced Road	t.km	₹ 4.20
		Case - II : Unsurfaced Gravel Road	t.km	₹ 5.30
		Case - III : Katcha Track and Track in River Bed/Nallah Bed and Choe Bed	t.km	₹ 8.80
1.11		Supply of quarried stone and hand breaking.		
		(i) Supply of quarried stone and hand breaking into coarse aggregate to Grading 1 (90 mm to 45 mm) as per Table 400.8 of Technical specifications.	cum	₹ 5,092.40
		(ii) Supply of quarried stone and hand breaking into coarse aggregate to Grading 2 (63 mm to 45 mm) as per Table 400.8 of Technical specifications.	cum	₹ 5,264.30
		(iii) Supply of quarried stone and hand breaking into coarse aggregate to Grading-3 (53 mm to 22.4 mm) as per Table 400.8 of Technical specifications.	cum	₹ 5,436.11
1.12		Crushing of Stone boulders in to aggregates 100 per cent passing through 53 mm sieve as per Table 500.6 of Technical Specification.		
		Crushing of Stone boulders of 150 mm size and below in an integrated stone crushing unit of 200 t/ h capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates 100 per cent passing through 53 mm sieve as per Table 500.6 of Technical Specification including cost of stones.	cum	₹ 3,813.80
1.13		Crushing of Stone boulders in to aggregates 100 per cent passing through 22.4 mm sieve as per Table 500.6 of Technical Specification.		
		Crushing of Stone boulders of 150 mm size and below in an integrated stone crushing unit of 200 t/ h capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates 100 per cent passing through 22.4 mm sieve as per Table 500.6 of Technical Specification including cost of stones.	cum	₹ 4,493.70

Chapter - 1 : Loading, Unloading, Carriage, Crushing of Materials and Setting Out

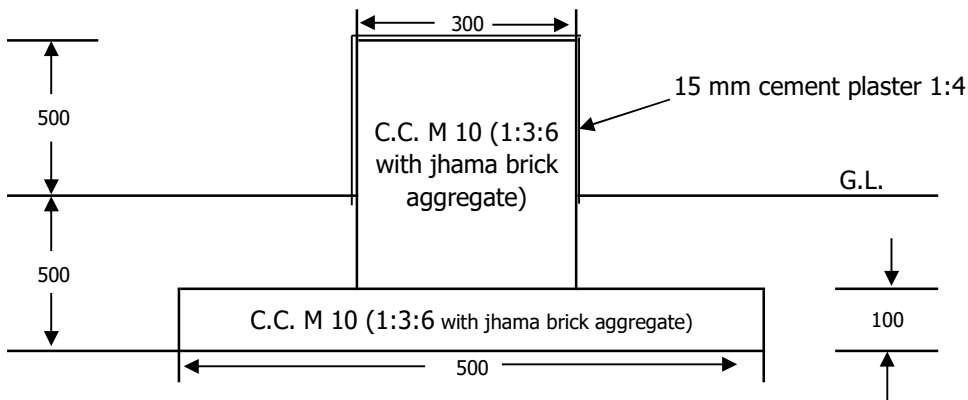
Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
1.14		Crushing of Stone boulders in to aggregates 100 per cent passing through 13.2 mm sieve as per Table 500.9 of Technical Specification.		
		Crushing of Stone boulders of 150 mm size and below in an integrated stone crushing unit of 200 t/ h capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates 100 per cent passing through 13.2 mm sieve as per Table 500.9 of Technical Specification including cost of stones.	cum	₹ 5,296.80
1.15		Crushing of Stone boulders in to aggregates 100 per cent passing through 9.5 mm sieve as per Table 500.9 of Technical Specification.		
		Crushing of Stone boulders of 150 mm size and below in an integrated stone crushing unit of 200 t/ h capacity comprising of primary and secondary crushing units, belt conveyor and vibrating screens to obtain stone aggregates 100 per cent passing through 9.5 mm sieve as per Table 500.9 of Technical Specification including cost of stones.	cum	₹ 5,296.80
1.16	100	Setting Out		
		(i) Reference benchmark	1 (one) no.	
		(ii) Working benchmark	4 nos. per km.	
		and near all drainage structure and bridges		
		(iii) Reference Pillars/Burjees @ 50 m interval on both sides of the formation width		
		(iv) The marking of centre line, setting out curves and recording of levels, etc. by the surveyor will be incidental to the work and no extra payment shall be made for the same.		
	A	Benchmark as per drawing 200.1	no	₹ 6,667.50
	B	Reference pillar as per drawing 200.2	no	₹ 3,042.10
1.17		Haulage excluding Loading & Unloading for Hume pipes.		
		Haulage of materials by truck excluding cost of loading, unloading and stacking.		
		Case - I : Surfaced Road		
		i) for 1000 / 1200 mm dia	per pipe per km	₹ 13.50
		ii) for 900 / 750 mm dia	per pipe per km	₹ 10.20

Chapter - 1 : Loading, Unloading, Carriage, Crushing of Materials and Setting Out

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		iii) for 600 / 450 mm dia	per pipe per km	₹ 6.80
Case - II : Unsurfaced Gravelled Road				
		i) for 1000 / 1200 mm dia	per pipe per km	₹ 23.00
		ii) for 900 / 750 mm dia	per pipe per km	₹ 17.20
		iii) for 600 / 450 mm dia	per pipe per km	₹ 11.50
Case - III : Katcha Track and Track in River Bed/Nallah Bed and Choe Bed				
		i) for 1000 / 1200 mm dia	per pipe per km	₹ 32.80
		ii) for 900 / 750 mm dia	per pipe per km	₹ 24.60
		iii) for 600 / 450 mm dia	per pipe per km	₹ 16.40

ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)

1.18	100	Setting Out (As per drawing 200.1 and 200.2) (using PCC with jhama brick aggregate)		
	A.	In Ordinary Soil	Per km	₹ 1,72,325.90
	B.	In Ordinary rock (not requiring blasting)	Per km	₹ 1,73,602.00
	C.	In Hard rock (blasting prohibited)	Per km	₹ 1,74,098.60
1.19	100	Setting Out (As per drawing enclosed) (using PCC with jhama brick aggregate)		
		For all class of Soil	Per km	₹ 64,386.40



Drawing for Item No. 1.19 of Chapter - 1 (Setting out)

Chapter - 2

Site Clearance

(a) Preamble

1. *Unless otherwise stated, the rates include sorting and disposal of unserviceable material and stacking of serviceable material with all lifts and upto a lead of 1000 m.*
2. *The rates include Tools & Plants (T&P) and scaffolding required for items of dismantling.*
3. *Carriage of dismantled materials, bushes, branches of tree, etc. has been catered with a tractor-trolley of 3 tonnes capacity with manual loading and unloading @ 2 trips per hour within a lead of 1000 m. This will be economical for such works as compared to tipper.*
4. *Where only grass wild is met with, rate of item No.2.1, i.e., clearing grass and removal of rubbish can be applied.*
5. *The dismantling of structures has been catered both by manual and mechanical means. The Engineer can use his discretion depending upon quantum of work and particular site conditions.*
6. *In case where lead for disposal is more than 1000 m, extra cost of carriage is required to be added based on tonne-kilometerage as per Chapter 1.*
7. *All minor Tools & Plants (T&P) items required have been considered to have been included in overhead charges.*
8. *For dismantling of structures, which remain submerged in water, the cost may be enhanced by 50 per cent. If site condition warrant lowering of water level to facilitate dismantling, the cost may be enhanced by additional 25 per cent.*
9. *Dismantling of utilities like water supply lines, electric and telephone lines is required to be done under the supervision of concerned departments with prior information to the user public.*
10. *In certain items of dismantling, like, pipe culverts, utilities, etc. excavation in earth and dismantling of masonry works is not included in this analysis, for which suitable notes have been inserted in respective chapters. These items are required to be priced separately based on actual quantities at site and nature of work.*
11. *The dismantled materials should be examined and a realistic assessment and provision should be made after due process for the salvage value for such materials, can be utilised for works or auctioned.*
12. *In case where lead for disposal is more than 1000 m, extra cost of carriage is required to be added based on tonne-kilometerage as per Chapter 1.*
13. *All minor Tools & Plants (T&P) items required have been considered to have been included in overhead charges.*

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
2.1	201	Clearing Grass and Removal of Rubbish Clearing grass and removal of rubbish up to a distance of 30 m outside the periphery of the area as per MoRD Technical Specification Clause 201.		
		By Manual Means	Hectare	₹ 22,910.90
2.2	201	Clearing and Grubbing Road Land Clearing and grubbing road land including uprooting wild vegetation , grass, bushes, shrubs,saplings and trees of girth upto 300 mm , removal of stumps of such trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, upto a lead of 1000 m including removal and disposal of top organic soil not exceeding 150 mm in thickness as per MoRD Technical Specification clause 201.		
		(I) By Manual Means		
		(A) In area of non-thorny jungle	Hectare	₹ 86,289.20
		(B) In area of thorny jungle	Hectare	₹ 1,15,301.20
		(II) By Mechanical Means		
		(A) In area of non-thorny jungle	Hectare	₹ 40,047.30
		(B) In area of thorny jungle	Hectare	₹ 48,856.10
2.3	201	Cutting of Trees, including Cutting of Trunks , Branches and Removal of Stumps Cutting of trees, including cutting of trunks , branches and removal of stumps & roots, refilling, compaction of backfilling and stacking of serviceable material by manual means with all lifts as per MoRD Technical Specification Clause 201.		
		A. Lead upto 100 m		
		(I) Girth above 300 mm to 600 mm	Each	₹ 369.80
		(II) Girth above 600 mm to 900 mm	Each	₹ 593.90
		(III) Girth above 900 mm to 1800 mm	Each	₹ 1,250.10
		(IV) Girth above 1800 mm to 2700 mm	Each	₹ 2,447.90
		(V) Girth above 2700 mm to 4500 mm	Each	₹ 4,955.50
		(VI) Girth above 4500 mm	Each	₹ 15,065.90
		B) Lead upto 1000 m		
		(I) Girth above 300 mm to 600 mm	Each	₹ 381.00

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(II) Girth above 600 mm to 900 mm	Each	₹ 627.50
		(III) Girth above 900 mm to 1800 mm	Each	₹ 1,294.90
		(IV) Girth above 1800 mm to 2700 mm	Each	₹ 2,515.10
		(V) Girth above 2700 mm to 4500 mm	Each	₹ 5,030.10
		(VI) Girth above 4500 mm	Each	₹ 15,215.20
2.4	201	Uprooting and Removing Stumps & Roots		
		Uprooting and removing stumps & roots, compaction of backfilling and stacking of serviceable material by manual means as per MoRD Technical Specification Clause 201.		
	A.	Lead upto 100 m		
		(I) Girth above 300 mm to 600 mm	Each	₹ 235.80
		(II) Girth above 600 mm to 900 mm	Each	₹ 362.30
		(III) Girth above 900 mm to 1800 mm	Each	₹ 787.80
		(IV) Girth above 1800 mm to 2700 mm	Each	₹ 1,566.60
		(V) Girth above 2700 mm to 4500 mm	Each	₹ 3,144.40
		(VI) Girth above 4500 mm	Each	₹ 8,871.50
	B)	Lead upto 1000 m		
		(I) Girth above 300 mm to 600 mm	Each	₹ 238.40
		(II) Girth above 600 mm to 900 mm	Each	₹ 371.70
		(III) Girth above 900 mm to 1800 mm	Each	₹ 799.00
		(IV) Girth above 1800 mm to 2700 mm	Each	₹ 1,581.50
		(V) Girth above 2700 mm to 4500 mm	Each	₹ 3,163.10
		(VI) Girth above 4500 mm	Each	₹ 8,964.90

2.5 202 Dismantling of Structures

Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.

(I) By Manual Means

A)	Lime Concrete	Cum	₹ 538.80
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Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		B) Cement Concrete	cum	₹ 653.40
		C) Reinforced Cement Concrete	cum	₹ 1,824.00
		(II) By Mechanical Means		
		A) Cement Concrete	cum	₹ 696.70
		B) Reinforced Cement Concrete	cum	₹ 1,262.50
2.6	202	Dismantling Brick/Tile Work as per MoRD Technical Specification No. 202.		
		Dismantling of existing structures like culverts, bridges, retaining walls and other structures comprising of brick masonry including disposal of unserviceable material and stacking the serviceable material with all lift and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
		A) Lime Mortar	cum	₹ 309.70
		B) Cement mortar	cum	₹ 424.30
		C) Mud Mortar	cum	₹ 263.90
		D) Dry Brick Pitching or Brick Soling	cum	₹ 241.00
2.7	202	Dismantling Stone Masonry as per MoRD Technical Specification Clause 202.		
		Dismantling of existing structures like culverts, bridges, retaining walls and other structures comprising of stone masonry including disposal of unserviceable material and stacking the serviceable material with all lift and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
		A) Rubble Stone Masonry in Lime Mortar	cum	₹ 355.60
		B) Rubble Stone Masonry in Cement Mortar	cum	₹ 424.30
		C) Rubble Stone Masonry in Mud Mortar	cum	₹ 309.70
		D) Dry Rubble Masonry	cum	₹ 286.80
		E) Dismantling Stone Pitching/Dry Stone Spalls	cum	₹ 263.90
		F) Dismantling boulders laid in wire crates including opening of crates and stacking dismantled materials	cum	₹ 309.70
2.8	202	Dismantling Wood Work Wrought and Planed Fixed in Frames of Trusses upto a height of 5 m above Plinth Level as per MoRD Technical Specification Clause 202.		
		Dismantling of existing Wood work, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.	cum	₹ 836.10

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
2.9	202	Dismantling Steel Work in all Types of Sections upto a height of 5 m above Plinth Level excluding Cutting of rivet as per MoRD Technical Specification Clause 202.		
		Dismantling of existing Steel work, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
		A) Including dismembering	t	₹ 2,246.80
		B) Excluding dismembering	t	₹ 1,595.40
		C) Extra over Items(A) and (B) for cutting rivets	each	₹ 16.50
2.10	202.00	Scraping of bricks dismantled from brick work including stacking as per MoRD Technical Specification Clause 202.		
		Scraping of bricks from dismantled brick work, including T & P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
			1000 nos	₹ 2,004.70
2.11	202	Scraping of Stone from Dismantled Stone Masonry as per MoRD Technical Specification Clause 202.		
		Scraping of stone from dismantled stone masonry, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
			cum	₹ 804.10
2.12	202	Scraping Plaster in Lime or Cement Mortar from Brick/ Stone Masonry as per MoRD Technical Specification Clause 202.		
		Scraping plaster in Lime or Cement Mortar from Brick/ stone masonry, including T&P and scaffolding whenever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
			sqm	₹ 22.90
2.13	202	Removing all types of Hume pipes.		
		Removing all types of Hume pipes and stacking within a lead of 1000 m excluding Earthwork and Dismantling of Masonry Works as per MoRD Technical Specification Clause 202 .		
		(A) Upto 600 mm dia Hume pipe	m	₹ 297.40
		(B) Above 600 mm to 900 mm dia Hume pipe	m	₹ 402.00

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(C) Above 900 mm dia Hume pipe	m	₹ 688.40
2.14	202	Dismantling of Flexible Pavements		
		Dismantling of flexible pavements and disposal of dismantled materials with all lifts and upto a lead of 100 m, stacking serviceable materials and unserviceable materials separately as per MoRD Technical Specification Clause 202.		
		(I) By Manual Means		
		(A) Bituminous Courses	cum	₹ 1,001.00
		(B) Granular Courses	cum	₹ 696.00
		(II) By Mechanical Means		
		(A) Bituminous Courses	cum	₹ 318.20
2.15	202	Dismantling of Cement Concrete Pavements as per MoRD Technical Specification Clause 202.		
		Dismantling of cement concrete pavements by mechanical means using pneumatic tools breaking to pieces not exceeding 0.02 cum in volume and stock piling at designated locations and disposal of dismantled materials with all lifts and upto a lead of 1000 m, stacking serviceable materials and unserviceable materials separately as per MoRD Technical Specification Clause 202.	cum	₹ 1,349.00
2.16	202	Dismantling of Guard Rails		
		Dismantling of Guard rails by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m, stacking serviceable materials and unserviceable materials separately as per MoRD Technical Specification Clause 202.	m	₹ 104.60
2.17	202	Dismantling of Kerb Stones		
		Dismantling of Kerb Stones by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.	m	₹ 16.10
2.18	202	Dismantling of Kerb Stone Channels		
		Dismantling of Kerb Stone channels by manual means and disposal of dismantled material with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.	m	₹ 24.40
2.19	202	Dismantling of Kilometre Stones		
		Dismantling of Kilometre Stones including cutting of earth, and disposal of dismantled material with all lifts and upto a lead of 1000 m and backfilling of pit as per MoRD Technical Specification Clause 202.		

Chapter - 2 : Site Clearance

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
	(A)	5th Km Stone	Each	₹ 485.60
	(B)	Ordinary Km Stone	Each	₹ 314.40
	(C)	200 m Stone	Each	₹ 64.70
2.20	202	Dismantling of Fencing		
		Dismantling of barbed wire fencing / wire mesh fencing including posts, foundation concrete, backfilling of pit by manual means including disposal of dismantled material with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately as per MoRD Technical Specification Clause 202.	m	₹ 76.60
2.21	202	Dismantling of CI Water Pipe Line		
		Dismantling of CI water pipe line 600 mm dia including disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately under supervision of the concerned department but excluding earth excavation and dismantling of masonry works as per MoRD Technical Specification Clause 202.	m	₹ 186.00
2.22	202	Removal of Cement Concrete Pipe of Sewer Gutter		
		Removal of Cement Concrete Pipe of Sewer Gutter 1500 mm dia under the supervision of the concerned department including disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately but excluding earth excavation and dismantling of masonry works as per MoRD Technical Specification Clause 202.	m	₹ 256.50
2.23	202	Removal of Telephone/ Electric Poles and Lines		
		Removal of telephone/ electric poles with wires including excavation and dismantling of foundation concrete and lines under the supervision of concerned department, disposal with all lifts and upto a lead of 1000 m and stacking the serviceable and unserviceable material separately as per MoRD Technical Specification Clause 202.	Each	₹ 255.66

Chapter - 3

Earthwork, Erosion Control and Drainage

(a) Preamble

1. *The rates have been analysed using mechanical means. But use of motor grader is avoided in works in embankments as per guideline. Manual means for certain items have also been provided which can be used for areas inaccessible to machines and also for small jobs.*
2. *In the rate analysis of earthwork, compacted volume of earth has been considered.*
3. *Cutting of earth by dozer has been proposed where the earth can be utilised for filling for embankment within a lead upto 100 m.*
4. *Where lead for transporting of earth is more than 100 m, excavator and tipper have been provided.*
5. *The rate caters for disposal of unsuitable soil only upto 1 km. The cost of transportation beyond the initial lead of 1 km will be paid separately based on tonne-kilometerage.*
6. *The replacement of unsuitable soil shall be provided separately in the estimate. The rate analysis for removal of unsuitable soil does not provide for replacement by suitable soil.*
7. *Excavation in hard rock (requiring blasting/ blasting prohibited/ controlled blasting) has not been considered in this SOR, as normally this type of hard rock is not generally found in Tripura. However, if such type rock is found separate analysis may be made with cost estimate.*
8. *For narrow and restricted areas, plate compactor has been proposed for compaction to achieve the desired density.*
9. *In case excavated rock is found suitable for incorporation in works, suitable credit for the available rock shall be given.*
10. *For excavation of structures refer to Chapter 11 dealing with items of foundation.*
11. *The possibility of using the blasted rock fragments for backfilling behind structures of backfilling of foundation pits or filling in medians/ separators or use in service road shall be examined before proposing disposal of excavated rock.*
12. *Any work involved for crossing of water courses for irrigation purpose etc., will be priced under respective items like excavation, grubbing, clearing etc., for which rate analysis have separately been made.*
13. *Earth excavated from drains can be used in roadway berms. Hence carriage for disposal of same is not provided.*
14. *In case of rock fill embankment, it is assumed that material is available at site from rock cutting.*
15. *For widening of existing pavement less than 1.8 m, the rates for all items of this Chapter may be increased by 30 percent.*
16. *The items for Seeding & mulching, fly ash/pond ash embankment are not considered.*
17. *Different type of pucca road side drains has been considered with PCC M10 (using jhama aggregate) alongwith drawing.*

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
Preparation of Foundation for Embankment				
3.1	301.4	Scarifying Existing Granular Surface to a Depth of 50 mm by Manual Means Scarifying Existing Granular Surface by manual means to a depth of 50 mm and disposal of scarified material with a lift upto 3 m and leads upto 1000 m as per MoRD Technical Specification Clause 301.4.	sqm	₹ 28.50
3.2	301.4	Scarifying Existing Bituminous Surface to a depth of 150 mm by Mechanical Means Scarifying Existing bituminous Road Surface by mechanical means to a Depth of 150 mm and disposal of scarified material with a lift upto 3 m and leads upto 1000 m as per MoRD Technical Specification Clause 301.4.	sqm	₹ 10.20
3.3	301.5	Construction of Embankment with Material Obtained from Roadway Cutting Construction of Embankment with approved materials deposited at site from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of Tables 300.1 and 300.2 as per MoRD Technical Specification Clause 301.5.		
		A. For spreading beyond 100 m	cum	₹ 81.10
		B. For spreading within 100 m	cum	₹ 59.60
3.4	301.5	Construction of Embankment with Material Obtained from Borrow Pits Construction of embankment with approved material obtained from borrow pits with a lift upto 1.5 m, transporting to site, spreading, grading to required slope and compacting to meet requirement of Tables 300.1 and 300.2 with a lead upto 1000 m as per MoRD Technical Specification Clause 301.5.	cum	₹ 245.40
3.5	302.3	(i) Excavation in Cutting in soil by manual means with lead upto 50 m Excavation in Roadway cutting in soil by using manual means for carrying of cut earth to embankment site with all lifts and lead upto 50 m as per MoRD Technical Specification Clause 302.3.	cum	₹ 214.80
		(ii) Excavation in Soil with Dozer with lead upto 100 m. Excavation for roadway in soil by mechanical means with Dozer including cutting and pushing the earth to site of embankment upto a distance of 100 m, including trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections as per MoRD Technical Specification Clause 302.3.	cum	₹ 81.10

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(iii) Excavation in Soil using Hydraulic Excavator and Tippers with disposal upto 1000 m Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections and transporting to the embankment location with all lifts and lead upto 1000 m as per MoRD Technical Specification Clause 302.3.	cum	₹ 44.10
3.6	302.3.6	Excavation in Marshy Soil Excavation for roadway in marshy soil with hydraulic excavator 0.9 cum bucket capacity including cutting and loading in tippers and disposal with all lifts and lead upto 1000 m trimming of bottom and side slopes in accordance with requirements of lines, grades and cross-sections as per MoRD Technical Specification Clause 302.3.6.	cum	₹ 63.60
3.7	302.3.11	Removal of Unsuitable Soil with Disposal upto 1000 m Removal of unsuitable soil including excavation, loading and disposal upto 1000 m lead but excluding compaction ground supporting embankment / subgrade, replacement by suitable soil, which shall be paid separately as per MoRD Technical Specification Clause 303.5.2 and as per MoRD Technical Specification Clause 302.3.11.	cum	₹ 44.10
3.8	302.3.11 i)	Excavation in Ordinary Rock by manual means Excavation in ordinary rock using manual means including carrying of excavated material to embankment site with all lifts and lead upto 50 m as per MoRD Technical Specification Clause 302.3.5.	cum	₹ 334.10
	ii)	Excavation in Ordinary Rock with Dozer with lead upto 100 m Excavation for roadway in ordinary rock by mechanical means with dozer including cutting and pushing the cut earth to site of embankment upto a distance of 100 m, including trimming bottom and side slopes in accordance with the requirements of lines, grades and cross-sections as per MoRD Technical Specification Clause 302.3.5.	cum	₹ 90.70
	iii)	Excavation in Ordinary Rock using Hydraulic Excavator and Tippers with disposal upto 1000 m Excavation for roadwork in ordinary rock with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, transporting to embankment site with all lifts and lead upto 1000 m, trimming bottom and side slopes in accordance with requirements of lines, grades and cross-sections and as per MoRD Technical Specification Clause 302.3.5.	cum	₹ 76.20

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
3.9	302.3.2	Stripping, Storing and Relaying Top Soil from Right-of-Way (R.O.W)		
		Stripping, storing and preservation of top soil by keeping it damp in stock piles and keep wet till it is used by road side at 15 m interval and re-application on embankment slopes, cut slopes and other areas in localities where the available embankment material is not conducive to plant growth as per MoRD Technical Specification Clause 302.3.2.	cum	₹ 323.80
3.10	302.3.2	Stripping, Storing and Relaying Top Soil from Borrow Areas in Agricultural Fields		
		Stripping of top soil from borrow areas located in agriculture fields, storing at a suitable place, spreading and relaying after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels to the satisfaction of the farmer/land owners as per MoRD Technical Specification Clause 302.3.2.	cum	₹ 265.70
3.11	309	Turfing with Sods		
		Furnishing and laying of the live sods of perennial turf forming grass on embankment slope , verges or other locations shown on the drawing or as directed by the Engineer including preparation of ground, fetching of sods and watering as per MoRD Technical Specification Clause 309.	sqm	₹ 36.20
3.12	303.1	Construction of Subgrade and Earthen Shoulders		
		Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts and leads, transporting to site , spreading, grading to required slope and compacted to meet requirement of Table 300.2 as per MoRD Technical Specification Clause 303.1.	cum	₹ 233.80
3.13	301.4	Compacting Original Ground		
	(i)	Compacting original ground supporting embankment		
		Loosening, Levelling and Compacting original ground supporting embankment to facilitate placement of first layer of embankment,scarified to a depth of 150 mm, mixed with water at OMC and then compacted by rolling so as to achieve minimum dry density as given in Tables 300.1 and 300.2 for embankment construction as per MoRD Technical Specification Clause 301.4.1.	cum	₹ 23.00
	303 (ii)	Compacting original ground supporting subgrade		
		Loosening of the ground upto a level of 300 mm below the subgrade level, watered, graded and compacted in layers to meet requirement of Tables 300.1 and 300.2 for subgrade construction as per MoRD Technical Specification Clause 303.5.2.	cum	₹ 30.40

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
3.14	301.5.5.1	Repairs of damages caused by rain/spillage of water		
		Preparation and surface treatment of formation by removing mud and slurry, watering to the extent needed to maintain the desired moisture content, trimming to the required line, grade, profile and rolling with three wheel 80-100 kN static roller, complete as per Technical Specification Clause 301.5.5.1.	sqm	₹ 2.50
3.15	307	Surface Drains		
		Construction of unlined surface drains of average cross-sectional area 0.40 sqm in ordinary soil to specified lines, grades, levels and dimensions. Excavated material to be used in embankment with a lift upto 3 m and lead of 50 m (average lead 25 m) as per MoRD Technical Specification Clause 307.		
		(i) Surface Drains in Ordinary Soil		
		(A) Manual Means	m	₹ 114.60
		(B) Mechanical Means	m	₹ 21.90
		(ii) Surface Drains in Ordinary Rock		
		(A) Manual Means	m	₹ 171.80
		(B) Mechanical Means	m	₹ 47.60

ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)
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3.16	307 & 1606	Road side Pucca Drains		
		Construction of road side pucca drain with M10 (1:3:6 with jhama brick aggregate) to specified lines, grades, levels and dimensions as per approved design and MoRD Technical Specification Clause 307, 1606. Excavated material to be used in embankment at site. (including centering, shuttering, etc. but excluding reinforcement)		
		A. Kerb & Channel drain (top clear width 600 mm, bottom clear width 150 mm and clear depth of 200 mm)		
		I. In Ordinary Soil	m	₹ 1,848.10
		II. In Ordinary rock (not requiring blasting)	m	₹ 1,877.90
		III. In Hard rock (blasting prohibited)	m	₹ 1,889.50
		B. Trapezoidal drain (top clear width 600 mm, bottom clear width 300 mm and clear depth of 400 mm)		

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		I. In Ordinary Soil	m	₹ 3,410.50
		II. In Ordinary rock (not requiring blasting)	m	₹ 3,470.10
		III. In Hard rock (blasting prohibited)	m	₹ 3,493.30
		C. Trapezoidal drain (top clear width 600 mm, bottom clear width 300 mm and clear depth of 600 mm)		
		I. In Ordinary Soil	m	₹ 4,215.23
		II. In Ordinary rock (not requiring blasting)	m	₹ 4,294.30
		III. In Hard rock (blasting prohibited)	m	₹ 4,325.10
		D. U shaped drain (top clear width 600 mm, bottom clear width 600 mm and clear depth of 600 mm)		
		I. In Ordinary Soil	m	₹ 4,866.90
		II. In Ordinary rock (not requiring blasting)	m	₹ 4,958.60
		III. In Hard rock (blasting prohibited)	m	₹ 4,994.20

3.17 307 Chute Drains

A. Providing chute drains across embankment slopes in approaches of bridges and on horizontal curves as per drawings.

(a) Earthwork in excavation for foundation of structures as per drawings and MoRD Technical Specifications Clause 307 including setting out construction of shoring and bracing deleterious matter, dressings of sides and bottom and backfilling with approved material (By manual means).

Rate as per item No.11.1 of Chapter 11 cum

(b) Providing and laying plain concrete M15 grade

Rate as per item No.12.14.I. of Chapter 12 cum

(c) Brick Masonry in cement mortar 1:5

Rate as per item No.12.1.III of Chapter 12 cum

(d) Plastering with in cement mortar 1:4

Rate as per item No.12.3 of Chapter 12 cum

(e) Providing and laying P.C.C. M 20 architectural coping on the top of chute walls.

Chapter - 3 : Earthwork, Erosion Control and Drainage

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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Rate as per item No.12.15 of Chapter 12

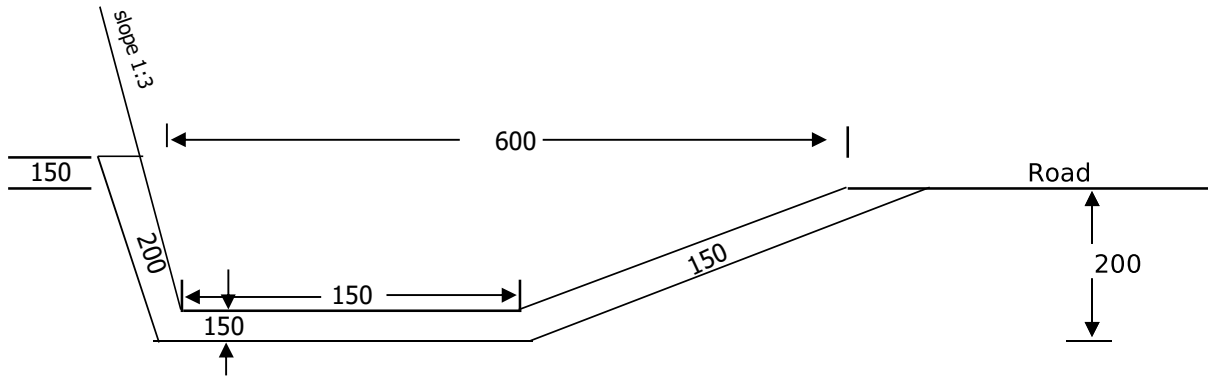
m

Rate per m = a+b+c+d+e

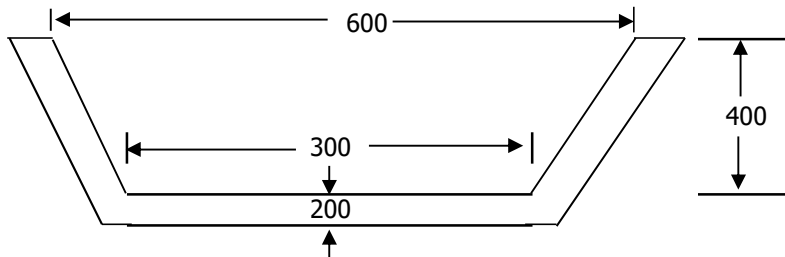
Note :- Quantities are to be taken as per design and drawings.

3.18	307 & 1606	Road side 'V' shaped Pucca Drains Construction of 'V' shaped road side pucca drain with 1st class brick work in cement Mortar 1 : 4 (1 cement : 4 river sand) laid brick on edge to specified lines, grades, levels and dimensions as per approved design and MoRD Technical Specification Clause 307, 1606. (Excluding the cost of excavation which would be paid separately)	sqm	₹ 1,246.80
3.19	307 & 1606	Dry brick pitching in road side drains Providing dry brick pitching in road side drain with 1st class brick laid on edge to specified lines, grades, levels and dimensions as per approved design and MoRD Technical Specification Clause 307, 1606. (Excluding the cost of excavation which would be paid separately)	sqm	₹ 929.70

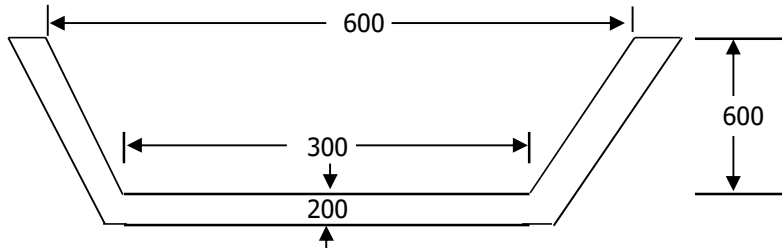
Drawing of different types of Roadside Drains



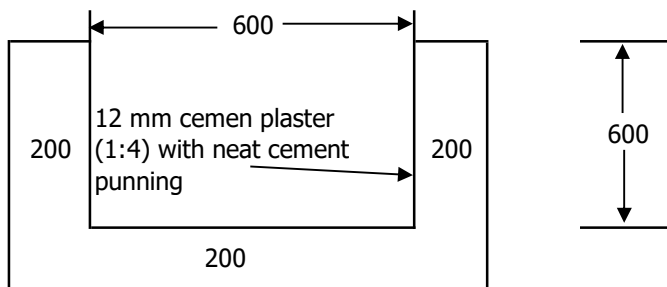
- A. Kerb & Chanel drain (Top clear width 600 mm, bottom clear width 150 mm and clear depth of 200 mm)



- B. Trapezoidal drain (Top clear width 600 mm, bottom clear width 300 mm and clear depth of 400 mm)



- C. Trapezoidal drain (Top clear width 600 mm, bottom clear width 300 mm and clear depth of 600 mm)



- D. U shaped drain (Top clear width 600 mm, bottom clear width 600 mm and clear depth of 600 mm)

- Note :**
1. All dimensions are in mm
 2. Not to Scale
 3. All with M 10 concrete (using jhama brick aggregate) with 12 mm thick cement plaster 1:4 (1 cement :4 sand) with neat cement punning in the exposed surface.

Chapter - 4

Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

(a) Preamble

1. *Quantities of materials provided are approximate and are meant for the purpose of estimating only. Actual quantities shall be as per mix design.*
2. *For construction of sub-base , two alternatives as under have been provided.*
 - a. *Mix in place method.*
 - b. *Plant mix method.*
3. *Construction of shoulders : - Earthen, Hard and Paved shoulders have been considered, the rates applicable are for subgrade , sub-base, and different layers of pavement respectively.*
4. *In the case of improvement of subgrade with lime stabilisation, soil is assumed to be available at the site and has not been provided for. Only lime has been catered. In the case of lime stabilisation of sub-base, soil has been provided to form the sub-base.*
5. *While providing the rates of items in the cost estimate of DPR, detailed local enquiries should be made keeping in view the location of crushing plants, brick kilns, local quarries and lead involved.*
6. *The quantities considered in the output are the compacted quantities. The quantities of aggregates provided in the rate analysis under the head material are the compacted quantities.*
7. *Granular Sub-base and WBM and WMM has also been considered with jhama brick aggregate as per specification for the rural roads.*
8. *The following items has not been considered.*
 - a. *WBM with crushable screenings*
 - b. *Granular sub base with gravel*
 - c. *Granular sub base with locally available materials such as Kankar,*
 - d. *laterite, Dhundla*
 - e. *lime flyash stabilised soil sub-base*
 - f. *Sub-base course using crushed slag*
 - g. *WBM with crushed slag*
 - h. *cement bound granular material sub-base*
 - i. *Crusher Run Macadam Base*
 - j. *Stone set pavement*

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
4.1	401	Granular Sub-base with Well Graded Material (Table 400.1)		
		(A) By Mix in Place Method		
		Construction of granular sub-base by providing well graded material spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with smooth wheel roller to achieve the desired density, complete as per MoRD Technical Specification Clause 401.		
		(i) For Grading I Material	cum	₹ 6,398.70
		(ii) For Grading II Material	cum	₹ 6,272.80
		(iii) For Grading III Material	cum	₹ 6,094.20
		(B) Plant Mix Method		
		Construction of granular sub-base by providing well graded material, mixing in a mechanical mix plant at OMC, carriage of mixed material to work site upto lead of 1000 m spreading in uniform layers with motor grader on prepared surface and compacting with smooth wheel roller to achieve the desired density, complete as per MoRD Technical Specification Clause 401.		
		(i) For Grading I Material	cum	₹ 6,631.20
		(ii) For Grading II Material	cum	₹ 6,537.70
		(iii) For Grading III Material	cum	₹ 6,353.60
4.2	405	Water Bound Macadam Sub-Base / Base		
		1) WBM Grading 1		
		Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with three wheel 80-100 kN static roller in stages to proper grade and camber, applying and brooming, stone screening/ binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading 1' as per MoRD Technical Specification Clause 404.		
		(A) By Manual Means	cum	₹ 7,823.20
		(B) By Mechanical Means	cum	₹ 7,469.40

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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- 2) WBM Grading 2
Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with smooth wheel roller 80-100 kN in stages to proper grade and camber, applying and brooming, stone screening/ binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading 2' as per MoRD Technical Specification Clause 405.
- | | | | |
|-----|---------------------|-----|------------|
| (A) | By Manual Means | cum | ₹ 8,318.70 |
| (B) | By Mechanical Means | cum | ₹ 7,965.00 |
- 3) WBM Grading 3
Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with smooth wheel roller 80-100 kN in stages to proper grade and camber, applying and brooming, stone screening to fill up the interstices of coarse aggregate, watering and compacting to the required density 'Grading 3' as per MoRD Technical Specification Clause 405.
- | | | | |
|-----|---------------------|-----|------------|
| (A) | By Manual Means | cum | ₹ 8,452.20 |
| (B) | By Mechanical Means | cum | ₹ 8,098.50 |

4.3 406 Wet Mix Macadam

Providing, laying, spreading and compacting stone aggregates to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed materials by tipper to site, laying in uniform layers in sub-base/ base course on a well prepared sub-base and compacting with smooth wheel roller of three wheel 80-100 kN static roller to proper grade and camber, achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and as per MoRD Technical Specification Clause 406.

	By Mechanical Means with 1.00 km lead	cum	₹ 6,849.20
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4.4 407 Construction of Shoulders as per MoRD Technical Specification Clause 407

A. Earthen Shoulders

The rate as applicable for Sub-grade construction may be adopted

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		B. Hard Shoulders		
		<i>The rate as applicable for Sub-base and / or Base may be adopted as per approved design</i>		
		C. Paved Shoulders		
		<i>The rates may be adopted as applicable for different layers of pavement depending upon approved design of paved shoulders.</i>		
4.5	412	Brick soling		
		i) Brick on edge soling		
		Providing and laying brick on edge soling layer on prepared subgrade according to lines, grades and cross-section shown on the drawing, filling joints with sand, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	sqm	₹ 991.70
		ii) Flat Brick soling		
		Providing and laying flat brick soling layer on prepared subgrade according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	sqm	₹ 579.10
		iii) Brick edging laid in full brick width		
		Providing and laying brick edging on prepared subgrade according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	m	₹ 252.36
		iv) Brick edging laid length wise		
		Providing and laying brick edging laid lengthwise on prepared subgrade according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	m	₹ 86.10

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)
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4.6	401	Granular Sub-base with Well Graded Material (Table 400.1) using Jhama Brick Aggregate		
	(A)	By Mix in Place Method		
		Construction of granular sub-base by providing well graded material (Jhama Brick Aggregate, Grading-I, as per Table 400.1, spreading in uniform layers with tractor with attachments on prepared surface, mixing by mix in place method with rotavator at OMC, applying and brooming sand to fill up the interstices of coarse aggregate, watering and compacting with smooth wheel roller to achieve the desired density, complete as per MoRD Technical Specification Clause 401.		
		(i) For Grading - I Material (jhama brick aggregate)	cum	₹ 4,720.70
4.7	405	Water Bound Macadam Sub-Base / Base using Jhama Brick Aggregate		
	1)	WBM Grading - 2		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing rolling with three wheel roller 80-100 kN in stages to proper grade and camber, applying and brooming binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density Grading- 2 as per MoRD Technical Specification Clause 405.		
	(A)	By Manual Means	cum	₹ 7,435.90
	(B)	By Mechanical Means	cum	₹ 7,082.20
	2)	WBM Grading - 3		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing rolling with three wheel roller 80-100 kN in stages to proper grade and camber, applying and brooming binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density Grading- 3 as per MoRD Technical Specification Clause 405.		
	(A)	By Manual Means	cum	₹ 7,474.10
	(B)	By Mechanical Means	cum	₹ 7,120.30

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
4.8	406	Wet Mix Macadam		
		Providing, laying, spreading and compacting 53 mm to 0.075 mm jhama brick aggregates to wet mix macadam specification including premixing the material with water at OMC in mechanical mixer (Pug Mill), carriage of mixed materials by tipper to site, laying in uniform layers in sub-base/ base course on a well prepared sub-base and compacting with smooth wheel roller of three wheel 80-100 kN static roller to proper grade and camber, achieve the desired density including lighting, barricading and maintenance of diversion, etc as per Tables 400.11 & 400.12 and as per MoRD Technical Specification Clause 406.		
		By Mechanical Means with 1.00 Km lead	cum	₹ 6,299.50
4.9	403	Lime Stabilisation for Improving Subgrade		
		Laying and spreading available soil in the subgrade on a prepared surface, pulverising, mixing the spread soil in place with rotavator with 2 per cent slaked lime having minimum 70 per cent of contents of CaO, grading with motor grader and compacting with the smooth wheel road roller at OMC to the desired density to form a layer of improved Sub-grade as per MoRD Technical Specification Clause 403.		
		(A) By Manual Means	cum	₹ 348.80
		(B) By Mechanical Means	cum	₹ 319.90
4.10	403	Lime Treated Soil for Sub-Base		
		Providing, laying and spreading soil on a prepared sub-grade, pulverising, mixing the spread soil in place with rotavator with 4 per cent slaked lime with minimum content of 70 per cent of CaO, grading with motor grader and compacting with the road roller at OMC to achieve atleast 98 per cent of the max dry density to form a layer of sub-base as per MoRD Technical Specification Clause 403.		
			cum	₹ 560.80
4.11	404	Cement Treated Soil Sub-Base/Base		
		Providing, laying and spreading soil on a prepared sub-grade, pulverising, adding the designed quantity of cement to the spread soil, mixing in place with rotavator, grading with the motor grader and compacting with the road roller at OMC to achieve the desired unconfined compressive strength and to form a layer of sub-base/base as per MoRD Technical Specification Clause 404.		
			cum	₹ 885.90

Chapter - 4 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
4.12	405	Water Bound Macadam Sub-Base / Base using Jhama Brick Aggragate		
		1) WBM Grading - 1		
		Providing, laying, spreading and compacting jhama brick aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing rolling with three wheel roller 80-100 kN in stages to proper grade and camber, applying and brooming binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density Grading- 1 as per MoRD Technical Specification Clause 405.		
		(A) By Manual Means	cum	₹ 7,230.20
		(B) By Mechanical Means	cum	₹ 6,876.50

Chapter - 5

Bases and Surface Courses (Bituminous)

(a) Preamble

1. *Bases and Surface courses are considered as below :*
 - i) *Prime coat and tack coat with bitumen emulsion*
 - ii) *BM, Carpet, Seal coat With Viscosity Graded Bitumen of VG-30 and VG-10.*
2. *The outputs considered for construction equipment are for compacted quantities of relevant items and not for loose quantities*
3. *In case of prime coat and tack coat, average quantities of binder indicated in specifications have been taken*
4. *Prime coat and tack coat, wherever provided, are required to be measured and paid separately.*
5. *Cleaning of surface is a part of the item of prime coat and tack coat. As such cleaning of surface has not been provided for bituminous courses as the same is already catered in prime / tack coat. However, for those cases where such coats are not required to be done, cleaning of surface shall be included and paid.*
6. *Rolling of bituminous courses is required to be done as per clause 504.3.6 of MORD specifications. Provision in the analysis has been made accordingly. It has been observed during actual practice at work sites, that the availability of road roller is generally inadequate. As compaction is the key to good construction, this point is being specifically highlighted to ensure that adequate number of road rollers as per provision in the rate analysis are deployed at site.*
7. *Spreading of bituminous materials shall be done by mechanical means except in areas where a mechanical paver cannot have access.*
8. *Mazdoors who work for bitumen heating / spreading of hot bituminous mix will be paid the same wages. However, they will be provided safety kits containing normally gumboots, hand gloves, dark goggles, barnol, country soap, coconut oil, tarring outfits, etc. For this purpose additional 0.5 percent sundries have been provided in the analysis of rates in addition to the normal sundries covered by overheads.*
9. *Where the proposed aggregates fail to pass the stripping value test, an approved adhesion agent shall be added to the binder as per clause 507.2.4 with the approval of the Engineer and the cost of adhesion agent shall be added under the subhead of materials.*
10. *The factor of usage of rollers has been taken as 0.65 in case of Bituminous Macadam only.*
11. *In the item 5.11 for Seal Coat (case IV - Type - D with fine sand by manual means) has been considered in addition to other Types.*
12. *Rate analysis has been given for use of Bitumen of Viscosity Grade ('VG-30', 'VG-10') complying with Indian Standard Specifications for "Paving Bitumen" IS 73 : 2013 & also bitumen emulsion.*

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
5.1	502	Prime Coat		
	(i)	Low porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.70- 1.00 kg/sqm using mechanical means as per MoRD Technical Specification Clause 502.	sqm	₹ 73.40
	(ii)	Medium porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 0.90- 1.20 kg/sqm using mechanical means as per MoRD Technical Specification Clause 502.	sqm	₹ 90.70
	(iii)	High porosity Providing and applying primer coat with bitumen emulsion (SS-1) on prepared surface of granular base including cleaning of road surface and spraying primer at the rate of 1.20- 1.50 kg/sqm using mechanical means as per MoRD Technical Specification Clause 502.	sqm	₹ 116.70
5.2	503	Tack Coat		
	(i)	Providing and applying tack coat with bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.20 to 0.25 kg per sqm on the prepared bituminous surface cleaned with Hydraulic broom as per MoRD Technical Specification Clause 503.	sqm	₹ 19.20
	(ii)	Providing and applying tack coat with bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared dry and hungry bituminous surface cleaned with Hydraulic broom as per MoRD Technical Specification Clause 503.	sqm	₹ 23.30
	(iii)	Providing and applying tack coat with bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.25 to 0.30 kg per sqm on the prepared granular surface treated with primer & cleaned with Hydraulic broom as per MoRD Technical Specification Clause 503.	sqm	₹ 23.30
	(iv)	Providing and applying tack coat with bitumen emulsion (RS-1) using emulsion distributor at the rate of 0.30 to 0.35 kg per sqm on the prepared non-bituminous surfaces (cement concrete pavement) cleaned with Hydraulic broom as per MoRD Technical Specification Clause 503.	sqm	₹ 27.50

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
5.3	504	Bituminous Macadam		
		Providing and laying bituminous macadam with hot mix plant using crushed aggregates of grading as per Table 500.4 premixed with bituminous binder, transported to site upto a lead of 1000 m laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled to achieve the desired compaction as per MoRD Technical Specification Clause 504.		
		i. With Viscosity Graded Bitumen of VG-30.	cum	₹ 16,348.10
		ii. With Viscosity Graded Bitumen of VG-10.	cum	₹ 16,266.40
5.4	505	Built-Up Spray Grout		
		Providing, laying and rolling of built-up spray grout layer over prepared base consisting of a two layer composite construction of crushed coarse aggregates using motor grader for aggregates. Key stone chips spreader may be used with application of bituminous binder (Bitumen VG-30) after each layer. and with key aggregates placed on top of the second layer to serve as a base, conforming to line, grades and cross section specified, the compacted layer thickness being 75 mm as per MoRD Technical Specification Clause 505.		
		(A) By Manual Means	sqm	₹ 962.50
		(B) By Mechanical Means	sqm	₹ 876.30
5.5	507	Surface Dressing using Bituminous (Viscosity grade Bitumen) Binder		
		Providing and laying surface dressing as wearing course consisting of a layer of bituminous binder laid on the prepared surface, followed by a cover of crushed stone aggregates of specified size and rolling with three wheel 80-100 kN static roller including cleaning the road surface as per MoRD Technical Specification Clause 507.		
		(A) By Manual Means		
		Case - I : Nominal chipping size 13.2 mm		
		(I) Bitumen of VG-30	sqm	₹ 191.60
		(II) Bitumen of VG-10	sqm	₹ 190.50
		Case - II : Nominal chipping size 9.5 mm		
		(I) Bitumen of VG-30	sqm	₹ 165.10
		(II) Bitumen of VG-10	sqm	₹ 164.10
		(B) By Mechanical Means		
		Case - I : Nominal chipping size 13.2 mm		
		(I) Bitumen of VG-30	sqm	₹ 156.60

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(II) Bitumen of VG-10	sqm	₹ 155.50
		Case - II : Nominal chipping size 9.5 mm		
		(I) Bitumen of VG-30	sqm	₹ 134.50
		(II) Bitumen of VG-10	sqm	₹ 133.50
5.6	507	Surface Dressing using Bitumen Emulsion		
		Providing and laying surface dressing as wearing course consisting of a layer of bitumen emulsion laid on the prepared surface, followed by a cover of crushed stone chippings of specified size and rolling with three wheel 80-100 kN static roller including cleaning the road surface as per MoRD Technical Specification Clause 507.		
		(A) By Manual Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 222.10
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 196.60
		(B) By Mechanical Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 190.30
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 169.90
5.7	507.2.	Pre-coating Chips		
	5	Pre-coating chips with 1 percent of paving bitumen by weight of chips in a suitable mixer duly heated to 160°C as per Technical Specification Clause 507.2.5.	cum	₹ 1,969.30
5.8	508	20 mm thick Open-Graded Premix Carpet using Bituminous (Viscosity grade/ modified bitumen) Binder		
		Providing, laying and rolling of open-graded premix carpet of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using Viscosity grade bitumen or emulsion to required line, grade and level to serve as wearing course on a previously prepared base , including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per MoRD Technical Specification Clause 508.		
		Case - I : By Manual Means		
		(I) Bitumen of VG-30	sqm	₹ 336.80
		(II) Bitumen of VG-10	sqm	₹ 335.20
		Case - II : By Mechanical Means		

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(I) Bitumen of VG-30	sqm	₹ 322.00
		(II) Bitumen of VG-10	sqm	₹ 320.40
5.9	508.2	20 mm thick Open-Graded Premix Carpet using Bitumen Emulsion as per MoRD Technical Specification Clause 508.2		
		Providing, laying and rolling of open-graded premix carpet of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates using bitumen emulsion to required line, grade and level to serve as wearing course on a previously prepared base , including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 KN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per MoRD Technical Specification Clause 508.2.	sqm	₹ 355.90
5.10	509	Mix Seal Surfacing		
		Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.9 mm (Type-A) or 13.2 mm to 0.9 mm (Type-B) aggregates using Viscosity grade bitumen to required line, grade and level to serve as wearing course on a previously prepared base , including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 KN static roller, finishing to required level and grades as per MoRD Technical Specification Clause 509.		
		(A) By Manual Means		
		i) Type-A		
		I) Bitumen of VG-30	sqm	₹ 420.00
		II) Bitumen of VG-10	sqm	₹ 417.50
		ii) Type-B		
		I) Bitumen of VG-30	sqm	₹ 394.10
		II) Bitumen of VG-10	sqm	₹ 392.00
		(B) By Mechanical Means		
		i) Type-A		
		I) Bitumen of VG-30	sqm	₹ 392.80
		II) Bitumen of VG-10	sqm	₹ 390.30
		ii) Type-B		
		I) Bitumen of VG-30	sqm	₹ 366.90
		II) Bitumen of VG-10	sqm	₹ 364.80

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
5.11	510	Seal Coat		
		Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A or Type B or Type C or Type D as per MoRD Technical Specification Clause 510.		
		A By Manual Means		
		Case - I : Type A		
		(I) Bitumen of VG-30	sqm	₹ 152.30
		(II) Bitumen of VG-10	sqm	₹ 151.20
		Case - II : Type B		
		(I) Bitumen of VG-30	sqm	₹ 89.90
		(II) Bitumen of VG-10	sqm	₹ 89.10
		Case - III : Type C		
		(I) Bitumen of VG-30	sqm	₹ 123.30
		(II) Bitumen of VG-10	sqm	₹ 122.50
		Case - IV : Type D (premix with fine sand)		
		(I) Bitumen of VG-30	sqm	₹ 77.10
		(II) Bitumen of VG-10	sqm	₹ 76.40
		B By Mechanical Means		
		Case - I : Type A		
		(I) Bitumen of VG-30	sqm	₹ 142.90
		(II) Bitumen of VG-10	sqm	₹ 141.80
		Case - II : Type B		
		(I) Bitumen of VG-30	sqm	₹ 86.60
		(II) Bitumen of VG-10	sqm	₹ 85.90
		Case - III : Type C		
		(I) Bitumen of VG-30	sqm	₹ 114.50
		(II) Bitumen of VG-10	sqm	₹ 113.70
5.12	508	25 mm thick Open-Graded Premix Carpet using Bituminous (Viscosity grade/ modified bitumen) Binder		

Chapter - 5 : Granular Sub-bases, Bases (Non-Bituminous) and Shoulders

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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Providing, laying and rolling of open-graded premix carpet of 25 mm thickness composed of 13.2 mm to 5.6 mm aggregates either using Viscosity grade bitumen or emulsion to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per MoRD Technical Specification Clause 508.

Case - I By Manual Means

(I)	Bitumen of VG-30	sqm	₹ 422.60
(II)	Bitumen of VG-10	sqm	₹ 420.50

Case - II By Mechanical Means

(I)	Bitumen of VG-30	sqm	₹ 404.00
(II)	Bitumen of VG-10	sqm	₹ 402.00

Chapter-6

Cement Concrete Pavement

(a) Preamble

1. *Use of cement concrete pavement for rural roads likely to be limited to small stretches. These will, therefore, have to be constructed without use of heavy equipment, like, high capacity batching/mixing plant and slip form pavers. Accordingly, the rate analysis is based on concrete mixture of suitable capacity with weigh batcher , fixed side forms and screed, plate and needle vibrators.*
2. *Provision of Plasticizer admixture to improve workability with reduced water cement ratio has been made.*
3. *The rates of materials taken in the analysis are in the place of origin as mentioned in the materials sheet. The concrete mixer placement is however assured close to the site of work so that transporting and placement of concrete can be done by labour alone.*
4. *Quantities of materials provided in the rate analysis are for the estimate purpose. Exact quantity of materials will be determined from the jobs mix formula.*
5. *The rates of earthwork , subgrade and sub-base may be adopted from Chapter 3 and 4 as appropriate.*
6. *The lime treated soil has not been considered.*

Chapter - 6 : Cement Concrete Pavement

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
6.1	400	Granual Sub-base <i>Rate as per item No.4.1 of Chapter 4.</i>		
6.2	1500 & 400	Water Bound Macadam (WBM) - Sub-base (A) By Manual Means <i>As per item No.4.2 of Chapter 4</i> (B) By Mechanical Means <i>As per item No.4.2 of Chapter 4</i>		
6.3	1500	Cement Concrete Pavement Construction of un-reinforced, dowel jointed at expansion and construction joint only, plain cement concrete pavement, thickness as per design, over a prepared sub base, with 43 grade cement or any other type as per Clause 1501.2.2 M30 (Grade), coarse and fine aggregates conforming to IS:383, maximum size of coarse aggregate not exceeding 25 mm, mixed in a concrete mixer of not less than 0.2 cum capacity and appropriate weigh batcher using approved mix design, laid in approved fixed side formwork (steel channel, laying and fixing of 125 micron thick polythene film, wedges, steel plates including levelling the formwork as per drawing), spreading the concrete with shovels, rakes, compacted using needle, screed and plate vibrators and finished in continuous operation including provision of contraction and expansion, construction joints, applying debonding strips, primer, sealant, dowel bars, near approaches to bridge/culvert and construction joints, admixtures as approved, curing of concrete slabs for 14-days,using curing compound (where specified) and water finishing to lines and grade as per drawing and MoRD Technical Specification Clause 1501.	cum	₹ 11,980.90
6.4	1500	Roller Compacted Concrete Pavement Construction of Roller Compacted Concrete Pavement (RCCP) with coarse and fine aggregates conforming to IS:383, the size of coarse aggregate not exceeding 25 mm with minimum aggregate cement ratio of 5:1 and with minimum cement content of 310 kg per cum, aggregate gradation to be as per Table 602.2 after blending, mixing in concrete mixer at optimum moisture content, transporting to site, laying with wheel barrows or steel pans or with mechanical paver , compacting with 80 - 100 kN smooth wheel, tandem vibratory roller, to achieve, the designed flexural strength, finishing and curing as per drawing and MoRD technical specification Clause 1502.	cum	₹ 10,960.90
6.5	1500	Rectangular Concrete Block Pavement		

Chapter - 6 : Cement Concrete Pavement

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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Manufacturing, laying of cement concrete blocks of size 0.450 m x 0.300 m x 0.150 m of Cement Concrete (C.C) M30 grade and spreading 25 mm thick sand under neath and filling joints with sand on existing W.B.M. base as per MoRD Technical Specification Clause 1503.

sqm

₹ 2,303.50

6.6 1500 DELETED

1) DELETED

2) DELETED

Chapter - 7

Causeway and Submersible Bridges

a) Preamble

- 1 *The quantities of various items may be worked out from the design and drawings.*
- 2 *Rate analysis of various items involved in the construction of concrete causeway may be taken from relevant Chapters.*
- 3 *RCC Hume Pipes of NP-3 have been considered in the analysis.*
- 4 *Rate analysis for items of submersible bridges may be based on the respective items of Chapters 11, 12 and 13 dealing with bridges. Rates for guide posts may be taken from Chapter 8.*
- 5 *Rate analysis of item of river training and protection works may be based on the respective items in Chapter 14 (Protection Works).*
- 6 *The following items has not been considered.*
 - a *Stone masonry in cut-off/ head walls.*
 - b *W.B.M Base course.*
 - c *Laying apron in stone boulders.*
 - d *Laying RCC Hume pipe NP4*

Chapter - 7 : Causeway and Submersible Bridges

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
7.1	1400, 300, 600,	Construction of Cut-off Walls/Head Walls (i) Earthwork in excavator for structures as per drawing and MoRD technical specification Clause 305. <i>Rate as per item No.11.1 of Chapter 11</i> (ii) Plain cement concrete M 15 grade <i>Rate as per item No.11.4(ii) of Chapter 11</i> (iii) Brick masonry in cement mortar 1:4 <i>Rate as per item No.11.5(ii) of Chapter 11</i> (v) Providing P.C.C M20 architectural coping on top of wall <i>Rate as per item No.12.11 of Chapter 12</i>		
Note :		1 Rate as appropriate for the type of soil/rock are to be taken in (i) . 2 Appropriate items may also be taken from the relevant item of the relevant Chapters in case of using jhama brick aggregate.		
7.2	300	Preparation of Subgrade <i>Rate as per item No.3.13 of Chapter 3</i>		
7.3	400	Granular Sub-base <i>Rate as per item No.4.1 of Chapter 4</i>		
7.4	1500	Cement Concrete Slab <i>Rate as per item No.6.3 of Chapter 6</i>		
7.5	1400 & 1300	(i) Providing and Laying of Apron with Cement Concrete Blocks as per drawing and MoRD technical specification Clause 1301. <i>Rate as per item No.14.3 of Chapter 14</i>		
7.6	1400 & 1600	Guide Posts Construction of R.C.C. guide posts of 250 mm dia , M15 grade as per Drawing and MoRD technical specification Clause 1401.6. <i>Rate as per item No.8.8 of Chapter 8</i>		
7.7	1400, 1100 & 800	Bedding for Causeway (i) Type A (concrete cradle) Bedding Clause 1402.5		

Chapter - 7 : Causeway and Submersible Bridges

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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As per item No.9.2 of Chapter 9

- 7.8 1400 & Laying Reinforced Cement Concrete Pipe NP3 as per
1100 drawing and MoRD technical specification Clause 1402.6

As per item No.9.3 of Chapter 9

- Note :
- 1 Rate as appropriate for the type of soil/rock are to be taken in (i) .
 - 2 Appropriate items may also be taken from the relevant item of the relevant Chapters in case of using jhama brick aggregate.

Chapter - 8

Hill Roads

(a) Preamble

1 *The Chapter covers only the analysis of rates for items which are peculiar to hill roads . For other items, reference may be made to relevent Chapters and analysis modified as suggested in note 2 below.*

2 *Extra Provision for High Altitude Areas.*

Considering the loss of output of men and machines above 2100 m altitude, the following percentage addition to cost of manpower and usage rates of machines may be considered in the analysis of rates given in various Chapters.

<i>Altitude in m</i>	<i>% of the value in Manpower to be added to rates</i>	<i>% of the value in Machine to be added to rates</i>
<i>2100 to 2400</i>	<i>7%</i>	<i>3%</i>
<i>2401 to 2700</i>	<i>15%</i>	<i>6%</i>
<i>2701 to 3000</i>	<i>25%</i>	<i>9%</i>
<i>3001 to 3300</i>	<i>32%</i>	<i>12%</i>
<i>3301 to 3600</i>	<i>48%</i>	<i>15%</i>
<i>3601 to 3900</i>	<i>66%</i>	<i>18%</i>
<i>3901 to 4200</i>	<i>86%</i>	<i>21%</i>
<i>4201 to 4500</i>	<i>108%</i>	<i>24%</i>
<i>4501 to 4800</i>	<i>132%</i>	<i>27%</i>
<i>4801 to 5100</i>	<i>186%</i>	<i>30%</i>

The above provisions are based on the report of Defence Institute of Physiology and Allied Sciences, Delhi Cantt. Regarding quantitative reduction in the physical work capacity of individuals working in high altitude areas and the recommendation of the Committee on Cost of Construction set-up by Border Roads Development Board for reduction in output of machines while working in high altitudes. These figures are adopted from 'Standard Schedule of Rates' of BRO as applicable to high altitude areas.

3 *The above addition is also to be applied on the analysis of rates for items provided in this Chapter.*

4 *The following items has not been considered*

- a Earth work in Hard Rock (Requiring Blasting)*
- b Hill side drains with stone masonry*
- c Constn of scupper*
- d Catch water/ intercepting drains*

Chapter - 8 : Hill Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
8.1	200	Site Clearance <i>As per Chapter 2</i>		
8.2	1600 & 300	Earthwork in hill Road		
	(i)	Excavation in Hilly Areas in Ordinary Soil by manual means.		
	A)	Excavation in ordinary soil in Hilly Areas by manual means including cutting and trimming of side slopes and disposing of excavated earth with a lift upto 1.50 m and a lead upto 20 m as per drawing and MoRD Technical Specification Clause 1603.1.	cum	₹ 286.40
	B)	Extra for Every Additional lift of 1.5 m or Part thereof	cum	₹ 30.30
	(ii)	Excavation in Hilly Areas in Ordinary Soil by mechanical means.		
	A)	Excavation in ordinary soil in Hilly Areas by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with a lift upto 1.50 m and a lead upto 20 m as per drawing and MoRD Technical Specification Clause 1603.1.	cum	₹ 130.30
	B)	Extra for Every Additional lift of 1.5 m or Part thereof	cum	₹ 30.30
	(iii)	Excavation in Hilly Area in Ordinary Rock by manual means		
	A)	Excavation in ordinary rock using manual means including loading in a truck and carrying of excavated material to embankment site with a lift upto 1.50 m and lead upto 20 m as per MoRD Clause 1603.2.	cum	₹ 630.10
	B)	Extra for Every Additional lift of 1.5 m or Part thereof	cum	₹ 47.40
	(iv)	Excavation in Hilly Areas in Ordinary Rock by mechanical means not requiring blasting		
		Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with a lift upto 1.50 m and lead upto 20 m as per MoRD Technical specification Clause 1603.2.	cum	₹ 265.70

Chapter - 8 : Hill Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
8.3	1400, 1700 & 800	Construction of RCC guide posts of 250 mm dia and total 1700 & 600 mm long,(300 mm below GL) M15 grade cast-in-situ with 20 mm nominal size aggregate, true to line and grade, tolerance of vertical RCC posts not to exceed 1 in 500 as per drawing and MoRD Technical Specification Clause 1401.6.		
	A.	In Ordinary Soil	Each	₹ 558.80
	B.	In Ordinary Rock (not requiring blasting)	Each	₹ 568.00
	C.	In Hard Rock (blasting prohibited)	Each	₹ 571.60
8.4	1600	Providing edge stones on valley side of formation as per drawing and Technical Specification Clause 1608.2.6.		
		<i>Same as Item No. 8.3 of this Chapter</i>		
8.5	1600 & 309	Turfing with Sods in hilly areas Furnishing and laying of the live sods of perennial turf forming grass on embankment slope of hill roads, verges or other locations shown on the drawing or as directed by the Engineer including preparation of ground, stacking the sods and watering as per MoRD Technical specification Clause 309.	sqm	₹ 85.60

ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)

- 8.6 1600, Retaining Walls/ Breast Walls
600 &
- Construction of retaining walls/ breast walls in Plain cement concrete with M10 (with jhama brick aggregate) as per drawing and MoRD technical specifications Clause 1604 (including centering, shuttering, staging etc. but excluding reinforcement).
- (i) Earthwork in excavation for structures
Rate as per item No. 11.1 of Chapter 11
- (ii) Plain cement concrete M 10 grade
Rate as per item No. 11.9.I.(i) of Chapter 11
- (iii) Providing P.C.C. M 20 architectural coping on top of retaining wall/breast wall
Rate as per item No. 12.15 of Chapter 12
- (iv) Filter material behind retaining wall/breast wall as per Specification 1204.3.8 in a width of 600 m
Rate as per item No. 12.13 of Chapter 12

Chapter - 8 : Hill Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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(v) Back filling behind retaining wall/ breast wall

Rate as per item No. 12.8.I of Chapter 12

Note : 1 Quantities of material/work shall be as per design and drawings.

2 Earth work in excavation may be taken as per site conditions. It may comprise of a number of sub-items depending upon the type of soil/ rock encountered.

8.7 1600, Construction of Hill Side Drain
700,
300 & Construction of hill side drain in accordance with the requirement of specifications true to lines and grades. Dimensions and other particulars as per drawing and MoRD Technical Specification Clause 1606.1.

Unit = 1 m

Rate as per item No. 3.16 of Chapter 3

1 Quantities of material/work shall be as per design and drawings.

2 Earth work in excavation may be taken as per site conditions. It may comprise of a number of sub-items depending upon the type of soil/rock encountered.

8.8 1400, Construction of RCC guide posts of 250 mm dia and total
1700 & 600 mm long,(300 mm below GL) M15 grade (with jhama
800 brick aggregate) cast-in-situ with 20 mm nominal size aggregate, true to line and grade, tolerance of vertical RCC posts not to exceed 1 in 500 as per drawing and MoRD Technical Specification Clause 1401.6.

A. In Ordinary Soil Each ₹ 535.10

B. In Ordinary Rock (not requiring blasting) Each ₹ 544.20

C. In Hard Rock (blasting prohibited) Each ₹ 547.80

8.9 1600 Providing edge stones with PCC using jhama brick aggregate on valley side of formation as per drawing and MoRD Technical Specification Clause 1608.2.6.

Same as Item No. 8.8 of this Chapter

8.10 1600 Setting Out (using PCC with jhama brick aggregate)

1) Construction of reference pillars (burjee) @ 20 m on both sides as per Fig. 1600.1 (b) and @ 8.33 m interval on curves

Chapter - 8 : Hill Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		A. In Ordinary Soil	Each	₹ 188.20
		B. In Ordinary Rock (not requiring blasting)	Each	₹ 189.90
		C. In Hard Rock (blasting prohibited)	Each	₹ 190.50
2)		Construction of back pillar as per Fig. 1600.1 (c) as per drawing and MoRD Technical Specification Clause 1602.3.		
		A. In Ordinary Soil	Each	₹ 477.80
		B. In Ordinary Rock (not requiring blasting)	Each	₹ 482.80
		C. In Hard Rock (blasting prohibited)	Each	₹ 484.70
3)		Construction of job pillars as per Fig. 1600.1(d) and MoRD Technical Specification Clause 1602.4.		
		A. In Ordinary Soil	Each	₹ 1,244.30
		B. In Ordinary Rock (not requiring blasting)	Each	₹ 1,258.20
		C. In Hard Rock (blasting prohibited)	Each	₹ 1,263.50

Chapter - 9

Pipe Culverts

(a) Preamble

1. *Pipe culverts of sizes 1200, 1000, 750 and 600 mm dia in single row and double row which are generally used on roads, have been included. Providing and laying of pipe has been included in the rate analysis. Items of auxiliary works as excavation, bedding, backfilling, concrete and masonry shall be analysed under the respective section and paid for separately.*
2. *Analysis has been given for NP3 and NP2 spun/ hume pipes only, because NP4 pipes are not generally used in this area.*
3. *Cost of any river training and protection work like stone pitching, apron, curtain wall etc. may be analysed under the respective item included in Chapter 14.*
4. *The joining of pipes is proposed by flush joints.*
5. *Chain & pulley for lifting of the pipes is considered part of overheads.*
6. *The thickness of first class bedding has been taken as 150 mm. The height of bedding has been taken as 1/10th of overall height of pipe in the analysis. This may be modified as per thickness indicated in the approved drawing.*

Chapter - 9 : Pipe Culverts

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
9.1	1100 & 300	Excavation for Structures Earthwork in excavation for foundation of structures upto 3 m depth as per drawing and MoRD technical specification Clause 1104, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material.		
		A. Ordinary Soil	cum	₹ 458.20
		B. Ordinary Rock (not requiring blasting)	cum	₹ 572.80
		C. Hard Rock (blasting prohibited)	cum	₹ 617.40
		D. Marshy Soil	cum	₹ 859.20
		Note: Rate as applicable for the type of soil/ rock are to be taken from Chapter 11		
9.2	1100 & 800	Bedding for Pipe (I) Type A (Concrete Cradle) Bedding Laying concrete cradle bedding with M15 Grade Cement Concrete as per MoRD Technical specification Clause 1105(i).		
		<i>Rate as per Item No.11.4. of Chapter 11</i>	cum	₹ 9,983.70
		Note: Rate as applicable for the type mixing are to be taken from Chapter 11		
		(II) Type B (First Class) Bedding Laying (First Class) bedding on well compacted sand, moorum or approved granular material as per MoRD Technical specification Clause 1105(i).		
		<i>Rate as per Item No.11.2.I of Chapter 11</i>	cum	₹ 1,168.00
9.3	1100	Providing and laying Reinforced Cement Concrete Pipe NP3 as per design in single Row Providing and Laying reinforced cement concrete pipe NP3 with collar for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
		(A) 1200 mm dia	m	₹ 17,559.30
		(B) 1000 mm dia	m	₹ 13,433.60
		(C) 750 mm dia	m	₹ 8,936.00
		(D) 600 mm dia	m	₹ 6,429.90

Chapter - 9 : Pipe Culverts

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
9.4	1100	Providing and laying Reinforced Cement Concrete Pipe NP3 as per design in Double Row Providing and Laying reinforced cement concrete pipe NP3 with collar for culverts on first class bedding of granular material in Double row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 35,231.70
	(B)	1000 mm dia	m	₹ 26,938.50
	(C)	750 mm dia	m	₹ 18,084.00
	(D)	600 mm dia	m	₹ 10,502.90
9.5	800 & 1100	Plain Cement Concrete M10(1:3:6 nominal mix) in levelling course below open foundation of Head walls as per drawings & MoRD Technical Specification Clause 800 & 1109. <i>Rate as per item No. 11.4.I.(i) of Chapter 11.</i>	Cum	₹ 9,983.70
9.6	1100 & 600	Brick Masonry Work in cement mortar in foundation of Head walls complete excluding pointing and plastering as per drawing and MoRD technical specification Clause 1109. (A) Brick Masonry in 1:4 cement mortar <i>Rate as per item No.11.5 (ii) Chapter 11</i>	cum	₹ 9,418.50
9.7	1100 & 600	Pointing with Cement Mortar (1:3) on brickwork as per MoRD Technical Specification Clause 613.3. <i>Rate as per Item No. 12.2 of Chapter 12.</i>	sqm	₹ 96.40
9.8	1100 & 600	Plastering with Cement Mortar (1 : 4), 15 mm thick on brickwork in substructure as per MoRD technical specification Clause 613.4. <i>Rate as per item No.12.3 of Chapter 12</i>	sqm	₹ 223.20
9.9	1100 & 300	Backfilling in Foundation Trenches as per drawing and MoRD technical specification Clause 1108. i) Sand Filling <i>Rate as per item No.11.2.I of Chapter 11.</i> ii) Earth Filling (for Marshy Soil) <i>Rate as per item No.11.2.II of Chapter 11.</i>	cum	₹ 1,168.00
			cum	₹ 293.70
9.10	1100, 600, 700 & 1200	Providing PCC M20 Architecture Coping on the top of wing wall, return wall etc. complete as per drawing and MoRD Technical Specification Clause 615. <i>Rate as per item No.12.11 of Chapter 12.</i>	m	₹ 739.60

Chapter - 9 : Pipe Culverts

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
9.11	1109 & 800	Cement Concrete M10 (1:3:6 nominal mix) in Head Walls with skin reinforcement (8 mm dia @ 200 mm c/c on exposed surface as per drawings & MoRD Technical Specification 1109 (including centering, shuttering, staging etc.)	cum	₹ 11,950.90
ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)				
9.12		Bedding for Pipe		
	1100 & 800	(I) Type A (Concrete Cradle) Bedding Laying concrete cradle bedding with M15 Grade Cement Concrete(with jhama brick aggregate as per MoRD Technical soecification Clause 1105(i).		
		<i>Rate as per Item No.11.9.II.(i) of Chapter 11</i>	cum	₹ 9,350.00
9.13	1100 & 800	Plain Cement Concrete M10(1:3:6 nominal mix with jhama brick aggregate) in levelling course below open foundation of Head walls as per drawings & MoRD Technical Specification Clause 1109 (including centering, shuttering, staging etc. but excluding reinforcement).		
		<i>Rate as per item No. 11.9.I.(i) of Chapter 11.</i>	cum	₹ 9,099.90
9.14	1100, 600, 700 & 1200	Providing PCC M20 (jhama brick aggregate) Architecture Coping on the top of wing wall, return wall etc. complete as per drawing and MoRD Technical Specification Clause 615 (including centering, shuttering, staging etc. but excluding reinforcement)	m	₹ 685.70
9.15	1109 & 800	Cement Concrete M10 (1:3:6 nominal mix with jhama brick aggregate) in Head Walls with skin reinforcement (8 mm dia @ 200 mm c/c on exposed surface as per drawings & MoRD Technical Specification 1109 (including centering, shuttering, staging etc.)	cum	₹ 10,975.40
9.16	1100	Providing and laying Reinforced Cement Concrete Pipe NP2 as per design in single Row		
		Providing and Laying reinforced cement concrete pipe NP2 for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling , concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 9,679.00
	(B)	900 mm dia	m	₹ 6,194.60
	(C)	600 mm dia	m	₹ 3,818.20

Chapter - 9 : Pipe Culverts

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(D) 450 mm dia	m	₹ 2,484.30
		(E) 300 mm dia	m	₹ 1,194.10
9.17	1100	Providing and laying Reinforced Cement Concrete Pipe NP2 as per design in Double Row		
		Providing and Laying reinforced cement concrete pipe NP2 for culverts on first class bedding of granular material in Double row including fixing collar with cement mortar 1:2 but excluding excavation, protection works, backfilling , concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
		(A) 1200 mm dia	m	₹ 19,471.20
		(B) 900 mm dia	m	₹ 12,460.60
		(C) 600 mm dia	m	₹ 7,844.50
		(D) 450 mm dia	m	₹ 5,141.30
		(E) 300 mm dia	m	₹ 2,523.30

Chapter - 10

Traffic Sign, Markings and other Appurtenances

(a) Preamble

- 1 *Rate analysis for fencing provides for Barbed wire fencing with R.C.C. M 15 grade concrete post.*
- 2 *Backfilling of foundation of boundary pillars has been proposed with stone spalls, tightly packed and compacted.*
- 3 *The item pertaining to road traffic signals has not been analysed as this is a specialized work and rates can be obtained from firms having specialization for design and installation of this work.*
- 4 *Two supports have been provided for direction and place identification signs where size is more than 0.9 square metres. Only one support is provided for size upto 0.9 square metres .*
- 5 *The traffic signs proposed are of retro-reflectorised types made of encapsulated lens type reflective sheeting fixed over Aluminium sheeting and semi-reflective type on M.S.sheet.*
- 6 *The size and location of traffic signs shall as per IRC:67.*
- 7 *Separate rate analysis has been made for tubular steel railing with RCC posts and MS steel posts.*
- 8 *In the case of road signs and direction boards, the depth of foundation and quantity of cement concrete provided in the rate analysis are indicative. These may be suitably increased in areas of higher wind velocities, like, coastal areas.*

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
10.1	1700	Printing New Letters and Figures of any Shade		
		Printing new letter and figures of any shade with synthetic enamel paint black or any other approved colour to give an even shade as per drawings and MoRD Technical Specification Clause 1701.		
	i)	Hindi (Matras commas and the like not to be measured and paid for. Half letters shall be counted as half only)	per cm height per letter	₹ 1.30
	ii)	English and Roman Hyphens, commas and the like not to be measured and paid for. Detail for 100 letters of 160 mm height, i.e., 1.6 m	per cm height per letter	₹ 0.80
10.2		Traffic Signs		
	1700, A, 300,	Retro-reflectorised Traffic Signs		
	1)	Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per drawings and MoRD Technical Specification Clause 801.		
	i)	with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,820.40
	ii)	with 600 mm equilateral triangle aluminium sheeting	Each	₹ 3,576.90
	iii)	with 600 mm circular aluminium sheeting	Each	₹ 3,736.30
	iv)	with 800 x 600 mm rectangular aluminium sheeting	Each	₹ 3,983.60
	v)	with 600 x 450 mm rectangular aluminium sheeting	Each	₹ 3,720.00
	vi)	with 600 x 600 mm square aluminium sheeting	Each	₹ 3,833.00
	vii)	with 900 mm side octagon aluminium sheeting	Each	₹ 4,224.50
	2)	Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on GI pipe 50 mm dia firmly fixed to the ground by means of properly designed foundation with M-15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per drawings and MoRD Technical Specification Clause 1701.		

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		i) with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,564.10
		ii) with 600 mm equilateral triangle aluminium sheeting	Each	₹ 3,320.60
		iii) with 600 mm circular aluminium sheeting	Each	₹ 3,480.00
		iv) with 800 x 600 mm rectangular aluminium sheeting	Each	₹ 3,727.20
		v) with 600 x 450 mm rectangular aluminium sheeting	Each	₹ 3,463.70
		vi) with 600 mm x 600 mm square aluminium sheeting	Each	₹ 3,576.60
		vii) with 900 mm side octagon aluminium sheeting	Each	₹ 3,968.20
3)		Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on RCC post 100 mm x 100 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per drawings and MoRD Technical Specification Clause 1701.		
		i) with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,154.40
		ii) with 600 mm equilateral triangle aluminium sheeting	Each	₹ 2,910.90
		iii) with 600 mm circular aluminium sheeting	Each	₹ 3,070.30
		iv) with 800 mm x 600 mm rectangular aluminium sheeting	Each	₹ 3,317.50
		v) with 600 mm x 450 mm rectangular aluminium sheeting	Each	₹ 3,053.90
		vi) with 600 mm x 600 mm square aluminium sheeting	Each	₹ 3,154.40
		vii) with 900 mm sides octagon aluminium sheeting	Each	₹ 3,558.50
B)		Semi Reflective Traffic Signs		
		Providing and fixing of semi reflective cautionary, mandatory and informatory sign board as per IRC:67 made of 1.5 mm thick MS sheet duly stove white colour in front and gray colour on back with red reflective border of 65 mm width and required letters and figures with reflective tape engineering grade as per Clause 1701.3.9 of MORD for Rural Roads of required shade and colour supported and welded on 47 mm x 47 mm x 12 SWG sheet tube firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and as per MoRD Technical specification Clause 1701.2.2.		

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		i) with 900 mm equilateral triangle MS sheeting	Each	₹ 3,335.00
		ii) with 600 mm equilateral triangle MS sheeting	Each	₹ 2,989.50
		iii) with 600 mm circular MS sheeting	Each	₹ 3,268.90
		iv) with 800 mm x 600 mm rectangular MS sheeting	Each	₹ 3,463.30
		v) with 600 mm x 450 mm rectangular MS sheeting	Each	₹ 3,256.00
		vi) with 600 mm x 600 mm square MS sheeting	Each	₹ 3,344.90
		vii) with 900 mm sides octagon MS sheeting	Each	₹ 3,652.90
10.3	1700, 800 & 300	Direction and Place Identification signs upto 0.9 sqm sign board		
		A. Retro-reflectorised Traffic Signs		
		(i) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,430.20
		(ii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on 2 inch dia GI Pipe firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,145.40
		(iii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on RCC post 100 mm x 100 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 4,690.10

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		B) Semi Reflective Traffic Signs		
		Direction and place identification signs up to 0.9 sqm sign board		
		Providing and erecting and place identifications of semi reflective sign boards as per IRC:67 made of 2 mm thick M.S. sheet duly stove enameled paint in white colour in front and gray colour on back with red reflective border of 70 mm width and required message, letters and figures with reflective engineering grade tape as per MORD specifications of required shade and colour. Supported and welded on 47 mm x 47 mm x 12 SWG square tube of 3050 mm height duly strengthened by 25 mm x 5 mm MS flat iron on edges on back firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 4,697.90
10.4	1700, 800 &	Direction and place identification signs with size more than 0.9 sqm sign board		
		A. Retro-reflectorised Traffic Signs		
		(i) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 6,171.60
		(ii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on 50 mm dia GI Pipe, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,829.80

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(iii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on RCC post 100 mm x 100 mm, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,287.20
		B) Semi Reflective Traffic Signs		
		Direction and place identification signs more than 0.90 sqm sign board		
		Providing and erecting direction and place identifications of semi reflective sign boards as per IRC:67 made of 2 mm thick M.S. sheet duly stove enameled paint in white colour in front and gray colour on back with reflective border of 70 mm width and required message, letters and figures with reflective engineering grade tape as per MORD specifications of required shade and colour. Supported and welded on 2 Nos. 47 mm x 47 mm x 12 SWG square tube of 3050 mm height duly strengthened by 25 mm x 5 mm MS flat iron on edges on back firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701	sqm	₹ 5,342.30
10.5	1700	Painting Two Coats on New Concrete Surfaces		
		Painting two coats including primer coat after filling the surface with synthetic enamel paint in all shades on new, plastered / concrete surfaces as per drawing and MoRD Technical Specification clause 1701.	sqm	₹ 130.70
10.6	1700	Painting on Steel Surfaces		
		Providing and applying two coats of ready mix paint including primer coat of approved brand on steel surface after through cleaning of surface to give an even shade as per drawing and MoRD Technical Specification Clause 1701.	sqm	₹ 123.10
10.7	1700	Painting on Concrete/Steel Surfaces with Epoxy		
		Painting two coats including prime coat with epoxy paint of approved brand on concrete/steel surfaces after through cleaning of surface to give an even shade as per drawing and MoRD Technical Specification Clause 1701.	sqm	₹ 138.50

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
10.8	1700	Painting lines, Dashes, Arrows, etc. on Road in Two Coats on New Work Painting lines, dashes, arrows, etc. on roads in two coats on new work with ready mixed road marking paint conforming to IS:164 on bituminous/concrete surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control as per drawing and MoRD Technical Specification Clause 1702.	sqm	₹ 158.20
10.9	1700	Painting lines, Dashes, Arrows, etc. on Road in Two Coats on Old Work Painting lines, dashes, arrows, etc. on roads in two coats on old work with ready mixed road marking paint conforming to IS:164 on bituminous / concrete surface, including cleaning the surface of all dirt, dust and other foreign matter, demarcation at site and traffic control as per drawing and MoRD Technical Specification Clause 1702.	sqm	₹ 111.10
10.10	1700	Kilometre Stone Reinforced cement concrete M15 grade kilometre stone / local stone of standard design as per IRC:8 fixing in position including painting and printing, etc. as per drawing and MoRD Technical Specification Clause 1703.		
		i) 5th Kilometre Stone(precast)	Each	₹ 6,217.40
		ii) Ordinary Kilometre Stone(precast)	Each	₹ 3,905.50
		iii) 200 m Stone(precast)	Each	₹ 981.20
10.11	1700, 800 & 300	G.I Barbed Wire Fencing 1.2 m high Providing and fixing 1.2 m high GI barbed wire fencing with 1.8 m RCC posts 150 mm x 150 mm placed every 3 m centre-to-centre founded in M-15 grade cement concrete, 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc. complete as per MoRD technical specification Clause 1705.	m	₹ 636.20
10.12	1700, 800 & 300	G.I Barbed Wire Fencing 1.8 m high Providing and fixing 1.8 m high GI barbed wire fencing with 2.4 m RCC M15 grade 150 mm x 150 mm concrete post placed every 3 m centre-to-centre founded in M15 grade cement concrete, 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 12 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc. complete as per MoRD technical specification Clause 1705.	m	₹ 884.40

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
10.13	1700, 800 & 300	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 m high above ground, 2 m centre-to-centre, complete as per approved drawings MoRD technical specification Clause 1706.	m	₹ 3,277.50
10.14	1700, 800 & 300	Tubular Steel Railing on Precast RCC posts, 1.2 m High Above Ground Level Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M-20 grade RCC vertical posts 175 mm x 175 mm x 1.8 m high (1.2 m above GL) with 3 holes 50 mm dia for pipe, fixed 2 m centre-to-centre complete as per approved drawings MoRD technical specification Clause 1706.	m	₹ 3,043.00
10.15	Suggestive	Traffic Cone Provision of red fluorescent with white reflective sleeve traffic cone made of Low Density Polyethylene (LDPE) material with a square base of 390 x 390 x 35 mm and a height of 770 mm, 4 kg in weight, placed at 1.5 m interval, all as per BS:873.	Each	₹ 582.30
10.16	Suggestive	Rumble Strips Provision of 15 nos. rumble strips covered with premix bituminous carpet, 15-20 mm high at centre, 250 mm wide placed at 1 m centre-to-centre at approved locations to control speed, marked with white strips of road marking paint.	sqm	₹ 109.10
10.17	Suggestive	Road Markers/Road Stud with Lens Reflector Providing and fixing of road stud 100 x 100 mm die cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling holes 30 mm upto a depth of 600 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS:873(Part 4) 1973.	Each	₹ 195.10

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
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ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)

10.18 1700, Traffic Signs (using jhama brick aggregate in CC/ PCC)
300,

A. Retro-reflectorised Traffic Signs

1) Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 801.

i)	with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,709.00
ii)	with 600 mm equilateral triangle aluminium sheeting	Each	₹ 3,465.50
iii)	with 600 mm circular aluminium sheeting	Each	₹ 3,624.90
iv)	with 800 x 600 mm rectangular aluminium sheeting	Each	₹ 3,872.10
v)	with 600 x 450 mm rectangular aluminium sheeting	Each	₹ 3,608.60
vi)	with 600 x 600 mm square aluminium sheeting	Each	₹ 3,721.50
vii)	with 900 mm side octagon aluminium sheeting	Each	₹ 4,113.10

2) Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on GI pipe 50 mm dia firmly fixed to the ground by means of properly designed foundation with M-15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.

i)	with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,452.70
ii)	with 600 mm equilateral triangle aluminium sheeting	Each	₹ 3,209.20
iii)	with 600 mm circular aluminium sheeting	Each	₹ 3,368.60
iv)	with 800 x 600 mm rectangular aluminium sheeting	Each	₹ 3,615.80
v)	with 600 x 450 mm rectangular aluminium sheeting	Each	₹ 3,352.30

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		vi) with 600 mm x 600 mm square aluminium sheeting	Each	₹ 3,465.20
		vii) with 900 mm side octagon aluminium sheeting	Each	₹ 3,856.80
3)		Providing and fixing of retro-reflectorised cautionary, mandatory and informatory sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 1.5 mm thick supported on RCC post 100 mm x 100 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.		
		i) with 900 mm equilateral triangle aluminium sheeting	Each	₹ 3,015.20
		ii) with 600 mm equilateral triangle aluminium sheeting	Each	₹ 2,771.70
		iii) with 600 mm circular aluminium sheeting	Each	₹ 2,931.10
		iv) with 800 mm x 600 mm rectangular aluminium sheeting	Each	₹ 3,178.30
		v) with 600 mm x 450 mm rectangular aluminium sheeting	Each	₹ 2,914.80
		vi) with 600 mm x 600 mm square aluminium sheeting	Each	₹ 3,015.10
		vii) with 900 mm sides octagon aluminium sheeting	Each	₹ 3,419.30
B)		Semi Reflective Traffic Signs		
		Providing and fixing of semi reflective cautionary, mandatory and informatory sign board as per IRC:67 made of 1.5 mm thick MS sheet duly stove white colour in front and gray colour on back with red reflective border of 65 mm width and required letters and figures with reflective tape engineering grade as per Clause 1701.3.9 of MORD specification for Rural Roads of required shade and colour supported and welded on 47 mm x 47 mm x 12 SWG sheet tube firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD technical specification Clause 1701.2.2.		
		i) with 900 mm equilateral triangle MS sheeting	Each	₹ 3,223.60
		ii) with 600 mm equilateral triangle MS sheeting	Each	₹ 2,877.10
		iii) with 600 mm circular MS sheeting	Each	₹ 3,157.50

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		iv) with 800 mm x 600 mm rectangular MS sheeting	Each	₹ 3,351.90
		v) with 600 mm x 450 mm rectangular MS sheeting	Each	₹ 3,144.60
		vi) with 600 mm x 600 mm square MS sheeting	Each	₹ 3,233.50
		vii) with 900 mm sides octagon MS sheeting	Each	₹ 3,541.50
10.19	1700, 800 & 300	Direction and Place Identification signs upto 0.9 sqm size board (using jhama brick aggregate in CC / PCC)		
		A. Retro-reflectorised Traffic Signs		
		(i) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,306.40
		(ii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on 50 mm dia GI Pipe firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,021.60
		(iii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on RCC post 100 mm x 100 mm firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 4,535.50
		B) Semi Reflective Traffic Signs		

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		Providing and erecting and place identifications of semi reflective sign boards as per IRC:67 made of 2 mm thick M.S. sheet duly stove enameled paint in white colour in front and gray colour on back with red reflective border of 70 mm width and required message, letters and figures with reflective engineering grade tape as per MORD specifications of required shade and colour. Supported and welded on 47 mm x 47 mm x 12 SWG square tube of 3050 mm height duly strengthened by 25 mm x 5 mm MS flat iron on edges on back firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 4,574.10
10.20	1700, 800 & 300	Direction and place identification signs with size more than 0.9 sqm sign board (using jhama brick aggregate in CC /PCC) A. Retro-reflectorised Traffic Signs (i) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceding 0.9 sqm supported on a mild steel angle iron post 75 mm x 75 mm x 6 mm 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 6,023.10
		(ii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceding 0.9 sqm supported on 50 mm dia GI Pipe 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,681.30

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Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(iii) Providing and erecting direction and place identification retro-reflectorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide MoRD technical specification Clause 1701.2.3 fixed over aluminium sheeting, 2 mm thick with area exceeding 0.9 sqm supported on RCC post 100 mm x 100 mm, 2 Nos. firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm bellow ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,101.60
		B) Semi Reflective Traffic Signs		
		Direction and place identification signs up to 0.90 sqm sign board		
		Providing and erecting and place identifications of semi reflective sign boards as per IRC:67 made of 2 mm thick M.S. sheet duly stove enameled paint in white colour in front and gray colour on back with reflective border of 70 mm width and required message, letters and figures with reflective engineering grade tape as per MORD specifications of required shade and colour. Supported and welded on 47 mm x 47 mm x 12 SWG square tube of 3050 mm height duly strengthened by 25 mm x 5 mm MS flat iron on edges on back firmly fixed to the ground by means of properly designed foundation with M 15 grade cement concrete (using jhama brick aggregate) 450 mm x 450 mm x 600 mm, 600 mm below ground level as per approved drawings and MoRD Technical Specification Clause 1701.	sqm	₹ 5,193.70
10.21	1700	Kilometre Stone (with RCC M15 grade using jhama brick aggregate)		
		Reinforced cement concrete M15 grade (using jhama brick aggregate) kilometre stone/local stone of standard design as per IRC:8 fixing in position including painting and printing, etc. as per drawing and MoRD Technical Specification Clause 1703.		
		i) 5th Kilometre Stone (precast)	Each	₹ 5,851.10
		ii) Ordinary Kilometre Stone(precast)	Each	₹ 3,653.60
		iii) 200 m Stone(precast)	Each	₹ 936.40
10.22	1700	Boundary Pillar (with PCC M15 grade using jhama brick aggregate and reinforcement)		

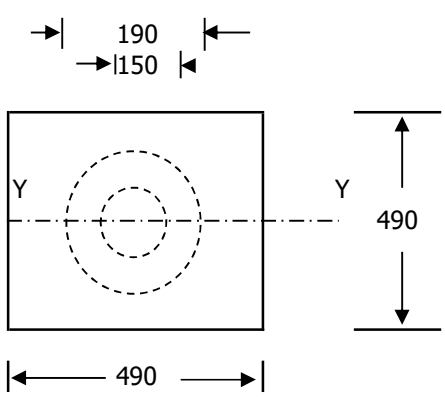
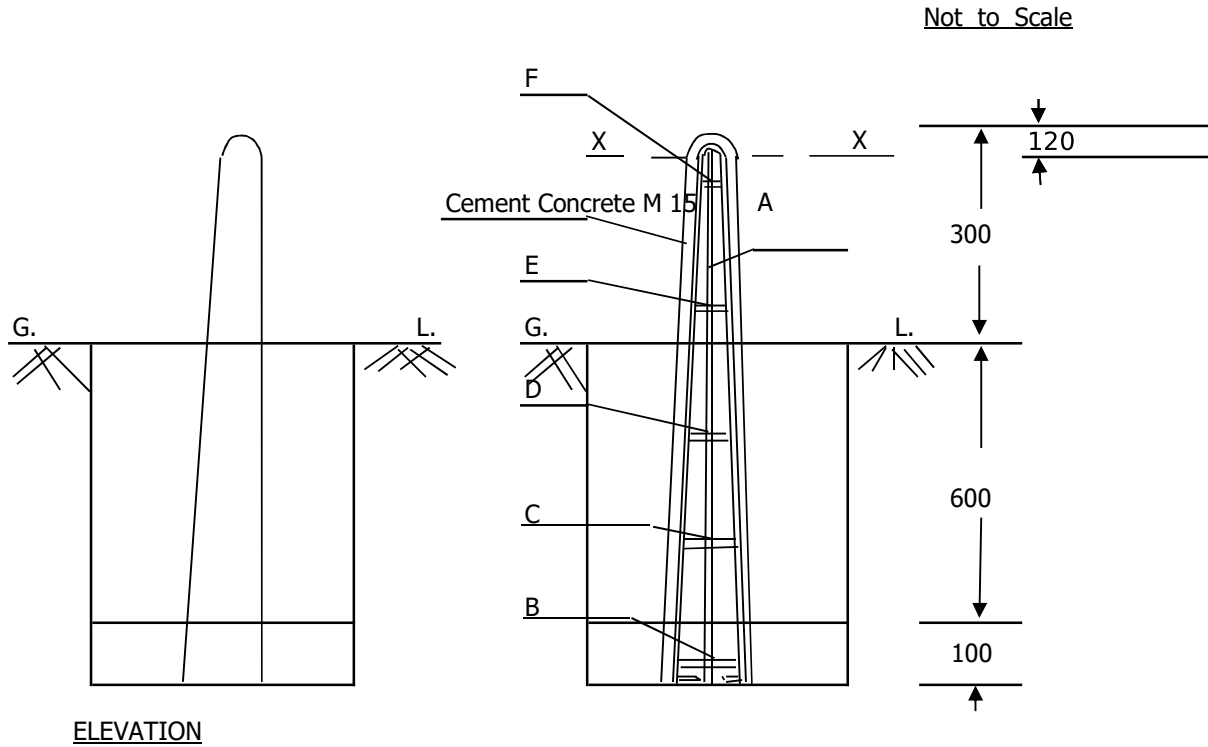
Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		Plain cement concrete M15 grade (using jhama brick aggregate and reinforcement) boundary pillar / local stone of standard design as per IRC:25 fixed in position including finishing and lettering but excluding painting as per drawing and MoRD Technical Specification Clause 1704.	Each	₹ 878.80
10.23	1700, 800 &	G.I Barbed Wire Fencing 1.2 m high (using jhama brick aggregate in CC/PCC/RCC) Providing and fixing 1.2 m high GI barbed wire fencing with 1.8 m RCC posts 150 mm x 150 mm placed every 3 m centre-to-centre founded in M15 grade cement concrete, (using jhama brick aggregate) 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 9 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc. complete as per MoRD technical specification Clause 1705.	m	₹ 620.50
10.24	1700, 800 &	G.I Barbed Wire Fencing 1.8 m high (using jhama brick aggregate in CC/PCC/RCC) Providing and fixing 1.8 m high GI barbed wire fencing with 2.4 m RCC M15 grade (using jhama brick aggregate) 150 mm x 150 mm concrete post placed every 3 m centre-to-centre founded in M15 grade cement concrete, 0.6 m below ground level, every 15th post, last but one end post and corner post shall be strutted on both sides and end post on one side only and provided with 12 horizontal lines and 2 diagonals interwoven with horizontal wires, fixed with GI staples, turn buckles etc. complete as per MoRD technical specification Clause 1705.	m	₹ 863.30
10.25	1700, 800 &	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 m high above ground, 2 m centre-to-centre, complete as per approved drawings as per MoRD technical specification Clause 1706.	m	₹ 3,220.20
10.26	1700, 800 &	Tubular Steel Railing on Precast RCC posts, 1.2 m High Above Ground Level Providing, fencing and erecting 50 mm dia painted steel pipe railing in 3 rows on precast M-20 grade RCC (using jhama brick aggregate) vertical posts 175 mm x 175 mm x 1.8 m high (1.2 m above GI) with 3 holes 50 mm dia for pipe, fixed 2 m centre-to-centre complete as per approved drawings as per MoRD technical specification Clause 1706.	m	₹ 2,891.00

Chapter - 10 : Traffic Sign, Markings and other Appurtenances

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
10.27	1700	Providing and Fixing 'Citizens' Information Board' of the Project(with CC structure)		
		Providing and fixing of typical Citizens' Information board with Logo as per MORD specifications and drawing with CC structure made with M-15 of Size 1150 mm in length, 300 mm in thickness and 2450 mm in height all above G.L. with foundation with M-15 concrete of size 1150 mm x 600 mm x 750 mm , 750 mm below ground level with skin reinforcement with 8 mm dia TMT bars @ 200 cm C/C from bottom of the structure. Lettering and printing arrows, border etc. will be painted with ready mixed synthetic enamel paint of superior quality in required shade and colour. All sections of structure will be painted with primer and two coats of epoxy paint as per drawing and MoRD technical specification Clause 1701 and Annexure 1700.1		
		A. Board 'A'	Each	₹ 23,011.20
		B. Board 'B'	Each	₹ 22,225.00

Boundary Pillar (with PCC M15 grade using jhama brick aggregate and reinforcement)



<u>SCHEDULE OF REINFORCEMENT</u>		
<u>M.S. BARS 6 mm DIA</u>		
	<u>LENGTH</u>	<u>No.</u>
A.	1.87 m	2
B.	48 cm	1
C.	47 cm	1
D.	46 cm	1
E.	43 cm	1
F.	41 cm	1

- Note :**
- 1 Not to Scale
 - 2 Hand Sketch
 - 3 All Dimensions are in mm

Chapter - 11

Foundation

(a) Preamble

- 1 *Excavation for structures has been provided by & large by manual means.*
- 2 *The earth excavated from foundation has been proposed to be backfilled in the foundation trenches except for marshy soil where disposal has been provided.*
- 3 *For excavation in marshy soil, extra provision of labour for filling with carted earth has been provided in a separate item. Cost of carted earth has been worked out separately if the same is not available from the adjoining area.*
- 4 *The rock surface for foundations is to be prepared which has been analysed accordingly.*
- 5 *In case of rock, excavation has been considered upto a depth of 1500 mm for rock of ultimate crushing strength of 10 Mpa or more, which shall be reckoned as hard rock.*
- 6 *Dewatering of rain water is part of the overhead. Dewatering may be provided in excavation for foundation on percentage basis as per site condition and decision of the Engineer-in-Charge. In case less dewatering is required or is not required at all for a particular site condition, the same may be reduced/omitted. Hence separate items are considered and analysed with dewatering.*
- 7 *Mixing of cement concrete has been considered by using concrete mixer with weight batching facility fitted with water measuring device. It is preferable to use concrete mixes fitted with load cells for weigh batching.*
- 8 *In remote areas, for isolated slab culvert / box culvert upto 2 m span, concrete can be hand mixed in accordance with Clause 806 of MORD Specifications. Therefore, in the analysis, for items of concrete, the alternative of hand mixing has also been considered.*
- 9 *Steel reinforcement for cement concrete work is required to be provided separately. The rate for the same has been analysed using Thermo-Mechanically treated bars. Provision of MS bars has also been kept, this should be used only if the specification permits.*
- 10 *Necessary safety precautions shall be taken for excavation for open foundation for which guidance may be taken from IS:3764. Cost of shoring and shuttering has been provided on percentage basis, which may be adjusted according to site condition.*
- 11 *The provision of Coarse sand has not been kept, because the same is not available in the State of Tripura.*
- 12 *Rates of all materials used in the analysis are at the place of origin as mentioned in the materials sheet which is excluding the loading,unloading and haulage.*
- 13 *Excavation of Hard Rock(requiring blasting) has not been considered.*
- 14 *Consumption of Bricks has been considered as per the sizes of the available bricks in Tripura.*
- 15 *Additional items by using jhama brick aggregates (i.e. locally available materials) have also been considered in Plain Cement Concrete.*
- 16 *All rates for concreting work are inclusive of necessary Formwork as per section 900 of the specification for Rural Roads.*

Chapter - 11 : Foundation

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
11.1	300	Excavation for Structures		
		A. Without dewatering.		
		Earthwork in excavation for structures as per drawing and MoRD technical specifications Clause 305.1 including setting out, construction of shoring & bracing, removal of stumps & other deleterious material and disposal upto a lead of 50 m, dressing of sides & bottom and backfilling in trenches with excavated suitable material.		
		I Ordinary Soil		
		(i) Upto 3 m depth	cum	₹ 458.20
		(ii) 3 m to 6 m depth	cum	₹ 544.10
		II Ordinary rock (not requiring blasting)		
		(i) Upto 3 m depth	cum	₹ 572.80
		III Hard rock (blasting prohibited)	cum	₹ 617.40
		IV Marshy soil	cum	₹ 859.20
		B. With dewatering.		
		Earthwork in excavation for structures as per drawing and technical specifications Clause 305.1 including setting out, dewatering, construction of shoring, shuttering & bracing, removal of stumps & other deleterious material and disposal upto a lead of 50 m, dressing of sides & bottom and backfilling in trenches with excavated suitable material.		
		I Ordinary Soil		
		(i) Upto 3 m depth	cum	₹ 495.60
		(ii) 3 m to 6 m depth	cum	₹ 628.50
11.2	300 & 1200	Filling in foundation trenches as per drawing & MoRD technical specification Clause 305.3.9, 1200.		
		I Sand filling	cum	₹ 1,168.00
		II Earth filling (For marshy soil)	cum	₹ 293.70
11.3.	300 & 1200	Filling annular space around footing in rock as per MoRD technical specification Clause 300, 1203.4.3.		
		P.C.C grade M 15 Nominal mix 1:2.5:5 (Hand mixing)	cum	₹ 10,325.80
11.4.	800, 900 &	Providing concrete for plain/reinforced concrete in open foundations complete including formwork as per drawings & MoRD technical specifications Clauses 802, 803, 900, 1202 and 1203. (including centering, shuttering, staging etc. but excluding reinforcement).		

Chapter - 11 : Foundation

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
	I	P.C.C grade M 10		
	(i)	Nominal mix 1:3:6	cum	₹ 9,983.70
	(ii)	Nominal mix 1:3:6 (Hand mixing)	cum	₹ 10,075.40
	II	P.C.C grade M 15		
	(i)	Nominal mix (1:2.5:5)	cum	₹ 10,234.20
	(ii)	Nominal mix 1:2.5:5 (Hand mixing)	cum	₹ 10,325.80
	III	P.C.C grade M 20		
	(i)	Nominal mix (1:2:4)	cum	₹ 10,774.89
	(ii)	Nominal mix 1:2:4 (Hand mixing)	cum	₹ 10,866.60
	IV	R.C.C grade M 20	cum	₹ 11,091.40
	V	R.C.C grade M 25	cum	₹ 11,629.10
11.5.	600 & 1200	Brick masonry work in cement mortar in foundation completed excluding pointing & plastering as per drawing & MoRD technical specifications Clauses 600, 1202 & 1203.		
	I	Brick masonry in 1:3 cement mortar	cum	₹ 9,717.20
	II	Brick masonry in 1:4 cement mortar	cum	₹ 9,418.50
11.6	1000 & 1200	Supplying, fitting & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar reinforcement in foundation complete as per drawings & MoRD technical specifications Clauses 1000 & 1202.	t	₹ 91,240.90
11.7	1000 & 1200	Supplying, fitting & placing MS bar reinforcement in foundation complete as per drawings & MoRD technical specifications Clauses 1000 & 1202.	t	₹ 89,761.90
ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)				
11.8	300 & 1200	Filling annular space around footing in rock as per MoRD technical specification Clause 1203.4.3.		
		P.C.C grade M 15 (using jhama brick aggregate)		
		Nominal mix 1:2.5:5 (Hand mixing)	cum	₹ 9,441.60
11.9	800, 900 & 1200	Providing concrete for plain concrete (using jhama brick aggregate) in open foundations complete including formwork as per drawings & MoRD technical specifications Clauses 802, 803, 900, 1202 and 1203. (including centering, shuttering, staging etc. but excluding reinforcement)		

Chapter - 11 : Foundation

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
I		P.C.C grade M 10 (using jhama brick aggregate)		
	(i)	Nominal mix 1:3:6	cum	₹ 9,099.90
	(ii)	Nominal mix 1:3.6 (Hand mixing)	cum	₹ 9,191.60
II		P.C.C grade M 15 (using jhama brick aggregate)		
	(i)	Nominal mix (1:2.5:5)	cum	₹ 9,350.00
	(ii)	Nominal mix 1:2.5:5 (Hand mixing)	cum	₹ 9,441.60
III		P.C.C grade M 20 (using jhama brick aggregate)		
	(i)	Nominal mix (1:2:4)	cum	₹ 9,989.10
	(ii)	Nominal mix 1:2:4 (Hand mixing)	cum	₹ 10,080.80

Chapter -12

Sub-Structure

(a) Preamble

- 1 *The cost of formwork will vary with the height & cross-section of the substructure. Provision has been made accordingly.*
- 2 *As the higher grade of concrete is costlier, the provision made for formwork on percentage basis has been suitably adjusted to make it compatible with other grades.*
- 3 *Filter media & backfilling behind abutment are required to be provided as per guidelines in IRC:78-2000.*
- 4 *Bearing shall be set truly level so as to have full & even seating.*
- 5 *The bearing should be procured only from those manufacturers who have been pre-qualified by MoRT&H.*
- 6 *For spans in gradient, the soffit shall be made horizontal specially at the supports & the bearing, where provided, shall be placed horizontally.*
- 7 *Weep holes shall be provided as per specifications.*
- 8 *For elastomeric bearings, the concrete surface shall be leveled such that the variation is not more than 1.5 mm from a straight edge placed in any direction across the area.*
- 9 *Note Nos.7 to 12 of Chapter 11 will hold good for this Chapter also.*
- 10 *Additional items by using jhama brick aggregates (i.e. locally available materials) have also been considered in Plain Cement Concrete.*
- 11 *All rates for concreting work are inclusive of necessary Formwork as per section 900 of the specification for Rural Roads.*

Chapter - 12 : Sub-Structure

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
12.1	600, 1200	Brick masonry work in cement mortar in substructure complete excepting pointing & plastering, as per drawing & MoRD technical specification Clauses 602, 603, 604, 1202 and 1204.		
	I	In 1:3 cement mortar	cum	₹ 10,203.10
	II	In 1:4 cement mortar	cum	₹ 9,889.40
	III	In 1:5 cement mortar	cum	₹ 9,720.60
12.2.	600, 1200	Pointing with cement mortar (1:3) on brickwork as per drawing & MoRD technical specification Clauses 613.3 & 1204.	sqm	₹ 96.40
12.3	600, 1200	Plastering with cement mortar (1:4) 15 mm thick on brickwork in substructure as per MoRD technical specification Clauses 613.4 & 1204.	sqm	₹ 223.20
12.4	800, 900, 1200	Plain/reinforced cement concrete in substructure complete including formwork as per drawings & MoRD technical specification Clauses 802, 804, 805, 806, 807, 900, 1202 & 1204. (including centering, shuttering, staging etc. but excluding reinforcement)		
	I.	P.C.C grade M 15 (1:2.5:5 Nominal mix)	cum	₹ 10,824.60
	II	P.C.C grade M15 (1:2.5:5 Hand mix)	cum	₹ 10,921.60
	III	P.C.C grade M20 (1:2:4) (Nominal mix)		
	i)	upto 5 m height	cum	₹ 11,396.50
	ii)	For height above 5 m upto 10 m	cum	₹ 11,835.80
	IV	P.C.C grade M-20 (1:2:4) (Hand mix)		
	i)	upto 5 m height	cum	₹ 11,493.50
	ii)	For height above 5 m upto 10 m	cum	₹ 11,936.50
	V.	R.C.C grade M-20 (1:2:4) (Nominal mix)		
	i)	upto 5 m height	cum	₹ 11,731.30
	ii)	For height above 5 m upto 10 m	cum	₹ 12,183.50
	iii)	For height above 10 m	cum	₹ 12,755.10
	VI.	R.C.C grade M-25		
	i)	upto 5 m height	cum	₹ 12,300.00
	ii)	For height above 5 m upto 10 m	cum	₹ 12,774.10
	iii)	For height above 10 m	cum	₹ 13,373.40

Chapter - 12 : Sub-Structure

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
12.5	1000 & 1200	Supplying, fitting & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar in substructure complete as per drawings & MoRD technical specification Clauses 1002, 1005, 1010 and 1202.	t	₹ 91,483.20
12.6	1000 & 1200	Supplying, fitting & placing with MS bar reinforcement in substructure complete as per drawings & MoRD technical specification Clauses 1002, 1005, 1010 and 1202.	t	₹ 90,004.20
12.7	600, 700, 1200	Providing weep holes in brick masonry/ stone masonry, plain/ reinforced concrete abutment, wing wall, return wall with 100 mm dia AC pipe or uPVC pipe (110 mm OD of 6.0 kg/cm ² pressure) extending through the full width of the structures with slope of 1(V):20(H) towards drawing face complete as per drawing and MoRD technical specification clauses 614, 709, 1204.3.7.	m	₹ 392.20
12.8	1200	Backfilling behind abutment, wing wall & return wall complete as per drawings & MoRD technical specification Clause 1204.3.8.		
		I) Sandy material	cum	₹ 1,592.10
12.9	1200	Providing & laying filter media with granular crushed aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil & bigger size towards the wall & providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and MoRD technical specification clause 1204.3.8.	cum	₹ 4,831.50
12.10	1200	Supplying, fitting & fixing in position true to line & level elastomeric bearing conforming to IRC:83 (Part-II) Section IX complete including all accessories as per drawings & MoRD technical specification Clause 1207.1.	cucm	₹ 1.60
12.11	600, 700, 1200	Providing PCC M 20 architectural coping on the top of wing wall, return wall etc. complete including formwork as per drawing & MoRD technical specification Clauses 615, 710 & 1204.3.11.	m	₹ 739.60
12.12	1200	Providing pressure relief pipes 100 mm dia in bottom slab of box cell on a filter media base of 500 mm x 500 mm as per drawing & MoRD technical specification Clause 1205.5.7.	nos	₹ 1,524.40
ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)				
12.13	1200	Providing & laying filter media with jhama brick aggregates as per specification to a thickness of not less than 600 mm with smaller size towards the soil & bigger size towards the wall & providing over the entire surface behind abutment, wing wall, return wall to the full height, compacted to firm condition complete as per drawing and MoRD technical specification clause 1204.3.8.	cum	₹ 4,582.60

Chapter - 12 : Sub-Structure

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
12.14	800, 900, 1200	Plain cement concrete (using jhama brick aggregate) in substructure complete including formwork as per drawings & MoRD technical specification Clauses 802, 804, 805, 806, 807, 900, 1202 & 1204 (including centering, shuttering, staging etc. but excluding reinforcement)		
	I.	P.C.C grade M 15 (1:2.5:5 Nominal mix)	cum	₹ 9,889.40
	II	P.C.C grade M15 (1:2.5:5 Hand mix)	cum	₹ 9,986.30
	III	P.C.C grade M20 (1:2:4)(Nominal mix)		
		i) upto 5 m height	cum	₹ 10,565.40
		ii) For height above 5 m upto 10 m	cum	₹ 10,972.70
	IV	P.C.C grade M-20 (1:2:4) (Hand mix)		
		i) upto 5 m height	cum	₹ 10,662.40
		ii) For height above 5 m upto 10 m	cum	₹ 11,073.40
12.15	600, 700, 1200	Providing PCC M 20 (with jhama brick aggregate) architectural coping on the top of wing wall, return wall etc. complete including formwork as per drawing & MoRD technical specification Clauses 615, 710 & 1204.3.11.	m	₹ 685.70
12.16	600, 1200	Plastering with cement mortar (1:4) 12 mm thick on brickwork/ C.C. work including a finishing coat of neat cement punning with 2.75 kg of cement per sqm in substructure as per MoRD technical specification Clauses 613.4 & 1204.	sqm	₹ 224.60

Chapter - 13

Super-Structure

(a) Preamble

- 1 *The rate for wearing coat has been analysed as under in accordance with the provisions of MORD Specifications:*
 - a *Bituminous type*
 - b *cement concrete*
- 2 *The rate analysis has been done for the following types of railings & parapet :*
 - i *R.C.C.railling*
 - ii *M.S. railling*
 - iii *Pipe railing (suitable for submersible bridges)*
- 3 *As per the MORD specifications, the type of superstructure envisaged for minor bridges & culverts for rural roads are R.C.C. slabs & box culverts not exceeding 15 m span, rates for which have been analysed. Stone/Brick masonry arches can be adopted where hard strata is available at shallow depth. R.C.C. arches can also be adopted as per IRC:SP:20. Hence rates for these types of arches for span length upto 15 m have been analysed.*
- 4 *For composite type of superstructure, comprising of steel beams/built-up sections & R.C.C. deck slab, analysis has been done for steel section separately.*
- 5 *For slab culverts and minor bridges of spans not more than 10 m, buried joint/filler joint may be adequate. For relatively longer spans & for highly seismic intensity areas, elastomeric slab seal/compression seal joint may be provided as per the MORD Specifications. Rates have been analysed accordingly.*
- 6 *In remote areas, for slab culverts & box culverts upto 2 m span, concrete used in superstructure can be hand mixed with 10 per cent extra cement at contractor's cost in accordance with Clause 806 of MORD Specifications. Hand mixing shall not be otherwise permitted.*
- 7 *Slab seal/compression seal expansion joints are specialised items commercially produced by a number of items. The rates for such items must be ascertained from firms pre-qualified by MoRT&H.*
- 8 *To provide better quality of work in the Superstructure portion, using of jhama brick aggregate has not been considered in this Chapter. Sand can be either coarse or fine as required/ available. Here, provision of fine sand is considered only due to non-availability of coarse sand in Tripura. However, if design of concrete dictates for use of coarse sand, then separate analysis may be taken as per site condition.*
- 9 *All rates for concreting work are inclusive of necessary Formwork as per section 900 of the specification for Rural Roads.*

Chapter - 13 : Super-Structure

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
13.1	800, 900, 1200	Providing & laying reinforced cement concrete in superstructure as per drawings & MoRD technical specifications Clauses 800, 900, 1205.4 & 1205.5 (including centering, shuttering, staging etc. but excluding reinforcement).		
		(I) R.C.C grade M 20		
		(i) For nominal mix 1:2:4	cum	₹ 12,720.00
		(ii) For nominal mix 1:2:4 (Hand mixed)		
		1 For height upto 5 m	cum	₹ 12,820.10
		2 For height from 5 m to 10 m	cum	₹ 13,354.30
		3 For height above 10 m	cum	₹ 13,888.50
		(iii) for design mix RCC M 20		
		1 For height upto 5 m	cum	₹ 12,568.00
		2 For height from 5 m to 10 m	cum	₹ 13,091.70
		3 For height above 10 m	cum	₹ 13,615.30
		II R.C.C M 25		
		1 For height upto 5 m	cum	₹ 13,372.20
		2 For height from 5 m to 10 m	cum	₹ 13,929.40
		3 For height above 10 m	cum	₹ 14,486.50
		III R.C.C. Grade M 30		
		1 For height upto 5 m	cum	₹ 13,716.90
		2 For height from 5 m to 10 m	cum	₹ 14,288.40
		3 For height above 10 m	cum	₹ 14,859.90
13.2	1000, 1200	Supplying, fitting, & placing Thermo-Mechanically treated bar/ Cold twisted deformed steel bar reinforcement in superstructure complete as per drawing & MoRD technical specifications Clauses 1002, 1010 & 1202.	t	₹ 93,234.90
13.3	1000, 1200	Supplying, fitting, & placing MS bar reinforcement in superstructure complete as per drawing & MoRD technical specifications Clauses 1002, 1010 & 1202.	t	₹ 91,755.90
13.4	800, 1200	Providing and laying cement concrete wearing course M 30 grade including reinforcement complete as per drawings & MoRD technical specifications Clauses 800 & 1206.3 (including centering, shuttering, staging etc. and reinforcement).	cum	₹ 19,166.50

Chapter - 13 : Super-Structure

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
13.5	800, 900, 1200	Construction of R.C.C railing of M 25 grade in cast-in-situ with 20 mm nominal size aggregate, true to line & grade, tolerance of vertical railing post not to exceed 1 in 500, centre-to-centre spacing between vertical posts not to exceed 2000 mm including reinforcement as per drawing and MoRD technical specifications Clauses 800, 900 and 1208.3 (including centering, shuttering, staging etc. and reinforcement).	m	₹ 4,251.20
13.6	1200	Providing, fitting & fixing mild steel railing complete as per drawing & MoRD technical specifications clause 1208.2.	m	₹ 4,290.10
13.7	1200	Providing & fixing in position pipe railing Providing & fixing in position pipe railing consisting of IS Rolled steel joist posts designation IS MB 100 (100 x 75) at 2.5 m interval & three rows of 50 mm dia steel pipes (light) including fixing in position on bridge deck complete as per drawing and MoRD technical specifications Clause 1208.2.	m	₹ 2,533.10
13.8	600, 900, 1200	Brick masonry work in cement mortar 1:3 in parapet excluding pointing & plastering as per drawing & plastering as per drawing & MoRD technical specifications Clauses 600, 900 & 1208.4. Rate same as in item 12.1 (I)	cum	₹ 10,203.10
13.9	1200	Providing and fixing in position Drainage spouts complete as per drawing & MoRD technical specifications Clause 1209. <i>Note:- Rate is inclusive of cost of steel grating and 1.00 m GI pipe of 100 mm dia.</i>	no	₹ 2,007.00
13.10	800, 1200	P.C.C. M 15 ordinary grade (1:2.5:5) levelling course below approach slab complete as per drawing & MoRD technical specifications Clauses 800 and 1211 (including centering, shuttering, staging etc. but excluding reinforcement)		
	I	P.C.C grade M 15		
	(i)	Nominal mix (1:2.5:5)	cum	₹ 9,839.10
	(ii)	Nominal mix 1:2.5:5 (Hand mixing)	cum	₹ 9,927.20
13.11	800, 1200	Reinforced Cement Concrete M 25 grade approach slab including reinforcement & formwork complete as per drawing & MoRD technical specifications Clauses 800 & 1211 (including centering, shuttering, staging etc. and reinforcement)	cum	₹ 18,033.90
13.12	500, 1200	Providing bituminous wearing coat comprising of 20 mm thick premix carpet with seal coat Type B for culverts as per drawing & MoRD technical specifications Clauses 1206.2 and 500.	sqm	₹ 426.70

Chapter - 14

Protection Works

(a) Preamble

1. *One type of apron as under have been catered for :*
 - a. *Apron laid in cement concrete blocks of M 15 Grade.*
2. *Pitching proposed is of the following types :*
 - a. *Brick Pitching.*
 - b. *CC Block pitching.*
3. *A toe wall for toe protection of pitching has been considered with nominal mix cement concrete M 10.*
4. *Flooring has been proposed cement concrete blocks M 15 and brick on edge in CM 1:3.*
5. *Curtain walls proposed are of the following :*
 - a. *Cement concrete M 10 grade.*
6. *The rate analysis of protection works using timber/ bamboo as per details provided by Assam PWD (already incorporated in SOR'08 & '11) and as found in the SDB as suggestive the same has been analysed .*
7. *All rates for concreting work are inclusive of necessary Formwork as per section 900 of the specification for Rural Roads.*

Chapter - 14 : Protection Works

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
14.1	1300	Providing and laying of apron with cement concrete blocks of size as per Table 1300.1 cast-in-situ and made with nominal mix of M-15 grade cement concrete as per drawing and MoRD technical specification Clause 1301(rate includes preparation of bed, nominal surface reinforcement and filling of granular material in recesses between blocks).		
	a)	Concrete grade M 15	cum	₹ 10,438.90
14.2	1300	Single bamboo palasiding/walling of whole 2nd class bamboo (Jati or Bethua) 65 to 75 mm dia and closely packed & driven @ 150 mm c/c including fitting fixing with half bamboo kamis horizontally in three rows with cane or tying with wire complete and struts 1.5 m apart longitudinally and providing bitumen drum sheet walling fixed with nails as per drawing and MoRD technical specification Clause 1302.5.		
	A)	Driven at least 900 mm below ground and 1200 mm above ground on average	m	₹ 1,149.40
	B)	Driven at least 900 mm below ground and 900 mm above ground on average	m	₹ 1,102.50
14.3	1300	Providing and laying flooring laid over cement concrete bedding complete as per drawing and MoRD technical specification Clause 1303.		
	I.	Cement concrete blocks cast in situ grade M15 (size 400 mm x 400 mm x 150 mm) over cement concrete (with M10) bedding of 150 mm thick	sqm	₹ 3,048.20
	II.	Brick on edge laid in cement mortar 1:3	cum	₹ 10,290.30
14.4	1300	Providing and laying curtain walls complete as per drawing and MoRD technical specification Clause 1304.		
		Unit = cum		
	I.	Brick masonry in cement mortar(1:4) (Rate same as per item 12.I(II))		
	III.	Cement concrete grade M10 (Rate same as per item 11.4 I (i))		
	Note : 1	Other items like excavation for foundation, filling behind wall, filter media, weep holes, etc. shall be added separately as per approved design.		
14.5	1300	Construction of toe walls for protection of slopes as per Drawing and MoRD technical specifications Clause 1302.5 (including centering, shuttering staging etc. but excluding reinforcement)		

Chapter - 14 : Protection Works

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		I. Brick masonry in cement mortar 1:4 in case of brick pitching	cum	₹ 9,418.50
		II. Cement concrete grade M 10 in case of concrete block pitching		
		(i) Nominal mix 1:3:6	cum	₹ 10,364.60
		(ii) Nominal mix 1:3:6 (Hand mixing)	cum	₹ 10,456.20
14.6	1300	Single bamboo spur and palasiding of whole 2nd class bamboo (Jati or Bethua) 65 mm to 75 mm dia @ 150 mm c/c and closely packed & driven including fitting fixing with half bamboo kamis horizontally in three rows with cane or tying wire complete and struts 1500 mm apart longitudinally and providing brush wood as per drawing and technical specification Clause 1302.5.		
		Note : This item may be used for spur only		
		A) Driven at least 900 mm below ground and 1800 mm above ground on average	m	₹ 711.30
		B) Driven at least 900 mm below ground and 900 mm above ground on average	m	₹ 567.40
14.7	Suggestive	Single bamboo spur and palasiding of whole 1st class bamboo (Bholuka or Barua or barak) 85 mm to 100 mm dia and closely packed & driven @ 150 mm c/c including fitting, fixing with half 2nd class bamboo (Jati or Bethua) horizontally in three rows with cane or tying wire complete and struts 1500 mm apart longitudinally and providing brush wood as per drawings and technical specifications.		
		A) Driven at least 900 mm below ground and 1800 mm above ground	m	₹ 963.90
		B) Driven at least 900 mm below ground and 900 mm above ground on average	m	₹ 723.70
		C) Driven at least 600 mm below ground and 1200 mm above ground on average	m	₹ 723.70
14.8	Suggestive	Bamboo spur 'A' type with whole bamboo placed 230 mm centre to centre driven 900 mm below ground and 1200 mm to 1500 mm above ground tied with 2nd class bamboo (Jati or Bethua) on either side at 450 mm apart horizontally with galvanized wire etc. complete as per drawings and technical specifications.		
		A) 2nd class bamboo (Jati or Bethua) 65 mm to 75 mm dia	m	₹ 565.20
		B) 1st class bamboo (Bholuka or Barua) 85 mm to 100 mm dia	m	₹ 773.10

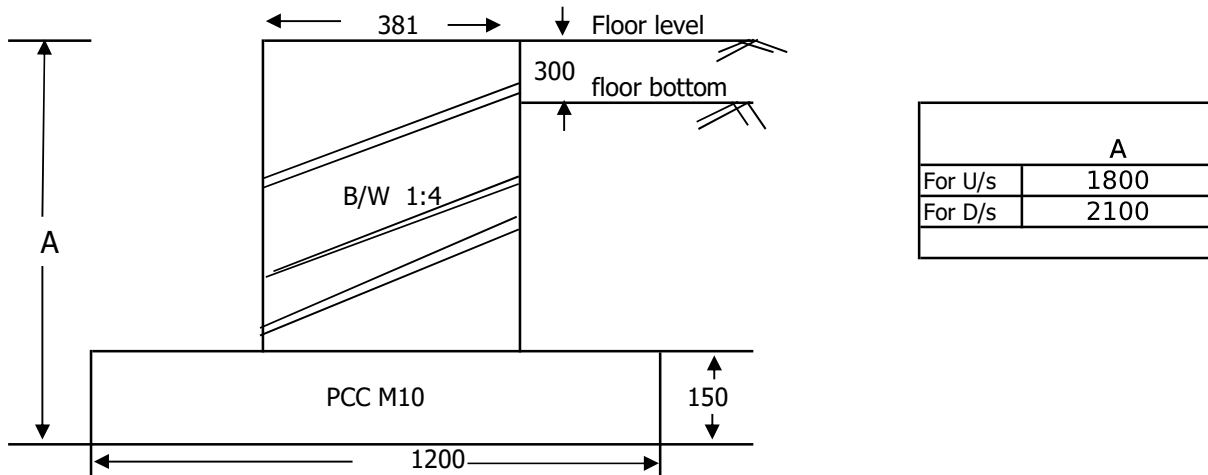
Chapter - 14 : Protection Works

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
14.9	Suggestive	Providing 'A' type single spur with 1st class bamboo (Bholuka or Barua) 85 mm to 100 mm dia closely placed 230 mm centre to centre, driven 1200 mm to 1500 mm below ground and 3 m to 4 m above ground and tied with cane or coir string, half 2nd class bamboo (Jati or Bethua) horizontally on both face placed not more than one metre apart and 2 nos. of purlin at top and bottom fitted with vertical struts at 1500 mm apart and filling with brushwood or jungle wood inside the spur complete as per drawing and technical specifications.	m	₹ 1,517.40
14.10	1300	Providing close bamboo toe walling consisting of 65 mm to 75 mm diameter bamboos driven 900 mm below ground and 900 mm above ground at 150 mm C/C and provided with three horizontal split bamboo runner fixed with nails. All bamboos to be duly protected by coal tar painting.	m	₹ 456.90
14.11	Suggestive	Double timber spur with two rows at 800 mm c/c apart of 1st class local wood piles with timber of Sal/ Nahar/ Nageswar wood piles of 150 mm dia placed at 400 mm centre to centre, driven 2000 mm minimum below ground and 3600 mm above ground average and placing and fixing bracings etc. of 100 mm x 75 mm size 1st class local wood longitudinally & crosswise at 800 mm apart, at ends fitted with 10 mm dia bolts and nuts etc. including coaltarring of timber members and cost of necessary bamboo staging etc. as directed by the Engineer as per drawing and technical specifications.	m	₹ 56,441.80
14.12	Suggestive	Supplying and filling up hollows of the timber spur to an average height of 3600 mm above ground with jungle wood branches as per drawing and technical specifications as directed by the Engineer.	m	₹ 147.50
ADDITIONAL ITEMS BY USING JHAMA BRICK AGGREGATE (i.e. LOCALLY AVAILABLE MATERIALS)				
14.13	1300	Providing and laying of apron with cement concrete blocks of size as per Table 1300.1 cast-in-situ and made with nominal mix of M-15 grade cement concrete (using jhama brick aggregate) as per drawing and MoRD technical specification Clause 1301 (rate includes preparation of bed, nominal surface re-inforcement and filling of granular material in recesses between blocks).	cum	₹ 9,537.00
14.14	1300	Providing and laying flooring laid over cement concrete bedding complete as per drawing and MoRD technical specification Clause 1303.		
	I.	Cement concrete blocks cast in situ grade M15 (size 400 mm x 400 mm x 150 mm) over cement concrete (with M10, using jhama brick aggregate) bedding of 150 mm thick	sqm	₹ 2,781.70

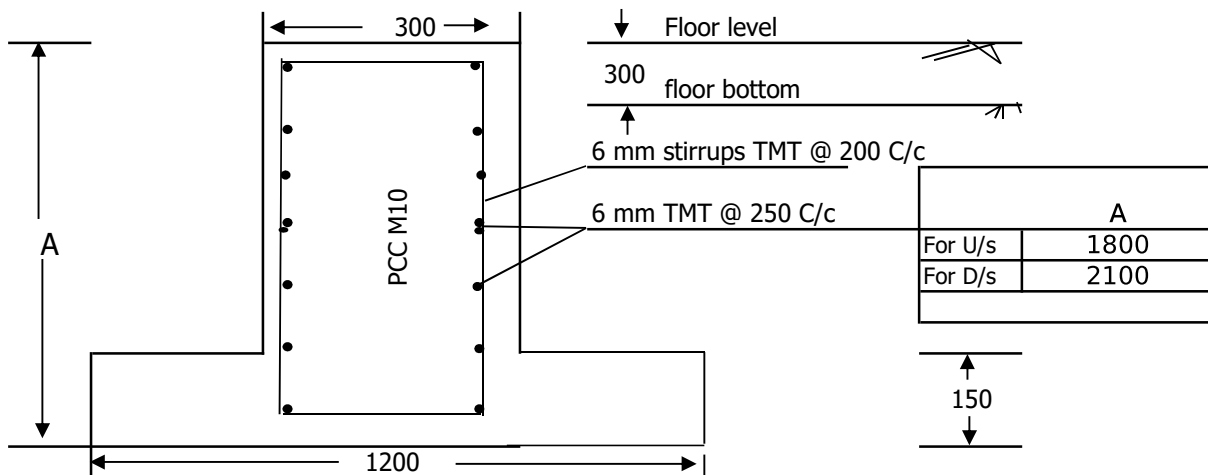
Chapter - 14 : Protection Works

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
14.15	1300	Providing and laying curtain walls complete as per drawing and MoRD technical specification Clause 1304.		
	I.	Brick masonry in cement mortar (1:4) (as per drawing given in the Analysis of Rates)	m	₹ 9,225.40
	II.	PCC grade M10 with jhama brick aggregate (including centering, shuttering staging etc. and reinforcement) (as per drawing given in the Analysis of Rates)	m	₹ 13,689.30
14.16	1300	Construction of toe walls for protection of slopes as per Drawing and MoRD technical specifications Clause 1302.5 (including centering, shuttering staging etc. but excluding reinforcement)		
	I.	Cement concrete grade M 10 (using jhama brick aggregate) in case of concrete block pitching		
	(i)	Nominal mix 1:3:6	cum	₹ 9,420.50
	(ii)	Nominal mix 1:3:6 (Hand mixing)	cum	₹ 9,512.20

Chapter - 14 : Protection Works



Drawing of Curtain Wall for Item No. 14.15.I of Chapter - 14



Drawing of Curtain Wall for Item No. 14.15.II of Chapter - 14

- Note :
- 1 All Dimensions are in mm
 - 2 Not to scale.

Chapter - 15

Maintenance of Roads

(a) Preamble

1. *In the case of rain cuts, it has been assumed that some material cut by rain, approximately 25 percent will be available at site which can be retrieved and re-used and the balance 75 percent is required to be provided as fresh material.*
2. *For making up earthen shoulders, it has been assumed that on an average 150 mm filling will be required. Similarly, for striping of excess soil from shoulder, an average depth of 75 mm has been assumed.*
3. *Pothole repairs and patchwork are provided to be done by using Mixall 6/10 M.T.*
4. *In case of maintenance of Gravel and W.B.M. surfaces, it has been assumed that 25 percent material will be available at site, which can be retrieved and re-used and the balance 75 percent is required to be provided as fresh material.*
5. *The items of periodical renewal by premix carpet and surface coating have also been included in the rate analysis for guidance of field Engineers. The detailed analysis of various items of bituminous works is given in Chapter 5 and rates can be taken from there as appropriate. Additional provision of patch repair and profile correction varying from 10 percent to 30 percent of the material of premix carpet surface dressing may be made in the estimate of periodical renewal.*
6. *Maintenance of Gravel and WBM Road is not considered.*

Chapter - 15 : Maintenance of Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
15.1	1900	Restoration of Rain Cuts		
		Restoration of rain cuts with soil , moorum gravel or a mixture of these, clearing the loose soil, benching for 300 mm width laying fresh material in layers not exceeding 250 mm and compaction with plate compactor or power rammer to restore the original alignment, level and slopes as per drawings and MoRD technical specification Clause 1902.		
		A. Manual Means	cum	₹ 398.20
		B. Mechanical Means	cum	₹ 226.80
		Note : Only 75% of fresh material has been provided as 25% can be retrieved from site i.e. soil flown down the slope in the form of slurry and deposited at the foot of rain cuts.		
15.2	1900	1 Maintenance of Earthen shoulder (filling with fresh selected soil)		
		Making up loss of material/ irregularities on shoulders to the design level by adding fresh approved selected soil and compacting it with appropriate equipment at OMC upto a lead of 1000 m as per MoRD technical specification Clause 1903.	sqm	₹ 46.30
		2 Maintenance of Earthen shoulder (Stripping of excess soil)		
		Stripping excess soil from the shoulder surface to achieve the approved level and compacting with plate compactor at OMC as per drawing and MoRD technical specification Clause 1903.	sqm	₹ 19.10
15.3	1900, 500	Maintenance of bituminous surface road		
		I. Repair to pot holes by removal of failed material, trimming the sides to vertical and levelling the bottom, cleaning the same with compressed air or any appropriate method, filled with 75 mm B.M, after applying bitumen emulsion prime coat at the bottom and bitumen emulsion tack coat on sides and on bottom as per MoRD technical specification Clauses 1900, 502, 503 and 504.	cum	₹ 17,862.70
		II. Patch repair on already filled pot holes with 75 mm BM with 20 mm premix carpet and seal coat type A as per drawing and MoRD technical specification Clauses 1904.2, 508 and 510.	sqm	₹ 462.10
		III. Repair to pot holes and removal of loose material, trimming of sides , cleaning of surface , providing tack coat , 20 mm thick premix carpet and seal coat type B as per drawing and MoRD technical specification clauses 1904.2, 503 and 508.1.	sqm	₹ 471.60

Chapter - 15 : Maintenance of Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		IV. Repair to pot holes and removal of loose material, trimming of sides, cleaning of surface, providing tack coat with bitumen emulsion, 20 mm thick premix carpet using cationic bitumen emulsion and seal coat type B with bitumen emulsion as per MoRD technical specification clauses 1904.2, 503 and 508.2.	sqm	₹ 533.10
15.4	1900	Maintenance of Drains		
		The maintenance of drains include erosion, repair, clearing, cleaning, reshaping, regrading, deepening of side drains as well as catch water drains as per MoRD technical specification Clause 1907.	m	₹ 4.60
15.5	1900	(I) Maintenance of Culverts Hume pipe type		
		Maintenance of Hume pipe Culvert by way of clearing, cleaning, erosion repair, repairs to cracks, parapet wall and protection work as per drawing and MoRD technical specification Clause 1908.	Each	₹ 3,085.00
		(II) Maintenance of Culverts Slab Type		
		Maintenance of Slab Type Culverts by way of clearing, cleaning, erosion repair, repairs to cracks, parapet wall and protection work as per drawing and MoRD technical specification 1908.	Each	₹ 5,367.90
15.6	1900	Maintenance of Road Signs		
		Maintenance of road signs by way of cleaning and repainting of mandatory/ regulatory/ cautionary/ informatory and place identification sign board as per drawings and MoRD technical specification Clause 1910.	per km	₹ 3,086.70
15.7	1900	Maintenance of Steel and RCC Railing		
		(i) Repair of steel railing to bring it to original shape, cleaning and repainting as per drawing and MoRD technical specification Clause 1911.	m	₹ 503.80
		(ii) Repair of RCC railing to bring it to the original shape, cleaning and repainting as per drawings and MoRD technical Specification Clause 1911.	m	₹ 2,772.60
15.8	1900	Maintenance of 200 metre and km stones		
		Maintenance of 200 metre and km stone by way of refixing of tilted stones repairing with cement mortar, cleaning, repairing and lettering on 200 metre, km stone and 5th km stone as per drawing and MoRD technical specification Clause 1912.	per km	₹ 1,505.80
15.9	1900	Cutting of Branches of Trees Shrubs and Trimming of Grass and Weeds		

Chapter - 15 : Maintenance of Roads

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		(i) Cutting of branches of trees and shrubs from the roadway or within R.O.W including disposal of wood and leaves to suitable location as per MoRD technical specification Clause 1914.	per tree	₹ 183.70
		(ii) Cutting of shrubs from the roadway or within R.O.W and disposal of shrubs to suitable locations as per MoRD technical specification Clause 1914.	Each	₹ 11.50
		(iii) Trimming of grass and weeds from the shoulders/berms and disposing off the same to suitable location as per MoRD technical specification Clause 1914.	sqm	₹ 3.80
15.10	1900	White Washing of Parapet Walls of CD Work and Tree Trunks		
		White washing two coats on parapet walls and tree trunks including preparation of surface by cleaning scraping etc. as per MoRD technical specification Clause 1915.	sqm	₹ 23.70
15.11	1900, 500	Periodical Renewal to Existing Bituminous Surface		
		1 Open Graded Premix Carpet 20 mm Thick		
		Unit = sqm		
		(i) Tack coat		
		With Bitumen Emulsion grade RS-1		
		Rate as per item No. 5.2 (ii)	sqm	
		(ii) Premix Carpet using bituminous (Viscosity grade-modified bitumen) binder		
		Rate as per item No. 5.8	sqm	
		as relevent		
		Or		
		(iii) Premix Carpet using Bitumen Emulsion		
		Rate as per item No. 5.9	sqm	
		(iv) Seal coat Type A or B or C or D		
		Rate as per item No. 5.11	sqm	
		2 Surface dressing single coat/first coat or 2nd coat		
		Rate as per item No. 5.5	sqm	

Chapter - 16

Pile Foundation & Well Foundation for Bridge

(a) Preamble

1. *The rate analysis has been based specifications of the Ministry of Road Transport and Highways.*
2. *The unit rate of materials, labour, and the hire charges of plant and machineries has been considered as per the local market rates.*
3. *Loading, unloading & Carriage rate of the materials will be added to these rates as applicable for each link road while preparing the the cost estimate of DPR.*
4. *Sand can be either coarse or fine as required/ available. Here, provision of fine sand is considered only due to non-availability of coarse sand in Tripura. However, if design of concrete dictates for use of coarse sand, then separate analysis may be taken as per site condition.*

Chapter - 16 : Pile Foundation & Well Foundation for Bridge

Sl. No.	Ref. to MoRT&H Spec.	Description	Unit	Rate
16.1	1100, 1200, 1500, 1700	Bored Cast-in-Situ piles 1200 mm dia, M-25 grade RCC pile excluding reinforcement complete as per drawing and technical specification and removal of excavated earth with all lifts and lead upto 1000 m as per MoRT&H specification clause 1100, 1200, 1500, 1700.	Metre	₹ 19,479.20
16.2	1100, 1200, 1500, 1700	Bored Cast-in-Situ piles 1000 mm dia, M-25 grade RCC pile excluding reinforcement complete as per drawing and technical specification and removal of excavated earth with all lifts and lead upto 1000 m as per MoRT&H specification clause 1100, 1200, 1500, 1700.	Metre	₹ 14,767.40
16.3	1100, 1200, 1500, 1700	Bored Cast-in-Situ piles 750 mm dia, M-25 grade RCC pile excluding reinforcement complete as per drawing and technical specification and removal of excavated earth with all lifts and lead upto 1000 m as per MoRT&H specification clause 1100, 1200, 1500, 1700.	Metre	₹ 8,843.50
16.4	1100, 1200, 1500, 1700	Bored Cast-in-Situ piles 600 mm dia, M-25 grade RCC pile excluding reinforcement complete as per drawing and technical specification and removal of excavated earth with all lifts and lead upto 1000 m as per MoRT&H specification clause 1100, 1200, 1500, 1700.	Metre	₹ 6,550.00
16.5	1100, 1200, 1500, 1700	Bored Cast-in-Situ piles 500 mm dia, M-25 grade RCC pile excluding reinforcement complete as per drawing and technical specification and removal of excavated earth with all lifts and lead upto 1000 m as per MoRT&H specification clause 1100, 1200, 1500, 1700.	Metre	₹ 4,795.60
16.6	1200, 1500, 1700	Providing and laying RCC with M-25 grade concrete in Well Curb including cost of centering & shuttering, but excluding cost of reinforcement complete as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1500, 1700.	cum	₹ 13,580.90
16.7	1200, 1500, 1700	Providing and laying RCC with M-20 grade concrete in Well Steining including cost of centering & shuttering, but excluding cost of reinforcement complete as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1500, 1700.	cum	₹ 11,938.10
16.8	1200, 1500, 1700	Providing and laying cast-in-situ PCC with M-20 grade concrete with 10% extra cement in bottom plug of well with minimum cement content 363 kg/m ³ as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1500, 1700.	cum	₹ 11,844.00
16.9	1200, 1500, 1700	Providing and laying cast-in-situ PCC with M-20 grade concrete in top plug of well as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1500, 1700.	cum	₹ 10,706.00

Chapter - 16 : Pile Foundation & Well Foundation for Bridge

Sl. No.	Ref. to MoRT&H Spec.	Description	Unit	Rate
16.10	1200, 1500, 1700	Providing and laying RCC with M-25 grade concrete in well cap including the cost of centering & shuttering but excluding the cost of reinforcement as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1500, 1700.	cum	₹ 11,741.80
16.11	1200	Sinking of wells of circular shape in all kinds of soil with or without water by all methods, other than pneumatic sinking including construction of cofferdams, wherever necessary including dressing for laying the well curbs, removal of underground snags, if any, such as logs, isolated boulders etc. encountered during sinking including use of Kentledge including supports, loading and unloading of weight etc.as per drawing and technical specification and removal of earths etc. with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200.		
May be taken from the relevant items of chapter - 12 for Highways and MDRs.				
16.12	1200, 1600, 1700, 1900	Supplying, fabricating and placing in position MS cutting edge of well curbs consisting of MS flats, plates, angles etc. complete including the cost of nuts and bolts as per drawing and technical specification with all lifts and lead upto 1000 m as per MoRT&H specification clause 1200, 1600, 1700, 1900.	Tonne	₹ 1,19,808.90
16.13	2,600	Supplying and installing strip seal type Elastomeric expansion joint of approved design and make as per drawing and technical specification clause 2600 of MoRT&H with all lifts and lead upto 1000 m.	Metre	₹ 19,409.60
16.14	2,000	Supplying, fitting & fixing in position true to line & level elastomeric bearing conforming to IRC : 83 (Part-II) Section IX complete including all accessories with additional steel fixtures as per drawings & MoRT&H technical specification clause 2000 with all lifts and lead upto 1000 m.	cucm	₹ 2.30

Note : *Initial and Routine load test and Lateral load tests for piles may be done with the items available in the Chapter - 12 of the Highways & MDRs.*

PART - III

**Miscellaneous items for
Roads,
Timber Bridges,
River training works.**

Miscellaneous - 1

Miscellaneous - 1 : Miscellaneous Items for roads, Timber Bridges, River training works.

(a) Preamble

- 1 Quantities of materials provided are approximate and are meant for the purpose of estimating only.*
- 2 While providing the rates of items in the cost estimate of DPR, detailed local enquiries should be made keeping in view the location of place of availability of the materials and leads involved.*
- 3 Specifications for the miscellaneous items of this chapter are incorporated in the SOR.*
- 4 Carriage of factory made interlocking blocks/ kerbstones are payable separately as per Chapter of carriage of material (item no. 1.8 and 1.10 of MoRD) .*
- 4 The rates for sub-grade/sub-base/ base course if required for laying interlocking blocks may be taken separately from respective Chapters.*
- 5 For all types of all weather instant patch repair cold readymix compound, respective manufacturer's specification/ direction shall also to be followed during execution of work.*

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M.1.1	202	Dismantling of Brick soling		
		Dismantling of brick soling, stacking serviceable materials and unserviceable materials separately with all lifts and upto a lead of 1000 m as per MoRD Technical Specification Clause 202.		
		(I) By Manual Means	cum	₹ 986.00
		(II) By Mechanical Means	cum	₹ 420.70
M.1.2	202	Dismantling of Brick soling		
		Dismantling of brick soling, stacking serviceable materials and unserviceable materials separately with all lifts and upto a lead of 500 m by manual means as per MoRD Technical Specification Clause 202.	cum	₹ 859.20
M.1.3	412	Charges for Brick soling		
		i. Laying brick soling on prepared subgrade with brick on edge (excluding the cost of bricks but including the cost of binding materials) according to lines, grades and cross-section shown on the drawing, filling joints with sand , watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	sqm	₹ 97.50
		ii. Laying flat brick soling on prepared subgrade (excluding the cost of bricks but including the cost of binding materials) according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	sqm	₹ 60.80
		iii. Laying brick edging on prepared subgrade (excluding the cost of bricks but including the cost of binding materials) according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	m	₹ 37.50
		iv. Laying brick edging laid lengthwise on prepared subgrade (excluding the cost of bricks but including the cost of binding materials) according to lines, grades and cross-section shown on the drawing, filling joints with Earth, free from clay with a Plasticity Index not exceeding 6, watering and rolling the same with three wheeled road roller 80-100 kN as per MoRD Technical Specification Clause 412.	m	₹ 17.30

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M-1.4		Labour charge for Breaking of jhama bats/ jhama bricks/ 1st class bricks. Breaking of jhama bats/ jhama bricks /1st class bricks (including bigger lumps) into metal/chips /aggregates and stacking serviceable materials and unserviceable materials separately as per direction of the Engineer-in-charge with all lifts and upto a lead of 100 m.		
	i.	Required sizes for filter media as per MoRD Technical Specification Clause 1204.3.8.	cum	₹ 1,404.40
	ii.	Required sizes for GSB (53 mm to 0.075 mm) as per MoRD Technical Specification Clause 401.	cum	₹ 1,520.10
	iii.	Required sizes for WBM Grading 2 (63 mm to 0.075 mm) as per MoRD Technical Specification Clause 405.	cum	₹ 1,431.90
	iv.	Required sizes for WBM Grading 3 (53 mm to 0.075 mm) as per MoRD Technical Specification Clause 405.	cum	₹ 1,520.10
M-1.5	401	Charge for construction of Granular Sub-base Charge for Construction of granular sub-base by providing well graded material (53 mm to 0.075 mm Jhama Brick Aggregate , Grading-I), spreading in uniform layers with tractor with attachments on prepared surface, mixing by mix in place method at OMC, applying and brooming sand to fill up the interstices of coarse aggregate, watering and compacting with smooth wheel roller to achieve the desired density, complete as per MoRD Technical Specification Clause 401. (excluding the cost of jhama aggregate which are available at site only).		
	(i)	For Grading - I Material		
	(A)	By Mix in Place Method	cum	₹ 279.80
M-1.6	405	Charge for construction of Water Bound Macadam Sub-Base / Base 1) WBM Grading 2 Charge for laying, spreading and compacting 63 mm to 0.075 mm jhama brick aggregates to water bound macadam specification including spreading in uniform thickness, hand packing rolling with three wheel roller 80-100 KN in stages to proper grade and camber, applying and brooming binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density Grading 2 as per MoRD Technical Specification Clause 405. (excluding the cost of jhama aggregate which are available at site only).		
	(A)	By Manual Means	cum	₹ 566.30
	(B)	By Mechanical Means	cum	₹ 210.40

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		2) WBM Grading 3 Labour charge for laying, spreading and compacting 55 mm to 0.075 mm jhama brick aggregates to water bound macadam specification including spreading in uniform thickness, hand packing rolling with three wheel roller 80-100 KN in stages to proper grade and camber, applying and brooming, binding materials to fill up the interstices of coarse aggregate, watering and compacting to the required density Grading 3 as per MoRD Technical Specification Clause 405. (excluding the cost of jhama aggregate which are available at site only).		
	(A)	By Manual Means	cum	₹ 566.30
	(B)	By Mechanical Means	cum	₹ 210.40
M-1.7	515 of MoRTH	Mastic asphalt wearing course Providing and laying mastic asphalt wearing course with paving grade bitumen (IS 73 : 2013), meeting the requirements given in table 500.29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated finegrained hard stone chipping 13.2 mm nominal size at the rate of 0.005 cum per sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of the surfaces is not less than 100° C, protruding 1 mm to 4 mm over mastic surface, all complete as per MoRTH Technical Specification Clause 515.		
	i.	25 mm thick	sqm	₹ 1,189.00
	ii.	40 mm thick	sqm	₹ 1,895.00
	iii.	50 mm thick	sqm	₹ 2,357.00
M-1.8		Sanding Applying local sands to areas of road where bleeding of excess bitumen has occurred as per specification incorporated in this SOR.	sqm	₹ 1.90
M-1.9	1100	Laying Reinforced Cement Concrete Pipe NP3 as per design in single Row Laying reinforced cement concrete pipe NP3 for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding cost of pipes (available at site), excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 375.00
	(B)	1000 mm dia	m	₹ 221.40

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
	(C)	750 mm dia	m	₹ 134.50
	(D)	600 mm dia	m	₹ 104.50
M-1.10	1100	Laying Reinforced Cement Concrete Pipe NP3 as per design in Double Row Laying reinforced cement concrete pipe NP3 for culverts on first class bedding of granular material in Double row including fixing collar with cement mortar 1:2 but excluding cost of pipes (available at site), excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 863.10
	(B)	1000 mm dia	m	₹ 514.00
	(C)	750 mm dia	m	₹ 477.10
	(D)	600 mm dia	m	₹ 383.80
M-1.11	1100	Laying Reinforced Cement Concrete Pipe NP2 as per design in single Row Laying reinforced cement concrete pipe NP2 for culverts on first class bedding of granular material in single row including fixing collar with cement mortar 1:2 but excluding cost of pipes (available at site), excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 375.00
	(B)	900 mm dia	m	₹ 221.40
	(C)	600 mm dia	m	₹ 134.50
	(D)	450 mm dia	m	₹ 105.50
	(E)	300 mm dia	m	₹ 85.80
M-1.12	1100	Laying Reinforced Cement Concrete Pipe NP2 as per design in Double Row Laying reinforced cement concrete pipe NP2 for culverts on first class bedding of granular material in Double row including fixing collar with cement mortar 1:2 but excluding cost of pipes (available at site), excavation, protection works, backfilling, concrete and masonry works in head walls and parapets as per MoRD Technical specification Clause 1106.		
	(A)	1200 mm dia	m	₹ 863.10

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
	(B)	900 mm dia	m	₹ 514.00
	(C)	600 mm dia	m	₹ 477.10
	(D)	450 mm dia	m	₹ 383.80
	(E)	300 mm dia	m	₹ 306.90
M-1.13	1900, 500	Maintenance of bituminous surface road using Jhama brick aggregate Repair to pot holes by removal of failed material, trimming the sides to vertical and levelling the bottom, cleaning the same with compressed air or any appropriate method, filled with B.M (using jhama brick aggregate & bitumen of VG-30), after applying prime coat at the bottom and tack coat on sides and on bottom (using bitumen emulsion) and compacting, trimming & finishing the surface to form a smooth continuous surface, all as per MoRD technical specification Clauses 1900, 502, 503 and 504.	cum	₹ 11,513.00
M-1.14	511	Seal coat on old bituminous road surface Sand seal coat on old bituminous road surface by applying Viscosity Graded (VG-30) bitumen @ 1.00 kg per sqm using rubber brush after proper cleaning of the road surface and spreading of river sand @0.06 cum/10 sqm complete as per specification and direction of the Engg.-in-Charge.	sqm	₹ 98.90
M-1.15	1900, 500	Patch repairing/ Maintenance of bituminous surface road using Jhama brick aggregate & Viscosity Graded bitumen (VG-30) Repairing pot-holes and making up small depressions with ramming or power rolling after removal/ disposal of disintegrated materials within a lead of 50 m, cutting pot holes to regular shapes with vertical edges and levelling the bottom, cleaning the same with compressed air or any other appropriate method including screening, cleaning of aggregates; and filling up with with jhama chips using bitumen of VG-30 @ 54 kg per m ³ of loose volume of jhama brick chips, after applying tack coat of bitumen on sides and bottom @ 0.75 kg/ sqm and finishing the top of repaired surface levelled with adjoining area in proper grade and camber including spreading of sand @ 0.006 cum/ sqm of prepared road surface as per direction of the Engineer-in-Charge and all as per MoRD technical specification Clauses 1900, 502, 503 and 504.	cum	₹ 11,274.60
<i>Note:-</i>				
1. Deduct ₹ 6,905.10 from the full item rate if only bitumen is issued at free of cost by the department.				
2. Deduct ₹ 4,761.50 from the full item rate if only jhama chips are issued at free of cost by the department.				
M-1.16	511	Labour charge for Seal coat on old bituminous road surface		

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
		Labour charge for Sand seal coat on old bituminous road surface by applying Viscosity Graded (VG-30) bitumen @ 1.00 kg per sqm using rubber brush after proper cleaning of the road surface and spreading of river sand @0.06 cum/10 sqm complete as per specification and direction of the Engg.-in-Charge. (bitumen to be issued at free of cost by the department)	sqm	₹ 13.50
M-1.17	502 & 503	Tack coat using hot straight run bitumen of grade VG-30 on W.B.M.		
		Providing and applying tack coat using hot straight run bitumen of grade VG-30, including heating the bitumen, spraying the bitumen, cleaning and preparing the existing road surface as per specifications: On W.B.M. @ 0.75 kg/ sqm.	sqm	₹ 55.20
M-1.18	502 & 503	Tack coat using hot straight run bitumen of grade VG-30 on bituminous surface		
		Providing and applying tack coat using hot straight run bitumen of grade VG-30, including heating the bitumen, spraying the bitumen, cleaning and preparing the existing road surface as per specifications: On bituminous surface @ 0.50 Kg/ Sqm.	sqm	₹ 41.00
M-1.19		Providing and laying factory made kerb stone		
		Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature jointed with cement mortar 1:3 (1 cement : 3 sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5 mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-Charge (length of finished kerb edging shall be measured for payment). (Precast c.c. kerb stone shall be approved by Engineer-in-Charge).	cum	₹ 12,708.80
M-1.20		Taking out existing CC interlocking paver blocks		
		Taking out existing CC interlocking paver blocks from footpath/ central verge, including removal of rubbish etc., disposal of unserviceable material to the dumping ground, for which payment shall be made separately and stacking of serviceable material within 50 metre lead as per direction of Engineer-in-Charge.	sqm	₹ 69.90
M-1.21		Laying old cement concrete interlocking paver blocks		
		Laying old cement concrete interlocking paver blocks of any design/shape laid in required line, level, curvature, colour and pattern over and including 50 mm thick compacted bed of coarse sand, filling the joints with fine sand etc. all complete as per the direction of Engineer-in-charge. (Old cc paver blocks shall be supplied by the department free of cost).	sqm	₹ 171.70

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M-1.22	1500	60 mm thick factory made c.c interlocking paver block of M -30 Grade Providing and laying 60 mm thick factory made cement concrete interlocking paver block of M-30 grade made by block making machine with strong vibratory compaction, of approved size, design & shape, laid in required colour and pattern over and including 50 mm thick compacted bed of sand, filling the joints with fine sand etc. all complete as per specification and approval/ direction of the Engineer-in-charge.	sqm	₹ 1,208.40
M-1.23	1500	60 mm thick factory made c.c. interlocking paver block of M-35 Grade Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with fine sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. complete as per specifications & approval/ direction of Engineer-in-Charge. (a) 60 mm thick c.c. paver block of M-35 grade with approved colour, design and pattern.	sqm	₹ 1,264.60
M-1.24	1500	80 mm thick factory made c.c. interlocking paver block of M-35 Grade Providing and laying factory made chamfered edge Cement Concrete paver blocks of required strength, thickness & size/ shape, made by table vibratory method to attain superior smooth finish using PU or equivalent moulds, laid in required grey colour & pattern over 50 mm thick compacted bed of sand, compacting and proper embedding/ laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with fine sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. all complete as per specifications & approval/ direction of the Engineer -in-Charge: (a) 80 mm thick c.c. paver block of M-35 grade with approved colour, design and pattern.	sqm	₹ 1,552.00
M-1.25	1500	Cement concrete 1:2:4 in pavements, laid to required slope and camber in panels Cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone aggregate 40 mm nominal size) in pavements, laid to required slope and camber in panels as required including consolidation finishing and tamping complete as per direction of the of the Engineer-in-Charge.	cum	₹ 10,629.70

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M-1.26	510 of MoRT&H / 508 of MoRD	Providing, laying and rolling of open - graded premix surfacing of 25 mm thickness composed of 13.2 mm to 5.6 mm aggregates using modified bitumen to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 tonne capacity, finished to required level and grades as per Technical Specification and as directed by the Engineer-in-Charge.		
	(i)	With Refinery Modified Bitumen CRMB 55 conforming to IRC: SP: 53-1999	sqm	₹ 418.20
	(ii)	With Polymer Modified Bitumen PMB - 70	sqm	₹ 558.80
M-1.27	510 of MoRT&H / 508 of MoRD	Providing, laying and rolling of open - graded premix surfacing of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates using modified bitumen to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a smooth wheeled roller 8-10 tonne capacity, finished to required level and grades as per Technical Specification and as directed by the Engineer-in-Charge.		
	(i)	With Refinery Modified Bitumen CRMB 55 conforming to IRC: SP: 53-1999	sqm	₹ 333.40
	(ii)	With Polymer Modified Bitumen PMB - 70	sqm	₹ 445.80
M-1.28		Road Stud with Lense Reflector		
	804 of MoRT&H	Providing and fixing reflective road studs of size 100 x 20 mm made of ASA (Acrylic styrene Acryloretrite) or HIPS (High impact polystyrene) or ABS (Acrylonitrile butadiene styrene) or any other suitable material approved by the engineer having electronically welded micro-prismatic lens with abrasion resistant coating. The glow stud shall support a load of 13.635 tonne tested in accordance with ASTM D 4280. The slope of retro-reflective surface shall be 35 (± 5) degrees to base. The reflective panel should conform to ASTM D 788. The area of each retro-reflecting surface shall not be less than 13 sqcm. The luminance intensity should be as per the specification and shall be tested as described in ASTM I : 809 as recommended in BS: 873 part 4 : 1973. The studs shall be fixed to the Road surface in accordance with technical specification clause no. 804.7.2 using the adhesive conforming to IS or as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-Charge and in field performance as per technical specification clause no. 804.7.3.	nos	₹ 183.20

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M-1.29		Solar Powered Road Markers (Solar studs)		
	804 of MoRT&H	Providing and fixing Solar Powered Road Markers (Solar studs) of specified size to meet the requirement of technical specification clause 804.6 made of aluminium alloy and poly carbonate material which shall be absolutely weather resistant and shall support a load of 13.635 tonne tested in accordance with ASTM D 4280, of appropriate color & water resistant to meet the requirement of IP 65 in accordance with IS: 12063:1987 category 2 for protection against water ingress. It shall have super bright LEDs of flashing rate not less than 1Hz having a life of not less than three years. The slope of retro-reflective surface shall be 35 (\pm 5) degrees to base. The studs shall be fixed to the Road surface in accordance with technical specification clause no. 804.7.2 using the adhesive conforming to IS or as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-Charge and in field performance as per technical specification clause no. 804.7.3.	nos	₹ 1,153.30
M-1.30	806	Delineators made of ABS		
		Providing and fixing post delineators made of ABS round body fitted with 2 nos 100 mm dia high reflective reflectors and mounted on MS pipe of 65 mm dia duly powder coated anti-rust and anti theft steel to be installed as per direction of Engineer-in-Charge.	nos	₹ 804.60
M-1.31		Mending Potholes and depressions by stitching picked jhama bricks with one brick-on-edge laid in herring bone pattern and including necessary cushion of sand below the soling (and in between layers) including cutting the pothole area to rectangular shape with vertical edges, removing all loose materials, finishing the surface to match with adjacent areas complete as per direction of the of the Engineer-in-Charge.		
		(a) One brick-on-edge laid in herring bone pattern on a layer of flat brick (thickness 75 mm plus 125 mm)	sqm	₹ 1,592.20
		(b) One brick-on-edge laid in herring bone pattern (thickness 125 mm)	sqm	₹ 987.60
M-1.32	303.5.2	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead upto 50 metres as per direction of the of the Engineer-in-Charge.	100 sqm	₹ 762.20
M-1.33	600,700 & 1200	Providing weep holes on brick masonry/ plain/ reinforced concrete wall with 90 mm dia uPVC pipe with ISI mark of approved/ reputed make extending through the full width of the structures with slope of 1(V):20(H) towards drawing face including cutting, fixing etc. complete as per drawing and direction of the Engineer-in-Charge and technical specification.	m	₹ 222.20

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. to MoRD Spec.	Description	Unit	Rate
M-1.34	600,700 & 1200	Providing weep holes on brick masonry/ plain/ reinforced concrete wall with 75 mm dia uPVC pipe with ISI mark of approved/ reputed make extending through the full width of the structures with slope of 1(V):20(H) towards drawing face including cutting, fixing etc. complete as per drawing and direction of the Engineer-in-Charge and technical specification.	m	₹ 161.40
M-1.35	900, 502, 503, 504 and 3004	Repair to pot holes/ patch repair on all types of bituminous pavement by using All Weather Instant Patch Repair Cold Readymix Compound (INSSTAPATTCH/ SHELMAC - PR/ SHALIPATCH or equivalent products accredited by IRC) within specified shelf life including cleaning the existing portion of the road to be repaired by appropriate method, disposal of all failed material, compacting, etc. complete as per relevant technical specification and as per direction of the Engineer-in-charge. (irrespective of recorded premeasured area/ volume of pot holes repaired, to be measured for payment in multiple packs of 25/ 50 kg net HDPE bags with inside LDPE liner actually supplied/ delivered & utilised)	kg	₹ 31.10
M-1.36	900, 502, 503, 504 and 3004	Labour charge for repair to pot holes/ patch repair on all types of bituminous pavement by using All Weather Instant Patch Repair Cold Readymix Compound (INSSTAPATTCH/ SHELMAC - PR/ SHALIPATCH or equivalent products accredited by IRC) including cleaning the existing portion of the road to be repaired by appropriate method, disposal of all failed material, compacting, etc. complete as per relevant technical specification and as per direction of the Engineer-in-charge. (irrespective of recorded premeasured area/ volume of pot holes repaired, to be measured for payment in multiple packs of 25/ 50 kg net HDPE bags with inside LDPE liner actually issued at free of cost by the department & utilised)	kg	₹ 1.40
M-1.37	402	Gravel / Soil - Aggregate Base (Table 400.2) Construction of gravel / soil - aggregate base by providing well graded material, spreading in uniform layers with Tractor mount grader on prepared surface, mixing by mix in place method with Tractor mount rotavator at OMC, and compacting with three wheel 80 - 100 kN static roller to achieve the desired density, complete as per Technical Specification Clause 402.		
		(i) Grading A	cum	₹ 6,821.40
		(ii) Grading B	cum	₹ 6,945.30
		(iii) Grading C	cum	₹ 6,796.70
M-1.38	402	Gravel / Soil - Aggregate Surface Course (Table 400.3) Construction of gravel / soil - aggregate surface course by providing well graded material, spreading in uniform layers with Tractor mount grader on prepared surface, mixing by mix in place method with Tractor mount rotavator at OMC, and compacting with three wheel 80 - 100 kN static roller to achieve the desired density, complete as per Technical Specification Clause 402.		
			cum	₹ 5,624.20

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. of Spec./ IRC Code	Description	Unit	Rate
M-1.39	IRC:SP:98-2013	40/50 mm compacted thickness with bitumen of grade VG-30 @ 5.5% percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) and waste plastic additive @ 8% (percentage by weight of bitumen) prepared in Batch Type Hot Mix Plant of 100- 120 TPH capacity as per direction of Engineer-in-charge.	cum	₹ 18,105.20
M-1.40		Providing and fixing Solar Powered Road Delineator made of poly carbonate cup of approximate 80 mm dia and 90 mm height and mounted on MS pipe of 65 mm dia duly powder coated anti-rust and anti theft steel to be installed as per direction of Engineer-in-charge.	each	₹ 1,137.40
M-1.41		Retro Reflective Tapes Providing and fixing retro-relectorised warning signs of red, white, yellow high quality retro-reflecting water proof sheeting tapes (45mx72mm) in width of standard specification and direction of the Engineer-in-charge.	m	₹ 13.70
M-1.42		Flexible median Marker Providing and Fixing of Flexible Median Markers as per IRC:79-2019 which shall be made of combination of tough, high impact resistant, injection-molded, thermoplastic body having overall height, width and body thickness not less than 180 mm, 120 mm and 6.5 mm respectively along with fluorescent yellow colour retro-reflective sheeting of Type XI as per IRC:67-2012 on both the faces with property of flexibility to provide high durability and U shape structure having rebound / bounce back property. The flexible Median Marker should have integrated shank having depth of min 30 mm and a dia min 20 mm fixed by drilling a hole on the kerb for the shanks to go inside, without nails and using epoxy resin based adhesive complete as directed by the engineer in charge.	each	₹ 190.50
M-1.43	507 of New MoRTH	Bituminous Concrete using Waste Plastic A. Providing and laying bituminous concrete with higher capacity batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder @ 5.20 percent of mix including cement filler, transporting the hot mix plant to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORT&H specification clause No. 507 complete in all respects and the bituminous mix be suitably modified with waste plastic as per "Dry Process" including collection of waste plastic, cleaning, shredding all complete as per IRC:SP:98. Grading I <i>(For layer thickness 50 mm)</i> i. With Viscosity Graded Bitumen of VG-30 & Waste Plastic	cum	₹ 20,595.00

Miscellaneous - 1 : Miscellaneous Items for roads.

Sl. No.	Ref. of Spec./ IRC Code	Description	Unit	Rate
		<p>B. Providing and laying bituminous concrete with higher capacity batch type hot mix plant using crushed aggregates of specified grading, premixed with bituminous binder @ 5.40 percent of mix including cement filler, transporting the hot mix plant to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MORT&H specification clause No. 507 complete in all respects and the bituminous mix be suitably modified with waste plastic as per "Dry Process" including collection of waste plastic, cleaning, shredding all complete as per IRC:SP:98.</p>		
		<p>Grading II <i>(For layer thickness 30 - 40 mm)</i></p>		
		<p>i. With Viscosity Graded Bitumen of VG-30 & Waste Plastic</p>	cum	₹ 21,192.30
M-1.44 New		<p>Spring Posts or Reboundable Delineators 450 mm</p>		
		<p>Providing and fixing Spring Posts or Reboundable Delineators or Tubular Marker made up of Polyurethane used to divide opposing lanes of road users shall be flexible in nature. Tubular marker having height upto 450 mm shall be having 75 mm reboundable work zone retroreflective sheeting as per ASTM 4956 S2. Application of Tubular Marker Shall be done as per IRC:SP:55.</p>	each	₹ 343.70
M-1.45 New		<p>Spring Posts or Reboundable Delineators 700 mm</p>		
		<p>Providing and fixing Spring Posts or Reboundable Delineators or Tubular Marker made up of Polyurethane used to divide opposing lanes of road users shall be flexible in nature. Tubular marker having height upto 700 mm shall be having 75 mm reboundable work zone retroreflective sheeting as per ASTM 4956 S2. Application of Tubular Marker Shall be done as per IRC:SP:55.</p>	each	₹ 490.10

Miscellaneous - 2

Miscellaneous - 2 : Misc. items for Timber Bridges.

(a) Preamble

- 1 Quantities of materials provided are approximate and are meant for the purpose of estimating only.*
- 2 While providing the rates of items in the cost estimate of DPR, detailed local enquiries should be made keeping in view the location of place of availability of the materials and leads involved.*
- 3 Specification for the items of this chapter is incorporated in the SOR.*

Miscellaneous - 2 : Misc. items for Timber Bridges.

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-2.1		Providing of Sal/ Nahar/ Nageswar piles dressed to heart wood and making shoes with end tapered upto 750 mm from the bottom of the pile, marking of length with chisel in metre and part of a metre run from the bottom of the piles, applying coal tar after verification and approval of the piles and stacking at the work site as per Specification.		
	i.	250 mm dia to 300 mm dia piles	metre	₹ 2,649.40
	ii.	200 mm dia to 250 mm dia piles	metre	₹ 2,291.20
M-2.2		Handling and driving of Sal / Nahar / Nageswar piles with 3/4th to 1.0 ton monkey upto refusal as per Specification.		
	i.	250 mm dia to 300 mm dia piles	metre	₹ 1,906.00
	ii.	200 mm dia to 250 mm dia piles	metre	₹ 1,370.30
M-2.3		Scarfig and jointing (half lap joint 1.00 m long) of Sal/ Nahar/ Nageswar piles of required dia with 3 Nos M.S. circular clamps of made of 50 mm x 10 mm MS flat or plate of required length, 2 nos. 100 mm x 100 mm x 10 mm MS angle 1.50 m long tightened with 12 mm dia & 50 mm long bolts and nuts for circular clamp and 3 Nos. 16 mm dia bolts and nuts of required length with washers on both side of the angles complete (payment for the length of piles required for jointing is to be made separately) as per drawing and as per Specification.		
	i.	250 mm dia to 300 mm dia piles	no	₹ 5,909.10
	ii.	200 mm dia to 250 mm dia piles	no	₹ 5,736.80
M-2.4		Cutting and jointing (butt joints) of Sal/ Nahar/ Nageswar piles of required dia fitted with 400 mm long 32 mm dia MS Dowel bar at centre of the pile, 4 nos. 100 mm x 100 mm x 10 mm MS angle 1.50 m long tightened with 6 x 2 Nos. 16 mm dia bolts and nuts of required length with washers on both side of the angles complete as per drawing and as per Specification		
	i.	250 mm dia to 300 mm dia piles	no	₹ 9,591.90
	ii.	200 mm dia to 250 mm dia piles	no	₹ 9,499.30
M-2.5		Providing and placing R.S. Joists in position in SPT bridges including cutting, hoisting, making holes, fitting with 3 nos of MS hooks of 16 mm dia on both side of the joists with each beam, applying priming coat of red lead paint as per drawing and as per Specification.	t	₹ 1,03,351.60
M-2.6		Charges for placing R.S. Joists in position in SPT bridges including cutting, hoisting, making holes, fitting with 3 nos of MS hooks of 16 mm dia on both side of the joists with each beam, applying priming coat of red lead paint as per drawing and as per Specification (excluding the cost of the RS Joist available at site).		

Miscellaneous - 2 : Misc. items for Timber Bridges.

Sl. No.	As per Spec. attached	Description	Unit	Rate
		i) For placing new RS joists	t	₹ 19,500.60
		ii) For placing old and dismantled RS joists	t	₹ 17,172.30
M-2.7		Dismantling R.S. Joists from SPT Bridges and stacking properly at site of work within 100 m lead with all lifts as per drawing and as per Specification.	t	₹ 10,741.30
M-2.8		Providing and fitting fixing of MS bolts with heads and nuts of various dia and length including making of holes in wooden members as per Specification.	kg	₹ 109.10
M-2.9		Applying coal tar at least two coats on wood work including handling and stacking the coal tarred material at the work site as per Specification.	sqm	₹ 45.90
M-2.10		Providing and fitting fixing of wooden beams including hoisting and placing in position with necessary dog spikes/nuts and bolts as per design and drawing, including applying coal tar of minimum two coats on all sides of new wood work complete as per the as per Specification.		
	A.	Sal wood	cum	₹ 1,26,052.40
	B.	Karai wood	cum	₹ 78,927.90
M-2.11		Providing and fitting fixing of deckings, trackways, battens and planks for abutments & wing walls including hoisting and placing in position with necessary nails and spikes as per design and drawings, including applying coal tar of minimum two coats on all sides of new wood work complete as per the Specification.		
	A.	Sal wood	cum	₹ 79,183.30
	B.	Karai wood	cum	₹ 54,007.10
	C.	Soft wood	cum	₹ 44,450.20
M-2.12		Providing and fitting fixing of joist runner, wheel guards, rail post, struts, railings, bracings of piles, including hoisting and placing in position with necessary nails and spikes and finally fitted with nuts & bolts as per design and drawings, including applying of coal tar of minimum two coats on all sides of new wood work complete (payment for nuts & bolts is to be made separately) as per the as per Specification.		
	A.	Sal wood	cum	₹ 79,447.10
	B.	Karai wood	cum	₹ 53,950.40
	C.	Soft wood	cum	₹ 44,340.80

Miscellaneous - 2 : Misc. items for Timber Bridges.

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-2.13		Dismantling of existing Wood work with all T&P and scaffolding whenever necessary, sorting the dismantled materials, disposal of unserviceable materials and stacking the serviceable materials separately and refitting the serviceable dismantled materials with spikes and nails with all lifts and lead at site of work as per Specification.	cum	₹ 3,273.10
M-2.14		Handling and lifting of Sal /Nahar /Nageswar piles by any means from river/ cherra bed level, stacking properly, as per Specification.		
	i.	250 mm dia to 300 mm dia piles	metre	₹ 1,260.50
	ii.	200 mm dia to 250 mm dia piles	metre	₹ 1,079.30
M-2.15		Making 12 mm dia holes in the RS joists at specified spacing for fitting, fixing of wooden joist runner as per Specification.	no	₹ 53.10
M-2.16		Charges for fitting fixing of new timber beams, deckings, trackways, battens and planks for abutments & wing walls, joist runner, wheel guards, rail post, struts, railings, bracings of piles, including hoisting and placing in position with necessary nails and spikes and or nuts & bolts as per design and drawings, including applying coal tar of minimum two coats on all sides of new wood work complete as per Specification (excluding the cost of new timbers available at the site of work and the cost of nuts and bolts which are to paid separately).		
	A.	Sal wood	cum	₹ 4,469.90
	B.	Karai wood	cum	₹ 4,221.00
	C.	Soft wood	cum	₹ 3,787.30
M-2.17		Charges for fitting fixing of old dismantled beams, deckings, trackways, battens and planks for abutments & wing walls, joist runner, wheel guards, rail post, struts, railings, bracings of piles, including hoisting and placing in position with necessary nails and spikes and or nuts & bolts as per design and drawings, including applying coal tar of minimum two coats on all sides of new wood work complete as per the Specification (excluding the cost of new timbers available at the site of work and the cost of nuts and bolts which are to paid separately).		
	A.	Sal wood	cum	₹ 3,957.70
	B.	Karai wood	cum	₹ 3,751.40
	C.	Soft wood	cum	₹ 3,249.00

Miscellaneous - 2 : Misc. items for Timber Bridges.

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-2.18		Providing of third class local wood piles dressed to heart wood and making shoes with end tapered upto 750 mm from the bottom of the pile, marking of length with chisel in metre and part of a metre run from the bottom of the piles, applying coal tar after verification and approval of the piles and stacking at the work site as per Specification.		
	i.	300 mm dia to 350 mm dia piles	metre	₹ 2,258.20
	ii.	250 mm dia to 300 mm dia piles	metre	₹ 1,541.30
	iii.	200 mm dia to 250 mm dia piles	metre	₹ 1,121.50
M-2.19		Handling and driving of 3rd class local wood piles with 1/2 ton monkey upto refusal as per Specification.		
	i.	300 mm dia to 350 mm dia piles	metre	₹ 1,811.10
	ii.	250 mm dia to 300 mm dia piles	metre	₹ 1,502.50
	iii.	200 mm dia to 250 mm dia piles	metre	₹ 1,082.31

Miscellaneous - 3

Miscellaneous - 3 : Misc. items for Timber Bridges.

(a) Preamble

- 1 Quantities of materials provided are approximate and are meant for the purpose of estimating only.*
- 2 While providing the rates of items in the cost estimate of DPR, detailed local enquiries should be made keeping in view the location of place of availability of the materials and leads involved.*
- 3 Specification for the items of this chapter is incorporated in the SOR.*

Miscellaneous - 3 : Misc. items for river training works

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-3.1		Supplying bamboo (1st class) 85 mm to 100 mm dia and making shoe with end tapered upto 300 mm from the bottom of the bamboo as per drawing and specification.	metre	₹ 42.00
M-3.2		Handling and driving bamboo (1st class) 85 mm to 100 mm dia upto the length required by heavy hammer as per drawing and specification.	metre	₹ 70.10
M-3.3		Providing and fitting, fixing bamboo (1st class) 85 mm to 100 mm dia for horizontal, diagonal bracing, strut etc. with nails / spikes and binding wire (GI 2.00 mm) as per drawing and specification.	metre	₹ 57.30
M-3.4		Providing and fitting, fixing brush wood (Tetul, Sheora, Mandar, etc.) tied with GI wire 2.00 mm well packed complete as per drawing and specification.	cum	₹ 381.80
M-3.5		Providing and fitting, fixing double layer split muli bamboo tatti lining in position as per drawing and specification.	sqm	₹ 205.10
M-3.6		Supplying ballies 100 mm dia well dressed and making shoe with end tapered upto 300 mm from the bottom including marking length and part of a metre as per drawing and specification.		
	i)	Sal Ballies	metre	₹ 546.50
	ii)	3rd class local wood Ballies	metre	₹ 93.20
M-3.7		Handling and driving ballies of 100 mm dia upto the length required by heavy hammer as per drawing and specification.	metre	₹ 81.80
M-3.8		Providing and fitting, fixing ballies of 100 mm dia for horizontal, diagonal bracing, strut etc. with nails/ spikes and binding wire (GI 2.0 mm) as per drawing and specification.		
	i)	Sal Ballies	metre	₹ 552.40
	ii)	3rd class local wood Ballies	metre	₹ 99.20
M-3.9		Providing and placing gunny/ polythene (of minimum wall thickness of 500 micron) bags filled with sand (of minmum qty of 0.034 cum) and properly manually stitched to avoid any leakage of sand as per specification.	no	₹ 45.50
M-3.10		Providing and fixing bitumen or tar drum guard posts including two coats of white synthetic enamel paint over a primer coat in the exposed outside surface above Ground level and applying two coats of coal tar on the outside surface below ground level including bottom before placing the same for a depth of 450 mm below ground level filled with earth as per specification.	no	₹ 785.40

BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

(a) Preamble

- 1 The items in this chapter have been considered mainly as per Zydex design road construction methodology which has been approved by TRRDA as per guidelines issued by NRRDA.

- 2 Items for road construction using nanotechnology are considered as below :
 - i) Surface waterproofing With Terrasil and Zycobond
 - ii) Sub-base/ Base With Soil, graded jhama brick aggregate mixed with Terrail and Zycobond
 - iii) Prime coat With Bitumen emulsion mixed with Terraprime
 - iv) Tack coat With Bitumen emulsion mixed with Nanotac
 - v) BM, MPM, MSS etc With Bitumen VG-30 mixed with Zycotherm
 - vi) Surface dressing, premix Carpet With Bitumen VG-30/ Bitumen emulsion mixed with Zycotherm/Nanotac
 - vii) Seal coat With Bitumen VG-30 mixed with Zycotherm

- 3 The Items should be executed as per the specification approved by TRRDA.

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-4.1	As per Technical Specification approved by TRRDA.	<p>Surface Water Proofing with organosilane Nano technology</p> <p>Providing and applying waterproofing with organosilane nanotechnology and nano acrylic co-polymer with water (<1000 ppm TDS) on top compacted subgrade, shoulder (in the ratio of 1.00 kg organosilane nanotechnology : 1.00 kg nano acrylic co-polymer : 200 litre water) by spraying solution at the rate of 3.00 litre/sqm in two spray application (1.50 litre + 1.50litre) as per Technical Specification approved by TRRDA.</p>	sqm	₹ 14.40
M-4.2	As per Technical Specification approved by TRRDA.	<p>Bases with organosilane Nano technology (NON-BITUMINOUS)</p> <p>Construction of stabilized granular sub-base/ base by providing well graded material (Jhama Brick Aggregate, as per approved Table, mixing with organosilane nanotechnology and nano acrylic co-polymer with water (<1000 ppm TDS), spreading in uniform layers with tractor with attachments on prepared surface, mixing by mix in place method with rotavator at OMC, watering and compacting with vibratory roller to achieve the desired density, complete as per Technical Specification approved by TRRDA.</p>	cum	₹ 3,729.60
M-4.3	As per Technical Specification approved by TRRDA.	<p>Prime Coat with organosilane nanotechnology</p> <p>(i) Low porosity Providing and applying prime coat with organosilane nanotechnology and cationic bitumen emulsion (CSS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CSS-1) : 200 litre water) by spraying solution at the rate of 1.00 litre/sqm using mechanical means on prepared surface of granular base of low porosity including cleaning of road surface as per Technical Specification approved by TRRDA.</p> <p>(ii) Medium porosity Providing and applying prime coat with organosilane nanotechnology and cationic bitumen emulsion (CSS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CSS-1) : 200 litre water) by spraying solution at the rate of 1.20 litre/sqm using mechanical means on prepared surface of granular base of medium porosity including cleaning of road surface as per Technical Specification approved by TRRDA.</p> <p>(iii) High porosity Providing and applying prime coat with organosilane nanotechnology and cationic bitumen emulsion (CSS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CSS-1) : 200 litre water) by spraying solution at the rate of 1.00 litre/sqm using mechanical means on prepared surface of granular base of high porosity including cleaning of road surface as per Technical Specification approved by TRRDA.</p>	sqm	₹ 34.30
			sqm	₹ 41.20
			sqm	₹ 54.50

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-4.4	Tack Coat with organosilane nanotechnology	Tack Coat with organosilane nanotechnology		
	(i)	Providing and applying tack coat with organosilane nanotechnology and cationic bitumen emulsion (CRS-1) and with water (<1000 ppm TDS) (in the ratio of 1.40 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CRS-1) : 200 litre water) by spraying solution at the rate of 1.00 litre/sqm using mechanical means on prepared bituminous surface cleaned with Hydraulic brooms per Technical Specification approved by TRRDA.	sqm	₹ 14.40
	(ii)	Providing and applying tack coat with organosilane nanotechnology and cationic bitumen emulsion (CRS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CRS-1) : 200 litre water) by spraying solution at the rate of 1.20 litre/sqm using mechanical means on the prepared dry and hungry bituminous surface including cleaning of road surface as per Technical Specification approved by TRRDA.	sqm	₹ 16.10
	(iii)	Providing and applying tack coat with organosilane nanotechnology and cationic bitumen emulsion (CRS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CRS-1) : 200 litre water) by spraying solution at the rate of 1.00 litre/sqm using mechanical means on the prepared granular surface treated with primer including cleaning of road surface as per Technical Specification approved by TRRDA.	sqm	₹ 14.30
	(iv)	Providing and applying tack coat with organosilane nanotechnology and cationic bitumen emulsion (CRS-1) and with water (<1000 ppm TDS) (in the ratio of 1.00 kg organosilane nanotechnology : 100.00 kg cationic bitumen emulsion (CRS-1) : 200 litre water) by spraying solution at the rate of 1.00 litre/sqm using mechanical means on the prepared non-bituminous surfaces (cement concrete pavement) including cleaning of road surface as per Technical Specification approved by TRRDA.	sqm	₹ 17.80

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-4.5	As per Technical Specification approved by TRRDA.	Bituminous Macadam with organosilane nanotechnology		
		Providing and laying bituminous macadam with organosilane nanotechnology by hot mix plant using crushed aggregates of grading as per Table 500.4 premixed with bituminous binder (VG-30) with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder , transported to site upto a lead of 1000 m laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled to achieve the desired compaction as per Technical Specification Clause 504	cum	₹ 16,295.30
M-4.6	As per Technical Specification approved by TRRDA.	Built-Up Spray Grout with organosilane nanotechnology		
		Providing, laying and rolling of built-up spray grout layer over prepared base consisting of a two layer composite construction of crushed coarse aggregates using motor grader for aggregates. Key stone chips spreader may be used with application of bituminous binder (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) after each layer. and with key aggregates placed on top of the second layer to serve as a base, conforming to line, grades and cross section specified, the compacted layer thickness being 75 mm as per Technical Specification Clause 505.		
		(A) By Manual Means	sqm	₹ 964.50
	(B) By Mechanical Means	sqm	₹ 878.90	
M-4.7	As per Technical Specification approved by TRRDA.	Modified Penetration Macadam with organosilane nanotechnology		
		Construction of penetration macadam over prepared base by providing a layer of compacted crushed coarse aggregate using chips spreader with alternate applications of bituminous binder (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) and key aggregates and rolling with a three wheel 80-100 kN static roller to achieve the desired degree of compaction per Technical Specification Clause 506.		
		(A) 50 mm thick	sqm	₹ 634.20
	(B) 75 mm thick	sqm	₹ 836.90	
M-4.8	As per Technical Specification approved by TRRDA.	Surface Dressing using Bituminous Binder with organosilane nanotechnology		
		Providing and laying surface dressing as wearing course consisting of a layer of bituminous binder (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) laid on the prepared surface, followed by a cover of crushed stone aggregates of specified size and rolling with three wheel 80-100 kN static roller including cleaning the road surface as per Technical Specification Clause 507.		

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
		(A) By Manual Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 193.00
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 166.40
		(B) By Mechanical Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 157.30
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 135.10
M-4.9	As per Technical Specification approved by TRRDA.	Surface Dressing using Bitumen Emulsion with organosilane nanotechnology Providing and laying surface dressing as wearing course consisting of a layer of bitumen emulsion mixed with 0.5% organosilane nanotechnology Nanotac by weight of bituminous emulsion laid on the prepared surface, followed by a cover of crushed stone chippings of specified size and rolling with three wheel 80-100 kN static roller including cleaning the road surface as per Technical Specification Clause 507.		
		(A) By Manual Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 232.60
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 206.10
		(B) By Mechanical Means		
		Case - I : Nominal chipping size 13.2 mm	sqm	₹ 191.90
		Case - II : Nominal chipping size 9.5 mm	sqm	₹ 170.30
M-4.10	As per Technical Specification approved by TRRDA.	Pre-coating Chips with organosilane nanotechnology Pre-coating chips with 1 percent of paving bitumen (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) by weight of chips in a suitable mixer duly heated to 160 oC as per Technical Specification Clause 507.2.5.	cum	₹ 1,962.40
M-4.11	As per Technical Specification approved by TRRDA.	20 mm thick Open-Graded Premix Carpet using Bituminous (Bitumen VG-30) Binder with organosilane nanotechnology Providing , laying and rolling of open-graded premix carpet of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates using bitumen (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per Technical Specification Clause 508		
		Case - I By Manual Means	sqm	₹ 327.60
		Case - II By Mechanical Means	sqm	₹ 311.10

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
M-4.12	As per Technical Specification approved by TRRDA.	<p>20 mm thick Open-Graded Premix Carpet using Bitumen Emulsion as per Technical Specification Clause 508.2 with organosilane nanotechnology</p> <p>Providing , laying and rolling of open-graded premix carpet of 20 mm thickness composed of 13.2 mm to 5.6 mm aggregates using bitumen emulsion mixed with 0.5% organosilane nanotechnology Nanotac to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per Technical Specification Clause 508.2</p>	sqm	₹ 360.80
M-4.13	As per Technical Specification approved by TRRDA.	<p>Mix Seal Surfacing with organosilane nanotechnology</p> <p>Providing, laying and rolling of close-graded premix surfacing material of 20 mm thickness composed of 11.2 mm to 0.9 mm (Type-A) or 13.2 mm to 0.9 mm (Type-B) aggregates using bitumen (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller, finishing to required level and grades as per Technical Specification Clause 509.</p>		
(A)	By Manual Means			
	i) Type-A		sqm	₹ 420.70
	ii) Type-B		sqm	₹ 390.10
(B)	By Mechanical Means			
	i) Type-A		sqm	₹ 393.10
	ii) Type-B		sqm	₹ 362.50
M-4.14	As per Technical Specification approved by TRRDA.	<p>Seal Coat with organosilane nanotechnology</p> <p>Providing and laying seal coat using bitumen (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A or Type B or Type C or Type D as per Technical Specification Clause 510</p>		
	A	By Manual Means		
		Case - I : Type A	sqm	₹ 153.80
		Case - II : Type B	sqm	₹ 90.50
		Case - III : Type C	sqm	₹ 124.50
		Case - IV : Type D (with fine sand)	sqm	₹ 77.80

Chapter - Miscellaneous - 4 : BASES AND SURFACE COURSES (NON-BITUMINOUS & BITUMINOUS) using ORGANOSILANE NANO TECHNOLOGY

Sl. No.	As per Spec. attached	Description	Unit	Rate
	B	By Mechanical Means		
		Case - I : Type A	sqm	₹ 143.70
		Case - II : Type B	sqm	₹ 86.80
		Case - III : Type C	sqm	₹ 114.80
M-4.15	As per Technical Specification approved by TRRDA.	25 mm thick Open-Graded Premix Carpet using Bituminous (Bitumen VG-30) Binder with organosilane nanotechnology		
		Providing, laying and rolling of open-graded premix carpet of 25 mm thickness composed of 13.2 mm to 5.6 mm aggregates using bitumen (Bitumen VG-30 mixed with 0.1% organosilane nanotechnology Zycotherm by weight of bituminous binder) to required line, grade and level to serve as wearing course on a previously prepared base, including mixing in a suitable plant, laying and rolling with a three wheel 80 - 100 kN static roller capacity, finished to required level and grades to be followed by seal coat of either Type A or Type B or Type C or Type D as per Technical Specification Clause 508		
		Case - I By Manual Means	sqm	₹ 409.50
		Case - II By Mechanical Means	sqm	₹ 388.90

**Additional
SPECIFICATION
for
Miscellaneous Items**

Additional Specification for Miscellaneous Items

Road work

M-1.1 : Sanding

M-1.1.1 Scope :

Sanding shall consist of the application of locally available sand or other graded fine material like crusher run stone dust approved by the Engineer-in-charge to areas of road where bleeding of excess bitumen is occurring.

M-1.1.2 Material :

Sand or stone dust shall generally be finer than 3.00 mm with not more than 10 per cent passing the 0.075 mm sieve and acceptable to the Engineer-in-charge.

M-1.1.3 Application :

Sand or stone dust shall be spread by manual application, to the areas of road defined by the Engineer. Sand or stone dust shall generally be applied during the hottest part of the day and when so instructed by the Engineer, surplus sand or stone dust displaced by passing traffic shall be manually swept back onto the area where further bleeding of excess bitumen is apparent. Sand or stone dust shall be applied at a nominal rate of 0.25 cum per hundred square metre.

M-1.1.4 Measurement :

Sanding work shall be measured in square metre, calculated from the dimensions taken correct to a cm.

M-1.1.5 Rate :

The rate for sanding work shall be in full for :

- i. Supplying all necessary materials required for the work of applying them.
- ii. All labour, tools, equipments and all incidentals necessary to complete the work according to the specification.

Timber Bridges

M - 2.1 **S.P.T. & Temporary Bridge :**

M-2.1.1 Supply of Sal or Nageswar pile :

Piles shall be straight as far as possible and free from defects. Main piles shall be 10 metre to 13 metre long and those for abutments should be even longer having 300 mm dia (minimum) at the top, minimum 275 mm dia at the middle and 250 mm dia at bottom after dressing but before making the shoe. Piles for the wing walls shall be 200 mm dia to 250 mm dia with 250 mm dia at top & 225 mm dia at the middle after dressing. The dias mentioned above should be after dressing.

M-2.1.2 Stacking :

The piles shall be stacked properly at the place selected by the Engineer-in-charge. The piles shall not come in contact with the soil while these are stacked before use. All precautionary measures should be taken to avoid damage of piles from white ants and other insects during the period it would be in the stack.

M-2.1.3 Dressing & marking :-

The piles should be dressed to heart wood. The piles shall be tapered gradually up to 0.75 metre from bottom of the piles for making shoes as directed by the Engineer-in-charge.

Each pile is to be marked with chisel at every metre and 1/10 of a metre from the bottom i.e. tapered end of the pile. The pile shall not be coal tarred till those are approved by the Engineer-in-charge before driving operation is started.

M-2.1.4 Measurements :

The measurements of piles shall be taken in running metres. Length shall be measured correct to a cm. Final length will be measured for payment after getting the finished length after driving as per the approved driving chart.

M-2.1.5 Rate :

The rate shall include the cost of materials carriage and labour involved in all the operations described above.

M-2.2 Coal tar :

M-2.2.1 Material :

Good quality of coal tar should be brought & the same should be got approved by the Engineer-in-charge before application.

M-2.2.2 Cleaning :

The surface of the piles and timbers shall be thoroughly brushed and cleaned free from all dust, dirt, etc. before application of the coal tar.

M-2.2.3 Application :

The coal tar shall be applied at the rate of 0.15 litre for 1st coat and 0.11 litre for 2nd coat per sqm. The 1st coat must be thoroughly dry and hard before any subsequent coat is applied. Pile / Wood / timber shall not be coal tarred until it is thoroughly dry.

M-2.2.4 Measurement :

The measurements shall be taken in Sqm. Length & width shall be measured correct to a cm. Area shall be worked out in Sqm correct to two places of decimals.

M-2.2.5 Rate :

The rate shall include the cost of materials, cartage and labour involved in all the operation described above.

M-2.3 Driving and handling of piles :

M-2.3.1 Driving and handling :

The piles for abutments, piers and trestles should be driven practically to refusal (not less than 6.00 metre below bed level) and for wing wall at least 5.00 metre (below ground level). The depth driven may be increased as per direction of the Engineer-in-charge. The refusal will mean sinking of not more than 10 mm, by the last 6 strokes with 3/4 to 1 tonne monkey from a clear drop of 1.50 metre (5 feet) on piles head. Suitable iron rings on the piles head should be provided so that during hammering operation, head of the piles are not damaged. Piles shall be driven to specified depth or to penetration point as directed by the Engineer-in-charge. Accurate record of the penetration up to the last 0.30 metre shall be kept for the guidance of the Engineer-in-charge in determining allowable loads on the piles. Where driving is interrupted before final penetration is reached, the record for penetration shall not be taken until after at least 0.30 mtr, penetration has been obtained on resumption of driving. Each pile must be able to carry load of 2 tonnes. For safe boring of the row of timber piles, driving with a drop monkey be estimated from the following formula

$$R = \frac{2 W.H.}{S + 1.00}$$

Where

R : Safe bearing power of piles in tonne with a factor of safety 6

W : Wt. of drop hammer in tons.

H : Drop of hammer in feet.

S : Average penetration of piles in inches (per blow) for the last 6 blows.

M-2.3.2 Driving cap Load and hammer :

The head of the piles shall be protected during driving with an approved cushion and helmet. Piles shall be secured against internal movement during driving by application of other suitable means. Drop hammer weighing not less than one third the weights of the piles may be used if suitable mechanical hammer is not available.

M-2.3.3 Fixing of final level of the substructure :

Final level of the substructure may be fixed / adopted to carry superstructure on it. Final level of the substructure should be selected and placed so judiciously that the wastage of piles becomes nominal as well as the jointing of piles are minimised.

M-2.3.4 Measurement :

Measurement of piles for the portion below bed level and above shall be ascertained from the driving chart as well as from the marking on the body of the piles. The measurements shall be recorded in metre and part thereof up to two places of decimals. Portion driven below bed / ground level for driving and handling may be ascertained after deducting the portion above bed / ground level from the whole length of the piles finally adopted to carry superstructure on it. .

M-2.3.5 Rate :

The rate shall include the cost of all the materials (except supply of piles, which shall be paid separately), labour, T & P etc. required for driving and handling of piles.

M-2.4 Joining of piles :

M-2.4.1 Joining :

Piles may be joined as and when necessary as per approved drawing and design and as directed by the Engineer-in-charge. No extra piece of wood for packing shall be allowed in joining. In case of half lap joint, the length of joint should not be less than 1 metre. Joining in a row of pile should be at different levels without weakening the row as a whole.

M-2.4.2 Types of joint :

Following types of joints may be adopted suitably as per the site condition.

i. Half lap joint

Jointing should be done with of piles of required dia matching the dia of the piles jointed, with 3 Nos M.S. circular clamps of made of 50 mm x 10 mm MS flat or plate of required length, 2 nos. 100 mm x 100 mm x 10 mm MS angle 1.5 m long tightened with 12 mm dia & 50 mm long bolts and nuts for circular clamp and 3 Nos. 16 mm dia bolts and nuts of required length with washers on both side of the angles complete.

Payment for the length of piles required for jointing is to be made separately.

Lapping of pile in joint should not be less than 1.0 metre in length.

ii. Butt joint

Jointing should be done with of piles of required dia matching the dia of the piles jointed , with 400 mm long 32 mm dia MS Dowel bar at centre of the pile, 4 nos. 100

mm x 100 mm x 10 mm MS angle 1.5 m long tightened with 6 x 2 Nos. 16 mm dia bolts and nuts of required length with washers on both side of the angles complete.

Payment for the length of piles required for jointing is to be made separately.

M-2.4.3 Measurements :

Measurement for each joint shall be taken in number. The fittings which are stipulated in nomenclature of the item should not be paid extra as its cost is included with the joining itself.

M-2.4.4 Rate :

Rate of joining shall include the cost of all the materials and labour involved in all the operations stated above. In case joining of piles is necessitated due to supply of piles less in length as stipulated, no extra payment for joining the piles will be entertained.

M-2.5 Supplying wooden beam, decking, collars, wheel guard etc. :

M-2.5.1 General :

The work shall be carried out as per detailed drawings or as detailed in the specification or as directed by the Engineer-in-charge. Only specified timber shall be used and it shall be sawn in the direction of the grains. Sawing shall be truly straight and square. The wood work shall be finished to the extent dimensions as shown on the drawings.

M-2.5.2 Quality of Timber :

Timber shall be the best of the kind specified and well seasoned. It shall be fairly uniform in colour, reasonably straight grained and shall be free from dead KNotes, crack shakes and Sap.

No individual hard and sound KNot shall exceed 25 mm in dia. And the aggregate area of all the KNotes shall not exceed 1% of the area of the piece. There shall not be less than 5 growth rings per 2 cm of width.

M-2.5.3 Fitting Fixing :

Fitting and fixing different members shall be as per drawing or as specified by the Engineer-in-charge. No member shall be painted, tarred or oiled until the same has been approved by the Engineer-in-charge.

M-2.5.4 Measurements:

Wood work for beams, decking, collars, wheel guards, struts, railing, bracing of beams etc. shall be measured for finished sections in cum (Cubic metre) nearest to three places of decimals, no allowance being made for wastage and for dimensions supplied beyond those specified. Length of each piece shall be measured overall nearest to a cm. In measuring cross sectional dimensions of the wood piece, tolerance up to + 3 mm shall be allowed.

M-2.5.5 Rates:

The rate include the cost of all the materials, cartage & labours involved in all the operation described above and in the nomenclature of the items.

M-2.6 Providing wooden planks :

M-2.6.1 General :

The work shall be carried out as per detailed drawings or as detailed in the specification or as directed by the Engineer-in-charge. Only specified timber shall be used and it shall be sawn in the direction of the grains. Sawing shall be truly straight and square. The wood

work shall be finished to the extent dimensions as shown on the drawings.

M-2.6.2 Quality:

Timber shall be the best of the kind specified and well seasoned. It shall be fairly uniform in colour, reasonably straight grained and shall be free from dead KNotes, crack shakes and Sap.

No individual hard and sound KNot shall exceed 25 mm in dia. And the aggregate area of all the KNotes shall not exceed 1% of the area of the piece. There shall not be less than 5 growth rings per 2 cm of width.

M-2.6.3 Fitting Fixing :

Fitting and fixing difference members shall be as per drawing or as specified by the Engineer-in-charge. No member shall be painted, tarred or oiled until the same has been approved by the Engineer-in-charge.

M-2.6.4 Measurement :

The measurements shall be taken in sqm. Length & width shall be measured correct to a cm. Area shall be worked out in Sqm. Correct to the two places of decimal.

M-2.6.5 Rate :

The rate shall include the cost of all the materials cartage and labour involved in all the operation mentioned above.

M-2.7 Placing R.S. Joists :

M-2.7.1 General :

The work shall be carried out as per detailed drawings or as detailed in the specification or as directed by the Engineer-in-charge.

M-2.7.2 Fitting & Fixing :

R.S. Joists should be placed in position after necessary cutting (if required) , making holes, fitting with 3 Nos. of MS hooks of 16 mm dia on both side of the joists with each beam, applying priming two coats of red lead paint.

R.S. Joists may also be painted with suitable paint for which extra payment may be made with suitable items available in other chapters.

M-2.7.3 Measurement :

The measurements shall be taken in tonne. Length shall be measured correct to a cm. Total weight shall be worked out by multiplying the length with standard weight per metre of the R.S. Joist as per instruction of the Engineer-in-charge. Total weight shall be worked out correct to the three places of decimal.

M-2.7.4 Rate :

The rate shall include the cost of all the materials, (except the cost of R.S. Joists if issued from the departmental store) cartage and labour involved in all the operation mentioned above.

M-2.8 M.S. Bolts & nuts :

M-2.8.1 Providing & fitting :

The bolts and nuts shall be of best quality. These shall be supplied as per the actual lengths required for the works with necessary washers. The bolts and nuts shall be fitted tightly as per design and as directed by the Engineer-in-charge.

- M-2.8.2 Measurements :
- Measurements of bolts and nuts shall be taken in Nos. & then converted to the kilogram up to two places decimals. The conversion shall have to be made as per standard weight or as per actual whichever is lesser, so as to reach to the quantity for payment.
- M-2.8.3 Rate :
- The rate shall include the cost of supply of materials, labour and cartage involved for the work.
- M-2.9 Dismantling existing numbers:-
- M-2.9.1 Dismantling :
- The existing members of the S.P.T. bridges considered for re-placement of or renewal shall be taken out very carefully. All serviceable dismantled materials are to be reused in the SPT bridge.
- The unserviceable materials, which can only be used as firewood, may taken by the contractor, for which suitable recovery may be made from the contractor's bill at the rate as specified in the agreement. The contractor will be held responsible for the theft/ loss/ misuse of any dismantled materials.
- M-2.9.2 Measurement :
- The measurements of the dismantled materials shall be in cum nearest to three place of decimals.
- M-2.9.2 Rate :
- The rate shall include the cost of all the operation, labour small T.& P. etc. required for the work.
- M-2.10 3rd class local wood piles :
- M-2.10.1 General :
- 3rd class local wood piles should be used in purely temporary and small bridges.
- M-2.10.2 Supply :
- Supply of these piles mainly shall be for construction of temporary bridge. Piles shall be straight as far as possible and free from all defects. Length of piles shall be as directed by the Engineer-in-charge. Size of pile will be :
- i. 300 mm to 350 mm dia
 - ii. 250 mm to 300 mm dia
 - iii. 200 mm to 250 mm dia
- The minimum diameter of piles at the middle shall be 325 mm, 275 mm, 225 mm respectively. The piles are to be dressed to heart wood properly. The diameter stated should be after dressing. The piles shall be tapered gradually up to 0.75 metre from the bottom of the pile as directed by the Engineer-in-charge.
- The piles of 300 mm to 350 mm dia may also be used as beam and long beam after dressing and sizing properly as per direction of the Engineer-in-charge.
- M-2.10.3 Stacking :
- The piles shall be stacked properly at the place selected by the Engineer-in-charge. The piles shall not come in contact with the soil while these are stacked before use. All precautionary measures should be taken to avoid damage of piles from white ants and other insects during the period it would be in the stack.

M-2.10.4 Dressing & marking :-

The piles should be dressed to heart wood. The piles shall be tapered gradually up to 0.75 metre from bottom of the piles for making shoes as directed by the Engineer-in-charge. Each pile is to be marked with chisel at every metre and 1/10 of a metre from the bottom i.e. tapered end of the pile. The pile shall not be coal tarred till those are approved by the Engineer-in-charge before driving operation is started.

M-2.10.5 Measurements :

The measurements of piles shall be taken in running metres. Length shall be measured correct to a cm. Final length will be measured for payment after getting the finished length after driving as per the approved driving chart.

M-2.10.6 Rate :

The rate shall include the cost of materials carriage and labour involved in all the operations described above.

M-2.11 Driving & handling of 3rd class local wood piles :

M-2.11.1 Driving and handling :

The piles for abutments, piers and trestles should be driven practically to refusal. The depth driven may be increased as per direction of the Engineer-in-charge. The refusal will mean sinking of not more than 12 mm, by the last 6 strokes with 3/4 to 1 ton monkey from a clear drop of 1.50 metre (5 feet) on piles head. Suitable iron rings on the piles head should be provided so that during hammering operation, head of the piles are not damaged. Piles shall be driven to specified depth or to penetration point as directed by the Engineer-in-charge. Accurate record of the penetration up to the last 0.30 metre shall be kept for the guidance of the Engineer-in-charge in determining allowable loads on the piles. Where driving is interrupted before final penetration is reached, the record for penetration shall not be taken until after at least 0.30 mtr , penetration has been obtained on resumption of driving.

M-2.11.2 Measurement :

Measurement of piles for the portion below bed level and above shall be ascertained from the driving chart as well as from the marking on the body of the piles. The measurements shall be recorded in metre and part thereof up to two places of decimals. Portion driven below bed/ ground level for driving and handling may be ascertained after deducting the portion above bed/ ground level from the whole length of the piles finally adopted to carry superstructure on it.

M-2.11.3 Rate :

The rate shall include the cost of all the materials (except supply of piles, which shall be paid separately), labour, T & P etc. required for driving and handling of piles.

River Training Works

M-3.1 1st class Bamboo in post/ pile :

M-3.1.1 Supply of 1st class Bamboo :

1st class Bamboo (Barak or like) shall be well matured. It should be 85 mm dia to 100 mm dia and of required length. Bamboo shall be free from any defects such as cracks, KNotes etc. It should be of uniform shape. The bamboo shall be properly dressed, cleaned & free from nodes etc.

i. Bamboo for post/ pile :

The bamboos to be used for pile shall be cut to required length as per drawing and as per direction of the Engineer-in-charge and the end tapered up to 300 mm from the bottom of bamboo, for making shoe as per direction of the Engineer-in-charge.

ii. Bamboo for runners, bracing, struts etc. :

The bamboos to be used for runners, bracing, etc. shall not cut into pieces and kept as a whole as far as possible and fitted to the piles with nails / spikes of required size and length and binding with 2.0 mm GI wire.

However the bamboos to be used for struts etc. shall be cut to required length as per drawing and as per direction of the Engineer-in-charge and fitted to the piles with nails / spikes of required size and length and binding with 2.0 mm GI wire.

M-3.1.2 Measurements :

The measurements of bamboo shall be taken in running metre. Length shall be measured correct to a cm.

M-3.1.3 Rates :

The rate shall include the cost of materials, cartage and labours involved in all the operations described above.

M-3.2 Driving of bamboo piles :

M-3.2.1 Driving :-

Each bamboo post for driving shall be marked at every metre and $1/4^{\text{th}}$ of a metre from the tapered end by coal tar or any other paint as specified by the Engineer-in-charge. Marking of bamboos in metre and $1/4^{\text{th}}$ of a metre shall have to be approved by the Engineer-in-charge before the driving operation is started.

The bamboo shall be driven to the required depth below ground level with heavy hammer or monkey as directed by the Engineer-in-charge.

M-3.2.2 Measurements :

Measurement shall be taken in running metres as obtained from the approved driving chart correct to a cm.

M-3.2.3 Rates :

The rate shall include the cost of all the operations described above.

M-3.3 Brush wood :

M-3.3.1 Material :

The brush wood shall be of Tetul, sheora, mandar etc. of approved quality. The brush wood shall be bundled properly with G.I. wire 2.0 mm before placing the same in position. The dia. of each bundle should be 300 mm to 350 mm.

M-3.3.2 Filling :

Bundles of Brush wood should be placed in layers. Each layer shall be well packed before the next layer is placed to ensure its proper compaction. Proper arrangements shall have to be made to resist the brush wood from floating away due to rise of water level at site.

M-3.3.3 Measurement :

Brush wood shall be measured in cum (cubic metre) up to two places of decimals. No deduction shall be made for voids.

- M-3.3.4 Rate :
- The rate shall include the cost of materials, cartage and labour involved in all the operations described above.
- M-3.4 Double layer split bamboo tatti-lining:-
- M-3.4.1 General :
- The muli bamboo shall be well matured. It shall be free from all defects. The preparations of tarja for lining shall be as per direction of the Engineer-in-charge. It shall be woven diagonally and compactly. Split bamboo battens shall have to be provided on both sides at 450 mm centre to centre and properly tightened with G.I. Wire 1.0 mm.
- M-3.4.2 Measurements :
- The measurements shall be taken in sqm. Length and breadth shall be measured correct to a cm & area shall be worked out in sqm. Correct to the two places of decimals.
- M-3.4.2 Rates :
- The rate shall include the cost of the materials, cartage and labour involved in all the operation mentioned above.
- M-3.5 Wooden bally :
- M-3.5.1 Supplying and fitting fixing wooden bally 100 mm dia :
- The ballies shall be straight as far as possible and free from all sorts of defects. Length of the ballies shall be as per requirement or as specified by the Engineer-in-charge. The average diameter shall not be less than 100 mm (at middle) after dressing to heart wood.
- The ballies for posts / piles shall be tapered up to 0.50 metre from the bottom of the piles as directed by the Engineer-in-charge.
- Fitting fixing of ballies as different members shall be done with nails and 2.0 mm GI wire.
- M-3.5.2 Dressing & marking :
- Each bally for post/ pile is to be marked at every metre and 1/10th of a metre from the tapered end. Post / Piles shall not be coal tarred till those are approved by the Engineer-in-charge.
- M-3.5.2 Measurements :
- The measurements of the ballies shall be taken in running metre. Length shall be measured correct to a cm.
- M-3.5.3 Rate :
- The rate shall include the cost of materials, cartage, and labours required for all the operations stated above. The cost of supply of nails and spikes has also been included.
- M-3.6 Driving of ballies :
- M-3.6.1 Driving :
- Each
- M-3.6.2 The bally shall be driven to the required depth below ground level with heavy hammer or monkey as directed by the Engineer-in-charge.

- M-3.6.3 Measurements :
- The measurements of the ballies shall be taken in running metre. Length shall be measured correct to a cm.
- M-3.6.4 Rate :
- The rate shall include the cost of all the materials (except supply of ballies which shall be paid separately) labour, T & P etc. required for driving and handling of ballies.
- M-3.7 Gunny/ polythene bags filled with sand :
- M-3.7.1 Material and placing in position :
- The gunny/ polythene bags shall be filled up with sand of minimum quantity of 0.034 cum, properly and the bags shall be tied properly with coir rope or G.I. wire as directed. The gunny bags should be laid properly as directed by the Engineer-in-charge. While placing gunny bags proper care shall be taken to avoid damage of bags.
- M-3.7.2 Measurements :
- Measurement shall be taken in number.
- M-3.7.3 Rate :
- Rate includes the cost of all the materials, cartage and labour involved in all the operations described in the item of works. The cost of gunny bags and sand are also included in the rate.
- M-3.8 Providing and fixing bitumen or tar drum guard posts :
- M-3.8.1 Material and placing in position :
- The empty bitumen or tar drum is to be collected in good condition without any major damages.
- The empty bitumen or tar drum should be painted with two coats of white synthetic enamel paint over a primer coat in the exposed outside surface above Ground level and applying two coats of coal tar on the outside surface below ground level including bottom.
- After the painting/ coal tarring dries up the same may placed in position in the excavated portion with minimum depth of 450 mm and then filled with earth available from excavation and available nearby.
- The sides of the guard posts are also to be properly filled with earth and duly compacted.
- M-3.8.2 Measurements :
- Measurement shall be taken in number.
- M-3.8.3 Rate :
- Rate includes the cost of all the materials, cartage and labour involved in all the operations described in the item of works. The cost of empty bitumen or tar drum is also included in the rate.

**Selected Tables from
Specifications For Rural Road
(First revision), 2014**

SECTION 300, EARTH WORK

Table 300.1 Minimum Density Requirements for Suitability of Embankment Materials

S.No.	Type of Work	Maximum Laboratory Dry Unit Weight, Tested as per IS:2720 (Part 7)
1)	Embankments not subject to flooding:	Not less than 14.4kN/m ³
2)	Embankments subject to flooding or exceeding 3 m height	Not less than 15.2kN/m ³

SECTION 300, EARTH WORK

Table 300.2 Compaction Requirements for Embankment

Type of Work/Material	Relative Compaction Percentage of Maximum Laboratory Dry Density Obtained by Standard Proctor Test as per IS:2720 (Part 7)
Embankment	Not less than 98%
Expansive Clays	90% - 95%

SECTION 400, GRANULAR SUB-BASES, BASES & SURFACINGS

Table 400.1-A Grading for Granular Sub-base Materials

IS Sieve Size	Percent by Weight Passing the IS Sieve		
	Grading I	Grading II	Grading III
75.0 mm	100	–	–
53.0 mm	–	100	–
26.5 mm	55-75	50-80	100
9.50 mm	–	–	–
4.75 mm	10-30	15-35	25-45
2.36 mm	–	–	–
0.425 mm	–	–	–
0.075 mm*	<15	<15	<15

* On clayey subgrades where otherwise drainage condition are encountered, the percent passing IS Sieve 0.075 mm shall not exceed 5

SECTION 400, GRANULAR SUB-BASES, BASES & SURFACINGS

Table 400.7 Physical Requirements of Coarse Aggregates for Water Bound Macadam for Sub-base/Base/Surfacing Courses

Table 400.2-A Grading Requirements for Sub-Base/Base Course

Sieve Size	Percent by Mass Passing IS Sieve Grading Designation		
	A	B	C
53 mm	100		
37.5 mm	97-100	100	
26.5 mm		97-100	100
19 mm	67-81		97-100
9.5 mm		56-70	67-79
4.75 mm	33-47	39-53	47-59
425 µm	10-19	12-21	12-21
75 µm	4-15	4-15	4-15

Table 400.2-B Grading Requirements for Soil-Aggregate Mixtures for Sub-Base/Base

Sieve Size	Percent by Mass Passing IS Sieve Grading Designation Nominal Maximum Size		
	80 mm	40mm	20mm
80 mm	100		
40 mm	80-100	100	
20 mm	60-80	80-100	100
10 mm	45-65	55-80	80-100
4.75 mm	30-50	40-60	50-75
2.36mm	-	30-50	35-60
600 µm	10-30	15-30	15-35
75 µm	5-15	5-15	5-15

Note: Less than 10% should be retained between each pair of successive sieves specified for use except for the pair comprising the first two sieves

SECTION 400, GRANULAR SUB-BASES, BASES & SURFACINGS

405.2.2 Aggregates, like, brick bats, kankar, laterite, etc. which get softened in presence of water shall be tested for Aggregate Impact Value under wet conditions in accordance with IS:5640.

Table 400.7 Physical Requirements of Coarse Aggregates for Water Bound Macadam for Sub-base/Base/Surfacing Courses

Test	Sub-base	Base	Surfacing
Aggregate Impact Value (IS:2386 Part 4 or IS:5640)	Less than 50	Less than 40	Less than 30
Flakiness Index (IS:2386 Part 1)	Less than 30	Less than 25	Less than 20
Soundness Test (IS:2386 Part 1)			
– Loss with Sodium Sulphate	Less than 12%	Less than 12%	Less than 12%
– Loss with Magnesium Sulphate	Less than 18%	Less than 18%	Less than 18%

405.2.3 The requirement of flakiness Index shall be enforced only in the case of crushed or broken stone and crushed slag.

SECTION 400, GRANULAR SUB-BASES, BASES & SURFACINGS

405.2.7 *Grading requirement of coarse aggregates*

The coarse aggregates shall conform to one of the Gradings given in **Table 400.8** as specified. The use of Grading No.1 shall be restricted to sub-base courses only.

Table 400.8 Grading Requirements of Coarse Aggregates*

Grading Designation	Size Range	IS Sieve No.	Passing Percent by Weight
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	
2)	63 mm to 45 mm	75 mm	100
	63 mm	90-100	
	53 mm	25-75	
	45 mm	0-15	
	22.4 mm	0-5	
3)	53 mm to 22.4 mm	63 mm	100
	53 mm	95-100	
	45 mm	65-90	
	22.4 mm	0-10	
	11.2 mm	0-5	

- * (i) The gradings for the aggregate are to be met with before using them for WBM construction. After rolling and compaction of WBM layer, the grading may vary from the specified values.
- (ii) Engineer may allow ± 5 percent variation from the specified upper and lower limits excluding the first and the last sieve in the gradings.

SECTION 400, GRANULAR SUB-BASES, BASES & SURFACINGS

Table 400.9 Grading for Screenings

Grading Classification	Size of Screenings	IS Sieve Designation	Percent by Weight Passing the IS Sieve
A	13.2 mm	13.2 mm	100
		11.2 mm	95-100
		5.6 mm	15-35
		180 micron	0-10
B	11.2 mm	11.2 mm	100
		9.5 mm	80-100
		5.6mm	50-70
		180 micron	15-35

The use of screenings shall be omitted in the case of soft aggregates, such as, brick metal, kankar, laterite, etc. as they are likely to get crushed to a certain extent under rollers.

Table 400.10 Approximate Quantities of Coarse Aggregates and Screenings Required for 100/75mm Compacted Thickness of Water Bound Macadam (WBM) Sub-base/Base/surfacing Course for 10 m² Area

Classification	Size Range	Compacted Thickness	Stone Screenings *			Crushable Screenings	
			Loose Quantity	Grading Classification & Size	For WBM Sub-base/Base Course (Loose Quantity)	such as moorum/gravel	
						Properties	Loose Quantity
	m ²	mm	m ³			m ³	m ³
Grading 1	90 to 45	100	1.21 to 1.43	Type A 13.2	0.27 to 0.30	LL<20; PI<6 Percent 0.075 passing mm <10	0.30 to 0.32
Grading 2	63 to 45	75	0.91 to 1.07	Type A 13.2	0.12 to 0.15	-do-	0.22 to 0.24
Grading 2	63 to 45	75	0.91 to 1.07	Type B 11.2	0.20 to 0.22	-do-	-do-
Grading 3	53 to 22.4	75	0.91 to 1.07	Type B 11.2	0.18 to 0.21	-do-	-do-

*Quantity of stone screenings for surfacing course will be about 80% of the quantity for sub-base/base course.

SECTION 500, BITUMINOUS SURFACING COURSES

Table 500.3 Physical Requirements for Aggregates for Bituminous Macadam

Property	Test	Specification
Cleanliness	Grain size analysis Max. 5% passing 75 micron sieve	
Particle shape	Flakiness Index ¹	Max. 25 percent
Strength	Aggregate Impact Value ²	Max. 30 percent
Durability	Soundness ³	
	Sodium Sulphate	Max. 12 percent
	Magnesium Sulphate	Max. 18 percent
Water Absorption	Water absorption ⁴	Max. 2 percent
Stripping	Coating and stripping of bitumen aggregate mixtures ⁵	Min. retained coating 95 percent

- Notes :** 1) IS:2386 Part 1 4) IS:2386 Part 3
 2) IS:2386 Part 4* 5) IS:6241
 3) IS:2386 Part 5

SECTION 500, BITUMINOUS SURFACING COURSES

Table 500.4 Composition of Bituminous Macadam

IS Sieve (mm)	Cumulative Percent Passing by Weight of Total Aggregate
26.5	100
19	90-100
13.2	56-88
4.75	16-36
2.36	4-19
0.3	2-10
0.075	0-5
*Bitumen content, percent by weight of total mixture	3.3-3.5
Bitumen Viscosity Grade	VG-10 to VG-30

* For conditions in cooler areas of India bitumen contents may be upto 0.5 percent higher, subject to the approval of the Engineer.

SECTION 500, BITUMINOUS SURFACING COURSES

Table 500.5 Mixing, Laying and Rolling Temperatures for Bituminous Mixes

(Degree Celcius)

Bitumen Viscosity Grade	Bitumen Temperature	Aggregate Temperature	Mixed Material Temperature	Laying Temperature	Rolling Temperature*
VG-40	160-170	160-175	160-170	150 Min	100 Min
VG-30	150-165	150-170	150-165	140 Min	90 Min
VG-20	145-165	145-170	145-165	135 Min	85 Min
VG-10	140-160	140-165	140-160	130 Min	80 Min

* Rolling must be completed before the mat cools to these minimum temperature

SECTION 500, BITUMINOUS SURFACING COURSES

Table 500.6 Grading Requirements for Aggregates Used for Surface Dressing

IS Sieve Designation (mm)	Cumulative Percent by Weight of Total Aggregates Passing for the Following Nominal Sizes (mm)			
	19	13	10	6
26.5	100	501	502	503
19	85-100	100	504	505
13	0-40	85-100	100	506
9.5	0-7	0-40	85-100	100
6.3	507	0-7	0-35	85-100
4.75	508	509	0-10	510
3.35	511	512	513	0-35
2.36	0-2	0-2	0-2	0-10
0.60	514	515	516	0-2
0.075	0-1.5	0-1.5	0-1.5	0-1.5
Minimum 65% by weight of aggregate	Passing 19 and retained on 13.2	Passing 13.2 and retained on 9.5	Passing 9.5 and retained on 6.3	Passing 6.3 and retained on 3.35

SECTION 500, BITUMINOUS SURFACING COURSES

Table 500.9 Quantities of Materials Required for 10 m² of Road Surface for 20 mm Thick Premix Carpet

Aggregate		Quantity
a)	Nominal Stone size 13.2 mm (passing 22.4 mm sieve and retained on 11.2 mm sieve)	0.18 m ³
b)	Nominal Stone size 11.2 mm (passing 13.2 mm sieve and retained on 5.6 mm sieve)	0.09 m ³
Total		0.27 m³

Binder		
a)	For 0.18 m ³ of 13.2 mm nominal size stone at 52 kg bitumen per m ³	9.4 kg
b)	For 0.09 m ³ of 11.2 mm nominal size stone at 56 kg bitumen per m ³	5.2 kg
Total		14.6 kg