National Highways & Infrastructure Development Corporation Limited
(Ministry of Road Transport & Highway)
Government of India

SPECIALISED CONSULTANCY SERVICES FOR 'GOOD FOR TENDER' DESIGN BASED ON DETAILED SURVEY, INVESTIGATIONS, ESTIMATION, COSTING AND PREPARATION OF TECHNICAL SCHEDULES OF EPC DOCUMENTS FOR CONSTRUCTION OF 1200 METRE. LONG NEW 4-LANE BRIDGE WITH APPROACHES AND RIVER TRAINING WORKS OVER RIVER JIA BHARALI IN THE STATE OF ASSAM

VOLUME-III-ANNEXURE-H-COST ESTIMATE
DECEMBER 2016

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VOLUME-III-COST ESTIMATE

Annexure -H:	Cost Estimate

GENERAL ABSTRACT OF COST

Name of Work-4-Construction of 1200 Meter long new 4-Lane Bridge with approaches, starting from km 17.300 of Dolabari Road Junction on NH-37A to km 182.000 of Jamagurihat Road Junction on NH-52(new NH 15) over River Jia Bharali and River Training Works in Sonitpur District in the State of Assam, for 4-Lane Capital Connectivity to Itanagar in Arunachal Pradesh under SARDP-NE, Phase A on EPC basis

ABSTRACT OF COST

Bill No.	Description of Items	Amount(Rs.)
1	SITE CLEARANCE & DISMANTLING	4646961
2	EARTHWORK	513002996
3	BASE AND SUBBASE COURSES	595113786
4	BITUMINOUS COURSES	643092029
5	DRAINAGE AND CULVERT WORKS	373343678
6	SAFETY WORKS: TRAFFIC ISLAND,TRAFFIC SIGNS,MARKINGS AND ROAD APPURTENANCES	52162287
7	MISCELLANEOUS	19217636
8	BRIDGES AND STRUCTURES	
8.1	Jia Bharali Bridge	1811031076
	RIVER TRAINING/PROTECTION WORKS	
8.2	Guide Bund, Embankment and Channel Closing Dyke	3316769312
8.3	Morabharali Bridge	261854926.6
8.4	Flyover(2 nos)	491719020.8
8.5	Minor Bridge(3 nos)	143429620.1
	TOTAL ESTIMATED COST(AS PER SOR 2013-2014) (A)	**8225383329**
9	Add Escalation @ 15% on(A)	1233807499
	TOTAL (B)	**9459190828**
10	Add Maintenance Cost @ 5% on (B)	472959541
11	Add Escalation during construction @ 12.5 % for 3.5 years on(B)	1182398854
12	Add Contingency @ 2.8% on (B)	264857343
	TOTAL (C)	**11379406566**
13	Add Construction Supervision Charge @ 3% on (C)	341382197
14	Add Administrative/Agency Charges @ 3% on (C)	341382197
15	Add Quality control @ 0.25% on (C)	284485164
16	Add Road Safety Audit Charges 0.25% on (C)	284485164
17	Add Environmental Impact Assessment,LA and others	0
	TOTAL PROJECT COST(TPC)	**12631141289**
	Say(in Rs.Crores)	**1263.11**

(Rupees One thousand two hundred sixty three crores eleven lakhs)only

DETAILS OF MEASUREMENT

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Bill No. 1 : SITE CLEARANCE				
1.1	**2.3(II)A / 201**	**Clearing and Grubbing Road Land :** Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable materials to beused or auctioned up to lead of 1000metres including removal and disposal of top organic soil not exceeding 150mm thickness.				
		(II) By Mechanical Means : Rate as per SOR				
		A. In area of light jungle				
		Qty. - 18810 x 60 / 10000 = 112.86 Hct.	hectare	112.860	39722.00	4483025.000
1.2	**2.1 / 201**	**Cutting of Trees, including Cutting of Trunks, Branches and Removal:** Cutting of trees, including cutting of trunks, branches and removal of stumps, roots, stacking of serviceable material with all lifts and up to a lead of 1000 mtrs and earth filling in the depression/pit.				
		(i) Girth from 300 mm to 600 mm	Each	32.000	140.00	4480.000
		(ii) Girth from 600 mm to 900 mm	Each	23.000	272.00	6256.000
		(iii) Girth from 900 mm to 1800 mm	Each	18.000	498.00	8964.000
		(iv) Girth above 1800 mm	Each	9.000	918.00	8262.000
		Qty. - refer MEA : Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
1.3	2.4(B) / 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 wherever necessary, sorting the dismantled material,disposal of unserviceable material and stacking the serviceable material with all lift and lead of 1000 metres				
		a) Concrete / Reinforced concrete / Prestressed concrete structures including clearing, straghtening & cutting bars and separating them out from RCC / PCC				
		i) M 10 & M 15	cum	27.000	356.00	9612.000
		ii) M 20 Grade and above	cum	9.000	573.00	5157.000
	2.10(B) / 202	**b) Ordinary km. stone including foundation concrete if any**	No.	5.000	125.00	625.000
		c) Pipes				
		i) Upto 600mm dia.				
		ii) 900mm dia. And above	m	30.000	206.00	6180.000
		Qty. - refer MEA : Rate as per SOR				
1.4	2.5(II)(a)/202	**Dismantling of Flexible Pavements :** Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately				
		(II) By Mechanical Means : Rate as per SOR				
		a) Bituminus course	cum	550.000	208.00	114400.000
		Total Cost of SITE CLEARANCE (Rs.) =				**4646961.000**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Bill No. 2 : EARTH WORK				
2.1	**3.6 / 301**	**Excavation in Soil using Hydraulic Excavator CK 90 and Tippers with disposal upto 1000 metres :** Excavation for roadwork in soil with hydraulic excavator of0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes,in accordance with requirements of lines, grades and cross sections,loading and disposal of cut road with in all lifts and leads upto 1000 metres	Cum	6743.000	51.00	343893.000
		Qty. - Refer Appendix E.5/MEA; Rate as per SOR				
2.2	**3.11/301**	**Removal of Unserviceable Soil with Disposal upto 1000 metres :** Removal of unserviceable soil including excavation, loading and disposal upto 1000 metres lead but excluding replacement by suitable soil which shall be paid separately as per clause 305.	Cum	78511.500	52.00	4082598.000
		Qty. - 17447 x 0.15 x 30 = 52341 cum ; Rate as per SOR				
2.3	**3.10 / 301**	**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 in all lifts and lead upto 1000 metres, trimming of bottom and side slopes in accordance with requirements of lines, grades and cross sections.	Cum	15702.3	58.00	910733.400
		Qty. - Refer Appendix E.5/MEA; Rate as per SOR				
2.4	**3.17 / 305**	**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	Cum	4720.100	99.00	467290.000
		Qty. - 70% of cut quantity				
2.5	**3.16 / 305**	**Embankment Construction with Material Obtained from Borrow Pits:** Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.)(Including cost of testing of materials at site and laboratory as directed by the deptt.	Cum	1840202.200	216.48	398366972.000
		a) From Private Land				
		Qty. - Refer Appendix E.5; Rate - Appendix C2				
2.6	**3.18 / 305**	**Construction of Subgrade and Earthen Shoulders:** Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)	Cum	350576.532	251.92	88317240.000
		a) From Private Land				
		Qty. - Refer Appendix E.5; Rate - Appendix C3				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
2.7	3.19(I)/305.34	**Compacting Original Ground :** 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 table 300-2 for subgrade construction.)	Cum	40742.460	63.00	2566775.000
		Qty. - Refer Appendix E.5; Rate as per SOR				
2.8	3.19(II)/305.34	**Compacting Original Ground**: 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 Table 300-2 for embankment construction.	Cum	13915.638	33.00	459216.000
		Qty. - Refer Appendix E.5; Rate as per SOR				
2.9	3.22 / 309	**Turfing :** Furnishing and laying of the live sods of perennial turf forming grass on embankment slope, verges or other locations as directed by the engineer including preparation of ground, fetching of rods and watering	Sqm.	244258.000	27.00	6594966.000
		Qty. - Refer MEA; Rate as per SOR				
2.10	3.16/305	**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 from drain and foundation of other structures, spread, graded and compacted as per cl.407.0	Cum	27479.025	216.48	5948659.000
		Qty. - 17447 x 4.5 x0.35 = 27479.025 cum				
2.11	3.18/305	**Construction of Medan and Island with Soil Taken from Borrow areas:** Construction of Median and Island above road level with approved material brought from borrow pits, spread, slope and compacted as per cl.407.0	Cum	19627.875	251.92	4944654.000
		Qty. - 17447 x 4.5 x0.25 = 19627.875 cum				
		Total Cost of EARTH WORK (Rs.) =				**513002996.400**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 3 : BASE AND SUB-BASE COURSE						
3.1	**7.6(A)/700**	**Sub Grade Stabilisation:** Providing and laying one layer of Non-Woven geotextile of minimum mass per unit area of 280gms/sqm.having minimum roll width of 5.0m treated with carbon black with physical properties as given in clause no 702.2.3. over 25mm thick compacted sand layer on a prepared subgrade as a filter media with necessary overlaps as per drawing and technical specification and as directed by the Engineer in charge complete.	Sqm.	55830.400	156.00	8709542.000
		Qty. - Refer MEA; Rate as per SOR				
3.2	**7.6(C)/700**	**Sub Grade Stabilisation:** Providing and laying one layer of Biaxial P.V.C.Knitted coated polyster Geogrid of unit roll width of 5.0m having minimum tensile strength of 40KN/m in both direction at a maximum elongation of 15% in th direction of the length of the roll and satisfying all requirements of IS Code/BIS code of practice and tests prescribed in ASTM or British standards or ISO on prepared subgrade as a seperator cum reinforceing agent with necessary overlaps as per drawing and technical specification and as directed by the Executive Engineer in charge complete.	Sqm.	55830.400	226.00	12617670.400
		Qty. - Refer MEA; Rate as per SOR				
3.3	**4.2 / 401**	**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 cl. 401(with an initial lead of 5 Km).(Including cost of testing of materials at site and laboratory as directed by the department) (i) For grading - I material	Cum	133856.950	2428.50	325071603.000
		Qty. - Refer MEA; Rate - Appendix C.4				
3.4	**4.12 / 406**	**Wet Mix Macadam:** Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam(WMM) 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 in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant	Cum	101454.200	2451.50	248714971.000
		Qty. - Refer MEA; Rate - Appendix C.5				
		Total Cost of BASE and SUB BASE COURSES (Rs.) =				**595113786.400**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 4 : BITUMINOUS COURSES						
4.1	**5.1/502**	**Prime coat:** Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means.(Including cost of testing of materials at site and laboratory as directed by the deptt).				
		A.Primer @0.60kg per sq.km				
		(ii) With bitumen emulsion-CSS-1 (IS-8887-2004)				
		Qty. - 17447 x 11 sqm.	Sqm.	191917.000	46.00	8828182.00
		For Service Road,Qty. - Refer Appendix 5.1	Sqm.	55000.000	46.00	2530000.00
		Junction(4 nos.), Qty. refer MEA	Sqm.	7425.000	46.00	341550.00
		Qty. - Refer MEA; Rate as per SOR	Sqm.	2300.000	46.00	105800.00
4.2	**5.2/502**	**Track coat:** Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous/granular surface cleaned with mechanical broom.(Including cost of testing of materials at site and laboratory as directed by the deptt).				
		(I)With Bitumen emulsion CSS-1h				
		© Granular surfaces treated with primer				
		Qty.- 17447x18x2 = 628092	Sqm.	628092.000	15.00	9421380.00
		(a) Normal bituminous surface				
		Qty.- 17447x18x2 = 628092	Sqm.	628092.000	12.00	7537104.00
		©Granular surfaces treated with primer				
		For Service Road,Qty. - Refer Appendix 5.1	Sqm.	110000.000	15.00	1650000.00
		(a) Normal bituminous surface				
		For Service Road,Qty. - Refer Appendix 5.1	Sqm.	110000.000	12.00	1320000.00
		For Junction, Refer MEA	Sqm.	7425.000	12.00	89100.00
		Cross Road (10 nos.), Qty. Refer MEA	Sqm.	2300.000	12.00	27600.00
		Traffic management,Qty. - Refer MEA; Rate as per SOR	Sqm.	23989.625	12.00	287875.50

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
4.3	**5.6 / 507**	**Dense Graded Bituminous Macadam:** Providing and laying dense 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% by weight of total mix and filler transporting the hot miox to work site,laying with a hydrostatic paver finisher with sensor control to the reqd. grade, level and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 507. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		C. With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		(II)'with Polymer modified bitumen 70				
		(ii) for Grading II(19 mm nominal size)				
		Qty. - Refer MEA; Rate - Appendix C.4	Cum	34631.450	10318.00	357327301.10
4.4	**App.C / 26**	**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 80 - 100 penetration, 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 surfaces with pneumatic roller to maximise paving fabrics contact with pavement surfaces. Rate as per SOR	Sqm.	306852.000	171.60	52655803.20
		Qty. = vol of main carriagewy BC/0.04, Refer MEA; Rate - Appendix C - 26				
4.5	**5.8 / 509**	**Bituminous Concrete:** Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, level and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(C) With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		(b)'with Polymer modified bitumen 70				
		(ii)for Grading-II(13 mm nominal size)				
		Qty. - Refer Appendix E.5, Rate - Appendix C.5	Cum	15074.090	12788.50	192774999.97

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
4.6	5.8(C)(II)(ii)/509	**Bituminous Concrete:** Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6% of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(c) With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		(b)'with Polymer modified bitumen 70				
		(ii) for Grading II(13 mm nominal size)				
		Qty. - Refer MEA, Rate - Appendix C.5	Cum	599.741	12788.50	7669783.05
4.7	5.10(B)(I) / 511	**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 penetration grade bitumen to required line, grade and level to serve as wearingcoarse on a previously prepared base, including mixing in a suitable plant laying and rolling with a smooth wheeled roller 8-10 T capacity to the reqd. level and grade. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		B. With anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		(i)Mechanical method using Penetration grade Bitumen (60/70 or VG-30 Grade)and HMP of appropriate capacity not less than 75 tonnes / hour .				
		Qty. - Refer MEA, Rate - Appendix C.5	Sqm.	2300.000	168.50	387550.00
4.8	5.12(b)(ii)/513	**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 and B seal coats) (including carriage up to initial lead of 5.0 km from quarry)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(b) With anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		Case - II : Type B (Providing and laying of premix seal coat with HMP of appropriate capacity not less than 75 tonnes/ hours using crushed stone chipping 6.7 mm size and penetration bitumen of 60/70 or VG-30 grade.)(including carriage up to initial lead of 5.0 km from quarry)				
		Qty. - Refer MEA, Rate - Appendix C.5	Sqm.	2300.000	60.00	138000.00
					Total Cost of BITUMINOUS COURSES(Rs.):	643092029

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 5 : DRAINAGE & PROTECTIVE WORKS						
	BOX CULVERTS					
5.1	**12.1 (I)(B)(b)(i) / 304**	**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 and backfilling with approved material.				
		(I)Ordinary soil				
		(B) Mechanical Means				
		(b) With dewatering				
		(i)Depth upto 3 m				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	15167.56	54.00	819048.46
5.2	**13.5(P)(B) / 1500,1700 & 2200**	**Plain/Reinforced cement concrete**, in sub structure complete as per drawing and technical specification and steel shuttering formwork				
		(B) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser(Masterplast ACPL or equivalent) conforming to IS-9103-1999				
		(A) PCC Grade M15 (Height upto 5m); in levelling course				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	1817.77	7453.00	13547802.55
5.3	**13.5(B)(F)(a)(ii)/ 1500,1700 & 2200**	**Plain/Reinforced cement concrete**, in sub structure complete as per drawing and technical specification and steel shuttering formwork				
		(F)RCC Grade M25				
		(a) Height upto 5m				
		Case II : With Batching Plant, Transit Mixer and Concrete Pump				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	8086.33	8917.00	72105831.36
5.4	**13.5(P)(B) / 1500,1700 & 2200**	**Plain/Reinforced cement concrete**, in sub structure complete as per drawing and technical specification and steel shuttering formwork				
		(P) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser(Masterplast ACPL or equivalent) conforming to IS-9103-1999				
		(B) PCC Grade M20 (Height upto 5m) Wing wall				
		in foundation, wing wall and return wall complete				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	4755.98	8120.00	38618557.60

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
5.5	**14.10 / 2700**	**PCC M15 Grade** leveling course below approach slab complete as per drawing and Technical specification				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	1228.50	5498.00	6754293.00
5.6	**14.11(a) / 1500,1600, 1700 & 2704**	**Reinforced cement concrete** approach slab including reinforcement and formwork complete as per drawing and Technical specification				
		(a) With TATA make TMT CRS (Fe-500) grade rebar				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	2457.00	12025.00	29545425.00
5.7	**14.7 / 2703, 1500, 1600 & 1700**	**Construction of RCC railing** of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolurence 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 posts for expansion, complete as per approved drawings and technical specifications. Qty. Refer Appendix C13,C14,C15,C16, Rate - As per SOR				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	M	594.88	2044.00	1215934.72
5.8	**8.22 (i/ 809)**	**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 HYSD/TMT reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 enclouser to MOST circular No. RW/NH - 33022/1/94-DO III dated June 1994 as per dimension in the approved drawing and at locations directed by the engineer, all as specified.				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	M	194.98	3932.00	766645.63
5.9	**13.5(P)(F)(a)(ii)/ 1500, 1700 & 2200**	**Plain/Reinforced cement concrete**, in sub structure complete as per drawing and technical specification and steel shuttering formwork				
		Railing Kerb (M - 25)				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	104.76	8917.00	934100.34
5.10	**15.5 / 2504**	**Providing and laying Filter material** underneath pitching in slopes complete as per drawing and Technical specification				
		Qty. - Appendix C13, C14, C15, C16; Rate as per Appendix C4	Cum	4543.23	2250.50	10224539.12
5.11	**15.4 / 2504**	**Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications**				
		Over floor Apron. Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per Appendix C4	Cum	1789.60	1798.50	3218595.60
5.12	**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.				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per Appendix C4	Cum	3177.20	1798.50	5714194.20
5.13	**9.1/408**	**PCC 1:3:6 in Foundation** (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per S.O.R	Cum	236.000	4535.00	1070260.00
5.14	**12.8(P) / 1500, 1700 & 2100**	**Plain/Reinforced cement concrete,** in open foundation complete as per drawing and technical specification including steel shuttering formwork, in U/S and D/S protection work complete as per drawing and Technical Specification.				
		(P) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		(A) PCC Grade M15				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	1572.400	6514.00	10242613.60
5.15	**Misc.**	**Tar Paper Bearing**	Sqm.	483.600	150.00	72540.00
5.16	**13.9(A) /305**	**Back filling behind abutment,** wing wall and return wall complete as per drawing and Technical specification				
		(A) Granular material				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	Cum	28496.776	1524.00	43429086.62
5.17	**14.18(iii) / 2605**	**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 drawing and technical specification.				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	M	1612.000	317.00	511004.00
5.18	**14.9 / 2705**	**Providing and fixing in position:** Drainage Spouts complete as per drawing and Technical specification				
		Qty. - Appendix C13, C14, C15, C16; Rate as per SOR	Nos.	124.000	10197.00	1264428.00
5.19	**13.8 / 2706**	**Providing weep holes** in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.				
		Qty. - Appendix C13, C14, C15, C16; Rate as per SOR	Nos.	3120.000	204.00	636480.00
5.2	**13.6(a) / 1600 & 2200**	**Supplying, fitting and placing TMT** bar reinforcement in sub-structure complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe-500) grade rebar				
		Qty. - Appendix C7,C8,C9,C10,C11,C12,C13; Rate as per SOR	MT	516.850	73343.00	37907329.55
	LONGITUDINAL DRAIN					
5.3	**3.24A / 309**	Construction of unlined surface drains of average cross sectional area 0.40 sqm in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of 50m (Average lead 25m)				
		Qty. Refer MEA ; Rate as per SOR	Rm	34894.000	59.00	2058746.00

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
5.4	**15.4 / 2504**	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications(between main carriageway and service road)				
		Qty. = 3740 x 3.5 x 0.35 = 4582 cum ; Rate as per Appendix C.4	Cum	4582.000	1798.50	8240727.00
5.5	**Analysis based on**	Providing and laying of stone pitching on slope for embankment protection at water logging area (upto 1m above of water level)				
		Qty. = (18810 - 1363 - 10000) x 2 = 14894m; Rate as per Appendix C.14	Rm.	14894.000	4824.19	71851485.86
5.6	**3.4A / 1400, 2200**	Stone masonary work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications.				
		A. Random Rubble Masonary, in side drain				
		Qty. = 2x650x2x0.6+2x650x1x1 = 2860 cum. Rate as per Appendix C.4	Cum	2860.000	4403.50	12594010.00
					Total Cost of DRAINAGE WORKS	**373343678.198**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 6 : TRAFFIC SIGNS, MARKINGS AND ROAD APPURTENANCES						
6.1	**8.6 / 801**	**'Direction and place identification sign more than 0.9sqm size board:** Providing and erecting direction and place identification retro-Reflectrorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3 fixed over aluminium sheeting, 2mm thick with area exceeding 0.9sqm fixed on an angle iron of 25x25x4mm supported on a mild steel angle iron post 75mm x 75mm x 6mm, 2 nos. firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing.				
		(i) 1500mm x 900mm ; Qty. ref, MEA ; Rate as per SOR	Sqm.	24.300	11000.00	267300.000
	8.5 / 801	(ii)800mm x 600mm ; Qty. ref, MEA ; Rate as per SOR	Sqm.	4.800	10000.00	48000.000
6.2	**8.4 / 801**	**Retro reflectorised Traffic sign:** Providing and erecting of Retro-Reflectrorised cautionary, mandatory & informatory sign as per IRC: 67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75mm x 75mm x 6mm firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing and sign.				
		a) Cautionary, 90cm equilateral traingle	Sqm.	25.430	10000.00	254340.000
		b) Speed Limit, 60cm Circular	Sqm.	11.300	10000.00	113040.000
		c) 600mm x 450mm ; Qty. ref, MEA ; Rate as per SOR	Sqm.	1.080	10000.00	10800.000
6.3	**8.47 / 801**	**Providing 'Sparkle Solar Road Studs,** manufactured by Tata B.P. Solar India Ltd. Of size (125mmx125mm), 90mm height (from bottom of shank to the top of stud) with detachable battery, m6LEDs-three on each side for Bi-directional studs/3 LEDs on one side for unidirectional studs, ultra bright LED in amber and red colour, weight per stud 700+25 gms, flash rate of 50-65 times per minute completely water resistant and weather proof with replacement warranty and free maintenance for one year from the date of installation of stud on road-(installation should be made using adhesives and procedures recommended by manufacturer under the supervision of their competent technician).				
		(a) Bi-directional Stud				
		2 nos. at every box culvert without surcharge and bridge.				
		Qty. ref., MEA ; Rate as per SOR	Each	90.000	3500.00	315000.000
6.4	**8.14 / 804**	**Kilo Metre Stone:** Reinforced cement concrete M15grade kilometre stone of standard design as per IRC:8-1980, fixing in position including painting and printing etc.				
		i) 5th kilometre stone (precast)	Each	4.000	3869.00	15476.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		ii) 'Ordinary Kilometer stone (Precast)	Each	15.000	2431.00	36465.000
		iii) Hectometer stone (Precast)	Each	76.000	628.00	47728.000
		Qty. ref., MEA ; Rate as per SOR				
6.5	**8.48**	**Providing spring post** of 750mm height, 80mm dia with round base of 200mm dia made of poly urethane with 3 white reflective bands made of HIG retro-reflectorised sheeting and fixing to the ground as per specifications of manufacturers				
		Qty. = (18810 / 5) x 2 x 50% = 3762 Nos.; Rate as per SOR	Each	3762.000	1500.00	5643000.000
6.6	**17.11 (A)**	**RCC guard post:** Supplying,fitting and fixing RCC guard post size 15 cm dia,150cm long,75cm above the ground and 75cm below the ground, including square base of 45cmx45cmx15cm with 4-12mm Tor steel main steel and 6mm MS stirrups at 30cm c/c tied in position with annealed black wire, cement concrete proportin 1:2:4 with broken stone ,6mm thick cement plastering in proportion 1:3 painted black and white alternately in 23cm strips upto 0.75m from the top keeping necessary grooves etc. as per design and direction complete.(i.e.,15cm dia with 4-12 mm Tor bar)				
		Qty. = (18810 / 5) x 2 x 50% = 3762 Nos.; Rate as per SOR	Each	3762.000	697.00	2622114.000
6.7	**8.23A / 810**	**Providing and erecting Type - 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 2m center to center, 1.8 m high, 1.1m below ground/road level, all steel parts and fitments to be galvanized by hot dip process, all fitting to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150mmX75mmX5mm, 330mm long complete as per clause 810.				
		At bridge approaches, Qty. - 3 x 200+4 x 750 = 3600m; Rate as per SOR	M	3600.000	3475.00	12510000.000
6.8	**8.51**	Supply and installation of **reflective pavement marker** with Micro prismatic lens in both direction having thermoplastic body adhering to the specification and guidelines of MoSRT&H's fixed to the road surface using the adhesives and the procedures recommended by the manufacturers with three months replacement warranty and free maintenance.				
		At X - roads for 50m on both sides; Qty. refer MEA; Rate as per SOR	Each	2500.000	298.00	745000.000
6.9	**8.16 / 806**	**Boundary pillar** at 100 m c/c**(** 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)				
		Qty. refer MEA; Rate as per SOR	Each	376.000	592.00	222592.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
6.10	**8.13 / 803**	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, 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 and conforming to the MoSrt&H specifications				
		Center Line				
		For Straight - 10870 / 3 x 0.10 = 362.333 Sqm.	Sqm.	362.333	750.00	271749.750
		For Curves - 7940 / 2 x 0.10 = 397 Sqm.	Sqm.	397.000	750.00	297750.000
		Edge Line - 18810 x 4 x 0.15 = 11286 Sqm.	Sqm.	11286.000	750.00	8464500.000
6.11		Providing and erecting overhead signs with a corrosion resistant aluminium alloy sheet reflected with high intensity retro-reflective sheeting 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 galvanised steel trusses of section and type to be mounted by bolts and nuts over RCC structures as per drawing.				
		Qty. ref., MEA ; Rate as per Appendix C.16	Nos.	3.00	965304.00	2895912.000
6.12	**8.1.,8.2 / 408**	**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 manually all complete as per clause 408.				
		Kerb (In straight)	Rm	21740.000	314.00	6826360.000
		Kerv with channel (In Curve)	Rm	15880.000	596.00	9464480.000
		Kerb (In Junctions) Qty. ref., MEA ; Rate as per SOR	Rm	1830.000	596.00	1090680.000
					Total Cost of ROAD APPURTENANCES	**52162286.750**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 7 : MISCELLANEOUS						
7.1	**11.8/307**	a.Planting flowering plants and shrubs in Central Verge	Km	17.450	48522.00	846563.000
		b.Maintenance of flowering plants and shrubs in Central Verge for one Year	Km	17.450	132875.00	2318270.000
7.2	**11.9/307**	Planting trees by the road side (Avenue trees in 0.60m dia. Holes, 1m deep dug in the ground, mixing the soil with decayed farm yard / sludge mannure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year.(Considering @10.00m spacing of trees on both side,200 Nos./km)	Each	3489.000	636.00	2219258.000
7.3	**MISC.**	Cost of consultancy for Environmental Impact Assessment (EIA)				
		@ Rs. 50,000 per km	Km	17.450	50000.00	872350.000
7.4	**MISC.**	Detail engineering, Design and Sub soil Investigation of 4 Lane RCC bridge over River Jia Bharali @ 0.5% of Estimated cost of the Bridge.				
		i.e. @0.5% of Rs. 3864404376.00 (Bridge cost estimate)				1932202.000
7.5	**MISC.**	Providing and Laying of with approved tiles excluding of kerb				
		In Junctions				
		Qty. ref., MEA ; Rate as per Appendix C.21	Sqm.	1030.000	650.00	669500.000
7.6	**MISC.**	Traffic management during execution				
		Qty. ref., MEA ; Rate as per Appendix C.27	LS			10249493.000
7.7	**3.37**	**Slope protection by Vetiver System**				
7.6		(A) **Plantation Part**: Supply of approved variety of vetiver plant certified by The Vetiver Network International (TVNI) or its affiliate in India including pouching of tiller with selected soil for agricultural use mixed with farmyard manure in 8"x 6" poly pouch, maintaining the pouched plants for at least 1(one) month with application of growth promoter, fertilizer, watering, weeding etc., dressing of the area of plantation, planting the pouched plants as per design approved by The Vetiver Network International (TVNI) or its affiliate in India. (Excluding jungle clearance, earth work in trimming, cutting, filling etc.)				
		At Approaches of 2 Nos Major Bridges. Qty. - (2x300)+(2x200) = 1000.00 m. Rate as per SOR	Rm	1000.000	79.00	79000.000
	3.37	(B) **Maintenance Part**: Maintenance of the vetiver plants by watering, pruning, weeding, mulching, application of manure, fertilizer, growth promoter etc. for 4 (four) months after completion of plantation.	Rm	1000.000	31.00	31000.000
		Total cost of MISCELLANEOUS WORKS (Rs.) :				19217636.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 8 : BRIDGES AND STRUCTURES						
8.1		**Construction of Jia Bhorali bridge of (2x2) 4-lane width (L = 1200m) at Ch.26100.00m on Dolabari - Jamugurihat 4 Lane stretch under Nagaon N.H. Division, Nagaon.**				
		Part A: BRIDGE PORTION:				
		WELL FOUNDATION:				
1.1	**12.1 / 304**	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 and backfilling with approved material.				
		I) Ordinary soil				
		B. Manual Means (With dewatering)				
		ii) 3-6 m depth	Cum.	11967.420	59.00	706077.780
		Qty. refer Appendix C - 33, Rate as per SOR				
1.2	**12.10 /1200,1500,1700**	Providing and laying cutting edge of mild steel weighing 40 kg per metre for well foundation complete as per drawing and technical specification.Item to include all material,labour,safety measures,equipment and incidental work required to execute the				
		Qty. refer Appendix C - 22, Rate as per SOR	MT	126.244	101302.00	12788769.688
1.3	**12.11/1200,1500 ,1700**	Plain/Reinforced cement concrete, in well foundation complete as per drawing and technical specification including steel shuttering formwork.				
		(A)Without Plasticiser				
		d.Top/Intermediate Plug				
		(ii)RCC M25 Grade				
		Case-II-With Batching Plant,transit mixer and concrete pump	Cum.	663.754	7183.00	4767744.982
		c.Bottom Plug				
		(ii)RCC M25 Grade				
		Case-II-With Batching Plant,transit mixer and concrete pump	Cum.	12780.021	7492.00	95747917.332
		Qty. refer Appendix C - 33, Rate as per SOR				
1.4	**12.21/1207**	**Sand filling in wells complete as per drawing and technical specification as per MoSRT&H Section 1207**	Cum.	20026.595	1798.00	36007817.810
		Qty. refer Appendix C - 33, Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
1.5	**12.11/1200,1500 ,1700**	Plain/Reinforced cement concrete, in well foundation complete as per drawing and technical specification including steel shuttering formwork.				
		(B)With Plasticiser				
		A.Well curb				
		(iv)RCC M35 Grade	Cum.	3481.022	10003.00	34820663.066
		Case-II-With Batching Plant,transit mixer and concrete pump				
		Qty. refer Appendix C - 33, Rate as per SOR				
1.6	**12.11/1200,1500 ,1700**	Plain/Reinforced cement concrete, in well foundation complete as per drawing and technical specification including steel shuttering formwork.	Cum.	45132.477	8917.00	402446297.409
		(B)With Plasticiser				
		B.Well steining				
		(v)RCC M25 Grade				
		Case-II-With Batching Plant,transit mixer and concrete pump				
		Qty. refer Appendix C - 33, Rate as per SOR				
1.7	**12.11/1200,1500 ,1700**	Plain/Reinforced cement concrete, in well foundation complete as per drawing and technical specification including steel shuttering formwork.	Cum.	5983.710	9030.00	54032901.300
		(P)With Plasticiser				
		F.Well cap				
		(iv)RCC M35 Grade				
		Case-II-With Batching Plant,transit mixer and concrete pump				
		Qty. refer Appendix C - 33, Rate as per SOR				
1.8	**12.18/1200**	Sinking of 12 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is rekonewedfrom bed level.				
		A)Sandy soil				
		a)Depth upto 10m from top of well cap	Meter	20.000	51791.00	1035820.000
		b)Depth beyond 10m upto 20m	Meter	20.000	68400.00	1368000.000
		c)Depth beyond 20m upto 30m	Meter	20.000	153961.00	3079220.000
		c)Depth beyond 30m upto 40m	Meter	10.000	365790.00	3657900.000
		Qty. refer Appendix C - 33, Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
1.9	**12.16/1200**	Sinking of 10 m external diameter well (other than pneumatic method of sinking) through all types of strata namely sandy soil, clayey soil and rock as shown against each case, complete as per drawing and technical specifications. Depth of sinking is rekonewedfrom bed level.				
		A)Sandy soil				
		a)Depth upto 10m from top of well cap	Meter	240.000	11399.00	2735760.000
		b)Depth beyond 10m upto 20m	Meter	240.000	15054.00	3612960.000
		c)Depth beyond 20m upto 30m	Meter	240.000	33885.00	8132400.000
		c)Depth beyond 30m upto 40m	Meter	180.000	80508.00	14491440.000
		Qty. refer Appendix C - 33, Rate as per SOR				
2.0		**REINFORCEMENT**				
2.1	**12.40/1600**	Supplying, fitting and placing un-coated TMT CRS (Fe 500)bar reinforcement in foundation complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	6189.481	73279.00	112608768.000
		For Foundation,sub structures and superstructures(combined)				
		Qty. refer Appendix C - 33, Rate as per SOR				
3.0		**SUB-STRUCTURE**				
3.1	**13.5/1500,1700, 2200**	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification cl.no.1500,1700 & 2200 including providing plasticiser(Masterplast PL-1),air entraining and water reducing plasticiser(Masterplast PAE) conforming to IS:1903-1999 and as per specification and direction of Engineer in-charge				
		(B)With Plasticiser	Cum.	7794.432	9169.00	71467147.008
		H.RCC M35 Grade				
		Case-II-With Batching Plant,transit mixer and concrete pump				
		Qty. refer Appendix C - 33, Rate as per SOR				
3.2	**13.8/2000,2706**	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical specifications	Nos.	1100.000	204.00	224400.000
		Qty. refer Appendix C - 33, Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
3.3	**13.10/2200**	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.	Cum.	672.000	1766.00	1186752.000
		Qty. refer Appendix C - 33, Rate as per SOR				
3.4	**13.9/2200**	Back filling behind abutment, wing wall and return wall complete as per drawing and clause no. 2607 of MORTH SpecificationTechnical specification	Cum.	5250.000	1524.00	8001000.000
		Qty. refer Appendix C - 33, Rate as per SOR				
4.0		**SUPER STRUCTURE**				
4.1	**14.1/1500,1600 & 1700**	Providing and laying Reinforced Cement Concrete of Grade M45 in deck slab, diaphragms including shuttering and staging complete as per Technical Specifications Section 1500,1700 & 2300.(Excluding cost of steel).All values for mix from batching plant.	Cum.	22000.000	13638.00	300036000.000
		B.With Plasticiser,VI.Grade M45,(iii)Box Girder,b)Height 5-10 m				
		Qty. refer Appendix C - 32, Rate as per SOR				
4.2	**14.3/1800**	Providing and placing High tensile steel in Precast beams including sheathing, anchorages, stressing and grouting all complete as per Technical Specifications and IRC 112				
		Qty. refer Appendix C - 32, Rate as per SOR	tonne	850.000	167708.00	142551800.000
4.3	**5.8/509**	Providing and laying wearing course comprising of 40mm thick asphalt concrete including cost of prime coat, prepared by using mastic cooker and laid to required level and slope after cleaning the surface,all complete as per Technical Specifications Clauses 509,515 & Sub Clause 2702.1.2				
		C)Hydrated Lime,(II)with Polymer modified bitumen 70,ii)for Grading-II(13 mm nominal size)				
		Qty. refer Appendix C - 32, Rate as per SOR	Cum.	1080.000	12788.50	13811580.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
4.4	**5.14/515**	Providing and laying 25mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-29(binder having penetration as (15+/- 5) at 25 deg. centrigrade), prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing anti skid surface with bitumen pre coated fine grained hard stone ships of 13.2mm nominal size at the rate of .005cum per 10 sqm. and at an approximate spacing of 10 cm center tpo center in both direction , pressed into surface when the temperature of surfaces not less than 1000C, protuding 1mm to 4mm over mastic surface , all complete as per clause 515 .(including carriage up to initial lead of 5.0 km from quarry.) i) Thickness - 25mm				
		Qty. refer Appendix C - 32, Rate as per SOR	Sqm	27000.000	634.00	17118000.000
4.5	**14.9/2705**	Providing and fixing galvanized Drainage Spouts along with drain pipes complete as per Technical Specifications Clause 2705				
		Qty. refer Appendix C - 32, Rate as per SOR	Nos	400.000	10197.00	4078800.000
4.6		Supplying, fitting and fixing in position true to line and level Spherical bearings conforming to IRC: 83(Pt.-1) as per MoRTH 2013 Section 2004.1 specifications complete including all accessories as per drawing and Technical Specifications.				
		a)Sliding Bearing 550t	Nos	25.000	220000.000	5500000.000
		b)Fixed Bearing 550t	Nos	25.000	247500.000	6187500.000
		c)Guided Bearing 550t	Nos	100.000	233750.000	23375000.000
		Qty. refer Appendix C - 32, Rate as per SOR				
4.7	**14.22 / 2607**	Providing and fixing strip seal type expansion joints complete as per Technical Specifications Section 2600				
		Qty. refer Appendix C - 32, Rate as per SOR	Rm	700.000	11804.00	8262800.000
4.8	**14.7/1500,1600, 1700 & 2703**	Reinforced cement concrete Railing				
		Qty. refer Appendix C - 32, Rate as per SOR	Rm	2500.000	2044.00	5110000.000
4.9	**14.1/1500,1600 & 1700**	Providng and constructing RCC Crash Barrier in M40 grade including cost of centering and shuttering as per technical specifications Clause 809 and as per IRC-6				
		B)With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		C. RCC grade M40,ii)For T-beam& slab,b)Height 5-10 m				
		Case II: Using Batching plant, Transit mixer and Concrete pump				
		Qty. refer Appendix C - 32, Rate as per SOR	Cum.	1850.000	11364.00	21023400.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
4.10	**14.10/2700**	Providing and laying Plain Cement concrete M-15 grade leveling course below approach slab as per Technical Specification Section 1500 &1700				
		Qty. refer Appendix C - 32, Rate as per SOR	Cum.	30.000	5498.00	164940.000
4.11	**14.11/1500,1600 ,1700 & 2704**	Providing and laying Reinforced Cement Concrete M-35 grade for approach slabs complete as per Technical Specifications Section 1500, 1700 and Clause 2704.				
		Qty. refer Appendix C - 32, Rate as per SOR	Cum.	60.000	12025.00	721500.000
4.12	**14.2/1600**	Providing, cutting, bending and fixing in position of High Yield Steel Strength deformed (HYSD) reinforcement complete in superstructure (I.e PSC beam, RCC Beams deck slab and diaphragms) as per Technical Specifications Section 1500.				
		Qty. refer Appendix C - 32, Rate as per SOR	tonne	5000.000	77554.00	387770000.000
4.13		Providing 150 mm dia PVC service pipe of approved quality as per directions of the Engineer.				
		Qty. refer Appendix C - 32	Rm	4800.000	500.00	2400000.000
		TOTALCOST OF 4 LANE BRIDGE AND APPROACHES(JIA BHARALI)				**1811031076.375**
8.2		**Construction of Guide bund , Embankment and Channel closing Dyke for construction of RCC Bridge over river Jia Bharali**				**3316769311.579**
		Refer Attachment as Appendix C.22				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 8 : BRIDGES AND STRUCTURES						
8.3		**Construction of Mora Bhorali bridges of 4-lane width (L = 70m) at Ch. 21710.00m on Dolabari - Jamugurihat 4 Lane stretch under Nagaon N.H. Division, Nagaon.**				
		Part A: BRIDGE PORTION:				
		FOUNDATION:				
1	**12.1 / 304**	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 and backfilling with approved material.				
		I) Ordinary soil				
		A. Manual Means (Without dewatering)				
		i) upto 3 m depth	Cum.	1033.420	65.00	67172.000
		A. Manual Means (With dewatering)				
		i) upto 3 m depth	Cum.	443.000	72.00	31888.000
		PILE Foundation				
		Qty. refer Appendix C - 23, Rate as per SOR				
2	**12.39 / 1100, 1700**	Levelling course for Pile cap : Providing and laying of PCC M - 15 levelling course 100mm thick below the pile cap, as per drawing and technical specifications of MORTH section.				
		Rate as per SOR	Cum.	191.800	5383.00	1032451.000
3	**12.38 / 1100, 1500**	Cement concrete for reinforced concrete in pile cap complete as per drawing and Technical Specification.Including steel shuttering formwork.				
		Pile Cap-D. RCC Grade M35(with plasticizer)				
		ii) Using Batching Plant, Transit Mixer and Concrete Pump	Cum.	2169.000	9157.00	19861570.000
		Rate as per SOR				
4	**12.25 / 1100, 1700**	Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m. (Pile diameter-1200 mm)				
		A. Sandy soil	Each	3762.000	1500.00	5643000.000
		I) Depth below Bed level up to 3.0m				
		II) Beyond 3.0m up to 10.0m				
		III) Additional depth beyond 10.0m upto 20.0m				
		IV) Additional depth beyond 20.0m up to 30.0m				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		(Pile dia. = 1200mm)	meter	4017.040	14953.00	60066859.000
		Rate as per SOR				
5	**12.40 / 1600**	**Reinforcement in Foundation**: Supplying, fitting and placing un-coated TMT bar reinforcement in foundation complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	979.910	73279.00	71806907.000
		Rate as per SOR				
6	**12.37 / 1100**	Pile load test on single vertical pile in accordance with IS:2911(Part-IV) as per technical specifications of MORTH section no. 1100. **i) Initial and Routine load test.**	MT	4000.000	363.00	1452000.000
		ii) Lateral load test	MT	800.000	6050.00	4840000.000
7	**13.5 / 1500, 1700, 2200**	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork including providing plasticiser (Masterplast PL-1), air entertaining and water reducing plasticiser (Masterplast PAE) conforming to IS: 1903-1999 and as per specification and direction of Engineer in charge.				
		H) RCC Grade M35; Case - I : Using Batching Plant				
		a) Height upto 5m	Cum.	630.070	8182.00	5155248.000
		b) Height 5m to 10m	Cum.	375.600	8361.00	3140370.000
8	**13.6 / 1500, 1700, 2200**	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	172.890	73343.00	12680292.000
		Rate as per SOR				
9	**13.14 / 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.	Cum.	1507000.000	1.02	1537140.000
		SUPER STRUCTURE				
10	**14.1 /1500, 1600, 1700**	**Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per drawing and Technical Specification' including steel shuttering formwork.**				
	(P)	With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		B. RCC grade M25				
		Case II: Using Batching plant, Transit mixer and Concrete pump				
		(ii) For T-Beam and slab				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		2) Height 5.0m to 10.0m	Cum.	1537.560	11014.00	16934685.840
		E. PSC grade M 40				
		Case II: Using Batching plant, Transit mixer and Concrete pump				
		(i) For Solid slab Super Structure				
		For Crash Barrier (T-beam and slab)				
		2) Height 5.0m to 10.0m	Cum.	125.380	11364.00	1424818.320
11	**14.2 / 1500, 1600, 1700**	**Reinforcement in Super Structure: Supplying, fitting and placing TMT bar reinforcement in super-structure including splicing complete as per drawing and technical specifications**				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	288.510	77554.00	22375287.000
		Rate as per SOR				
12	**5.14 / 515**	**Wearing coat, Mastic Asphalt:** Providing and laying 25mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-29(binder having penetration as (15+/- 5) at 25 deg. centrigrade), prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing anti skid surface with bitumen pre coated fine grained hard stone ships of 13.2mm nominal size at the rate of .005cum per 10 sqm. and at an approximate spacing of 10 cm center tpo center in both direction , pressed into surface when the temperature of surfaces not less than 1000C, protuding 1mm to 4mm over mastic surface , all complete as per clause 515 .(including carriage up to initial lead of 5.0 km from quarry.) ii) Thickness - 40mm	Sqm.	1130.570	1015.00	1147524.000
		Rate as per SOR				
13	**14.19 / 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 200mmX 6mm of wiedable structural steel conforming to IS:2062, asphaltic plug consist of polymer modified bitumen binder, carefully selected singl;e size aggregate of 12.5mm nominal size and heat resistant foam caulking/backer rod, all as per approved drawing and specifications.)	Rm	67.740	1861.00	126072.000
		Rate as per SOR				
14	**14.22 / 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 instruction for installation).	Rm	135.49	11804.00	1599300.000
		Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
15	**14.9 / 2705**	Providing Drainage Spouts complete as per approved drawing and technical specifications clause 2705 of MORTH Specification of Roads and Bridge Works for superstructure works	Nos.	70.080	10197.00	714606.000
		Qty. Ref. Appendix C.23; Rate as per SOR				
		Miscellaneous works				
16	**13.9 / 2200**	Back filling behind abutment, wing wall and return wall complete as per drawing and clause no. 2607 of MORTH SpecificationTechnical specification				
		A. Granular material	Cum.	2335.510	1524.00	3559310.000
		Rate as per SOR				
17	**13.10**	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.	Cum.	302.200	1766.00	533687.000
		Rate as per SOR				
18	**14.10**	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification as per MORTH section 2700				
		Rate as per SOR	Cum.	37.090	5498.00	203920.000
19	**13.8**	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specifications clause 2706 & 2200 of MORTH Specification. .	Nos.	62.780	204.00	12807.000
		Rate as per SOR				
20	**14.11**	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specifications clause 1500,1600,1700 & 2704 of MORTH Specification of Roads and Bridge Works for superstructure works				
		With TATA make TMT CRS (Fe-500) grade rebar	Cum.	73.580	12025.00	884848.000
		Rate as per SOR				
21	**13.9.7(b) (APWD Bldg SOR)**	Supplying and applying in interior / exterior walls / floor / roofs one coat of epoxy primer of Jhonson and Nicholson / Nerolac brand as primer coat after cleaning and claering the surface as specified and directed and then applying two coats of Epoxy paint of Jhonson and Nicholson / Nerolac brand of required shade on wall / floor / roof surfaces as specified and directed complete including scaffolding at all levels.	Sqm.	1265.940	178.12	225489.233

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
22	**14.6**	Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications clauses of section 2703, 1500, 1600 & 1700 of MORTH Specification of Roads and Bridge Works for superstructure works.	Rm	250.7696	2100.00	526616.000
		Rate as per SOR				
23		**Providing and fixing hand rail over the crash barrier consisting of MS base plate, embedded fastener and nuts, MS vertical plates and pipe etc. as shown in the drawing and as per specifications. All the railing components as mentioned above to be hot dip galvanised with a zinc coating of at least 175gm / sqm. The thickness of plates to be as shown in the drawings and pipe to be 65NB heavy class with a weight not less than 7.92 kg/m and conforming to IS: 1161 - 1979.Item components as mentioned above to be hot dip galvanised with zinc coating of at least 175gm / sqm. The thickness of plates to be as shown in the drawings and pipe to be 65NB heavy class with a weight not less than 7.92 kg/m and conforming to IS: 1161-179. Item to include all incidental works required to complete the work as directed by the Engineer - In - Charge. Measurement shall be made for the length of the pipe only.**	Rm	501.540	2316.30	1161715.000
		Rate as per Appendix C.28				
24	**17.58(I)(a)**	**Crash Barrier :-** **Providing and erecting steel rails crash barrier in selected location with vertical post of TATA STRUCTURA WRS of size (113.50X113.50 x4.800)mm & 1.50m1.25m/0.70m/0.60m height above the GL attached to the gusset plate (330X330)X25mm with nut and bolts and embeded in cement concrete in prop. 1:2:4 (450X450X750) mm as per approved and technical specification , 3.70m center to center for intermediate bay and 3.00m for end bay, 4 nos. horizantal steel rails of size (113.50X113.50X4.80) mm of TATA STRUCTURA WRS to be fixed on the vertical posts with a spacer channel section of size (113.5X113.5X4.80)mm of TATA-STR-WRS including all fittings such as Stainless Steel Hexagonal Head , SS washer & screw head , nylon top hat washer and galvanized steel washer including transportation & erection etc. complete as per approved drawing.**				
		(I) Four rail system				
		(a) 1.5m high above the ground	Rm	350.400	8793.00	3081067.200
		Qty. Ref. Appendix C.23; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
25	**17.11 (A) (ii)**	**RCC guard post:** Supplying,fitting and fixing RCC guard post size 15 cm dia,150cm long,75cm above the ground and 75cm below the ground, with 4-12mm Tor steel main steel and 6mm MS stirrups at 30cm c/c tied in position with annealed black wire, cement concrete proportin 1:2:4 with broken stone aggregate up to 20mm size including centering,moulding the top.curing,painted black and white alternately in 23cm strips upto 0.75m from the top having reflective band 2 nos. of desired shade etc. as per design and direction complete.				
		(ii) 30 cm dia with 6-12mmTor bar	Nos.	120.000	1409.00	169080.000
		Rate as per SOR				
		APPROACH PROTECTION WORKS (MORA BHARALI BRIDGE)				
26	**12.1**	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 and backfilling with approved material as per MORTH Clause No.304..				
		I) Ordinary soil				
		A) Manual Means (Without dewatering)				
		i) depth upto 3 m depth	Cum.	2476.100	65.00	160947.000
		A) Manual Means (Wit dewatering)				
		i) depth upto 3 m depth	Cum.	2476.100	72.00	178279.000
		Rate as per SOR				
27	**15.5**	Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification	Cum.	1353.820	1862.00	2520819.000
		Rate as per SOR				
28	**15.4**	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications				
		A) Stone/Boulder	Cum.	3476.880	1463.00	5086674.000
		Rate as per SOR				
29	**15.1**	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 Technical specifications with all lead, FR & ST.	Cum.	8055.560	1463.00	11785290.000
		Rate as per SOR				
		TOTAL OF PART-A (Bridge Proper and Protection Works) = Rs.				**261727738.593**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Estimate Part - B : ROAD FURNITURE WORKS				
30	**8.47 (a)**	Providing 'Sparkle Solar Road Studs, manufactured by Tata B.P. Solar India Ltd. Of size (125mmx125mm), 90mm height (from bottom of shank to the top of stud) with detachable battery, m6LEDs-three on each side for Bi-directional studs/3 LEDs on one side for unidirectional studs, ultra bright LED in amber and red colour, weight per stud 700+25 gms, flash rate of 50-65 times per minute completely water resistant and weather proof with replacement warranty and free maintenance fro one year from the date of installation of stud on road-(installation should be made using adhesives and procedures recommended by manufacturer under the supervision of their competent technician).				
		a) Bi-directional Stud-	Each	8.000	3500.00	28000.000
		Qty. Ref.Appendix C.23; Rate as per SOR				
31	**8.6**	**Direction and place identification sign more than 0.9sqm size board.** Providing and erecting direction and place identification retro-Reflectrorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3 fixed over aluminium sheeting, 2mm thick with area exceeding 0.9sqm fixed on an angle iron of 25x25x4mm supported on a mild steel angle iron post 75mm x 75mm x 6mm, 2 nos. firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing and sign. . (All the Steel work must be Tata/Sail/or any other approved brand)	Sqm.	4.320	11000.00	47520.000
32	**8.51**	Providing reflective pavement marker with Micro prismatic lens in both direction having thermoplastic body adhering to the specification and guidelines of MoSRT&H's fixed to the road surface using the adhesives and the procedures recommended by the manufacturers with three months replacement warranty and free maintenance.	Each	111.000	298.00	33078.000
		Qty. Ref.Appendix C.23; Rate as per SOR				
33	**8.60**	**Direction and place identification sign more than 0.9sqm size board.** Providing and erecting direction and place identification retro-Reflectrorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3 fixed over aluminium sheeting, 2mm thick with area exceeding 0.9sqm fixed on an angle iron of 25x25x4mm supported on a mild steel angle iron post 75mm x 75mm x 6mm, 2 nos. firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing and sign. . (All the Steel work must be Tata/Sail/or any other approved brand)	Sqm.	1.690	11000.00	18590.000
		Qty. Ref.Appendix C.23; Rate as per SOR				
		TOTAL OF PART-B = Rs.				**127188.000**
		TOTAL MORA BHARALI BRIDGE COST (Part A) + (Part B) = Rs.				**261854926.593**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 8 : BRIDGES AND STRUCTURES						
8.4		**Construction of 2 Nos. Fly Over at Ch. 17860m (Dolabari Junction on NH 37A) and at Ch.34930m (Jamgurihat Junction on NH 52)**				
		BRIDGE PORTION: (FLY OVER)				
1	**12.1 / 304**	**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 and backfilling with approved material.				
		B. Mechanical Means				
		(II) With dewatering				
		i) upto 3 m depth	Cum.	4133.376	54.00	223202.000
		Qty. Refer Appendix. C-24; Rate as per SOR				
2	**12.39 / 1100, 1700**	Levelling course below pile cap(M15)				
		Qty. Refer Appendix. C-24; Rate as per SOR	Cum.	194.104	5383.00	1044862.000
3	**12.8B(b) / 1500,1700, 2100**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		Below wing wall				
		Qty. Refer Appendix. C-24; Rate as per SOR	Cum.	148.000	7482.00	1107336.000
4	**12.25 / 1100, 1700**	Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m(Pile diameter-1200 mm) (P)With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999				
		Qty. Refer Appendix. C-24; Rate as per SOR	Meter	2048.000	14953.00	30623744.000
5	**12.38 / 1100, 1500**	Cement concrete for reinforced concrete in pile cap complete as per drawing and Technical Specification including providing plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		D. RCC Grade M35				
		ii) Using Batching Plant, Transit Mixer and Concrete Pump	Cum.	2216.160	9157.00	20293377.120
		Qty. Refer Appendix. C-24; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
6	**12.8 / 1500, 1700, 2100**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		P) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		H) RCC Grade M35				
		II) Using Batching Plant, Transit Mixer and Concrete Pump				
		For median wall				
		Qty. Refer Appendix. C-24; Rate as per SOR	Cum.	1084.800	9030.00	9795744.000
7	**12.40 / 1600**	**Reinforcement in Foundation**: Supplying, fitting and placing un-coated TMT bar reinforcement in foundation complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	546.080	73279.00	40016196.000
		Qty. Refer Appendix. C-24; Rate as per SOR				
8	**12.37 / 1100**	Pile load test on single vertical pile in accordance with IS:2911(Part-IV) i) Initial and Routine load test.	MT	1238.000	363.00	449394.000
		ii) Lateral load test	MT	120.000	6050.00	726000.000
		Qty. Refer Appendix. C-24; Rate as per SOR				
9	**13.5 / 1500, 1700, 2200**	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork.				
		(P)With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entertaining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS: 1903-1999.				
		H) RCC Grade M35; Case - II : Using Batching Plant				
		b) Height 5m to 10m	Cum.	3145.088	9369.00	29466329.000
		Qty. Refer Appendix. C-24; Rate as per SOR				
10	**13.6a / 1600, 2200**	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	438.340	73343.00	32149171.000
		Qty. Refer Appendix. C-24; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
11	**14.1 /1500, 1600, 1700**	Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per drawing and Technical Specification' including steel shuttering formwork.				
	(P)	With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		D. RCC Grade M35				
		Case II: Using Batching plant, Transit mixer and Concrete pump				
		(ii) For T-Beam and slab				
		2) Height 5.0m to 10.0m	Cum.	1197.720	11224.00	13443209.280
		Qty. Refer Appendix. C-24; Rate as per SOR				
12	**14.2 / 1600**	**Reinforcement in Super Structure:** Supplying, fitting and placing TMT bar reinforcement in super-structure including splicing complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	256.800	77554.00	19915867.000
		Qty. Refer Appendix. C-24; Rate as per SOR				
13	**13.16 /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 stainlesssteel matting surfaces, complete assembly to be of cast steel/fabricated structural steel, meatal and elastomer elements to be as per IRC:83 part-I &II respectively and parts conforming to BS:5400, section 9.1 & 9.2 and clause 2006 of MORTH&S Specification complete as per drawing and approved technical specification.				
		Qty. Refer Appendix. C-24; Rate as per SOR	MT	4248.000	371.00	1576008.000
14	**14.9 / 2705**	**Drainage Spouts complete as per drawing and Technical specification**	Nos.	16.000	10197.00	163152.000
		Qty. Ref. Appendix C.24; Rate as per SOR				
15	**14.22 / 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 instruction for installation.	Rm	144.000	11804.00	1699776.000
		Qty. Ref. Appendix C.24; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
16	**5.14 / 515**	**Mastic Asphalt:** Providing and laying 25mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-29(binder having penetration as (15+/- 5) at 25 deg. centrigrade), prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing anti skid surface with bitumen pre coated fine grained hard stone ships of 13.2mm nominal size at the rate of .005cum per 10 sqm. and at an approximate spacing of 10 cm center tpo center in both direction , pressed into surface when the temperature of surfaces not less than 1000C, protuding 1mm to 4mm over mastic surface , all complete as per clause 515 .(including carriage up to initial lead of 5.0 km from quarry.) (ii)Thickness=40 mm	Sqm.	1149.200	634.00	728592.800
		Qty. Ref. Appendix C.24; Rate as per SOR				
17	**14.6 / 1500, 1600, 1700, 2703**	Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications.	Rm	135.2000	2100.00	283920.000
		Qty. Ref. Appendix C.24; Rate as per SOR				
18	**8.22B / 809**	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 HYSD/TMT reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 June 1994 as per dimension in the approved drawing and at locations directed by the engineer, all as specified.				
		ii) M 40 grade concrete	Rm	270.400	4209.00	1138114.000
		Qty. Ref. Appendix C.24; Rate as per SOR				
19	**14.19 / 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 200mmX 6mm of wiedable structural steel conforming to IS:2062, asphaltic plug consist of polymer modified bitumen binder, carefully selected single size aggregate of 12.5mm nominal size and heat resistant foam caulking/backer rod, all as per approved drawing and specifications.)	Rm	96.000	1861.00	178656.000
		Qty. Ref. Appendix C.24; Rate as per SOR				
20	**14.16/ 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 Sq.m.)				
		(A) For Plain surface	Sqm.	405.600	45.00	18252.000
		Qty. Ref. Appendix C.24; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
21	**14.10 / 2700**	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification				
		Qty. Ref. Appendix C.24; Rate as per SOR	Cum.	57.600	5498.00	316685.000
22	**14.11a/ 1500,1600, 1700, 2704**	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specifications				
		Qty. Ref. Appendix C.24; Rate as per SOR	Cum.	100.800	12025.00	1212120.000
23	**15.5**	Providing and laying Filter material underneath pitching in slopes complete as per drawing and Technical specification				
		Qty. Ref. Appendix C.24; Rate as per SOR	Cum.	3341.090	1862.00	6221106.000
24	**8.47 (a)**	Providing 'Sparkle Solar Road Studs, manufactured by Tata B.P. Solar India Ltd. Of size (125mmx125mm), 90mm height (from bottom of shank to the top of stud) with detachable battery, m6LEDs-three on each side for Bi-directional studs/3 LEDs on one side for unidirectional studs, ultra bright LED in amber and red colour, weight per stud 700+25 gms, flash rate of 50-65 times per minute completely water resistant and weather proof with replacement warranty and free maintenance for one year from the date of installation of stud on road-(installation should be made using adhesives and procedures recommended by manufacturer under the supervision of their competent technician).				
		a) Bi-directional Stud-	Each	16.000	3500.00	56000.000
		Qty. Ref.Appendix C.24; Rate as per SOR				
25	**8.51**	Providing reflective pavement marker with Micro prismatic lens in both direction having thermoplastic body adhering to the specification and guidelines of MoSRT&H's fixed to the road surface using the adhesives and the procedures recommended by the manufacturers with three months replacement warranty and free maintenance.	Each	160.000	298.00	47680.000
		Qty. Ref.Appendix C.24; Rate as per SOR				
26	**8.5/ 801**	**Direction and place identification sign upto 0.9sqm size board:** Providing and erecting direction and place identification retro-Reflectrorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3 fixed over aluminium sheeting, 2mm thick with area not exceeding 0.9sqm fixed on an angle iron of 25x25x4mm supported on a mild steel angle iron post 75mm x 75mm x 6mm firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing and sign. (All the Steel work must be Tata/Sail/or any other approved brand)	Sqm.	34.560	10000.00	345600.000
		Qty. Ref.Appendix C.24; Rate as per SOR				
27	**13.8**	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specifications.	Nos.	480.000	204.00	97920.000
		Qty. Ref.Appendix C.24; Rate as per SOR				
		Sub total - Bridge portion (A)				**213338013.200**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		APPROACH PORTION (FLY OVER) B				
28	**12.1**	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 and backfilling with approved material.				
		I) Ordinary soil				
		B. Mechanical Means (With dewatering)				
		i) depth upto 3 m depth	Cum.	1632.000	54.00	88128.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
29	**12.4**	**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.) (RCC Retaining wall)	Cum.	435.660	4964.00	2162616.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
30	**12.8B**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including including providing plasticiser (Masterplast PL-1 / SPL-2 or equivalent), air entertaining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999, and steel shuttering formwork. (RCC Retaining walls)				
		H) Case II- RCC Grade M35				
		Using Batching Plant, Transit Mixer and Concrete Pump	Cum.	216.000	7636.00	1649376.000
31	**13.5B**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including including providing plasticiser (Masterplast PL-1 / SPL-2 or equivalent), air entertaining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999, and steel shuttering formwork. (RCC Retaining walls)				
		H) RCC Grade M35				
		a) Height upto 5m				
		Case II- With Batching Plant, Transit Mixer and Concrete Pump	Cum.	576.000	8182.00	4712832.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
32	**14.2**	**Reinforcement in Super Structure:** Supplying, fitting and placing TMT bar reinforcement in super-structure including splicing complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	221.240	77554.00	17157892.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
33	**12.3**	Sand Filling in Foundation Trenches as per Drawing & Technical Specification. (In the Embankment / Approaches).	Cum.	67956.000	1798.00	122184888.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
34	**Rate as per analysis sanctioned by Ministry in job No. AA037/AS/2008/09/061**	Providing and laying M35 grade (using 43/53 grade OPC) precast concrete face wall (area of each face panel shall not be less than 0.80 sqm, height shall not be less than 600 mm) including design and getting the approval, excavation, providing each "levelling pad". TMT reinforcement steel in precast facia panels, geotextile filter fabric behind precast facia panels, including filter media as required by designs behind the facia wall, supplying and laying in position the specified and approved galvanised steel strips soil reinforcement, including cutting in required length, placing in position and connecting with the precast facia panels as per the design and drawings and direction of the Engineer - In - charge and nailing with filled up surface of earth complete including all arrangement for drainage complete with all contractor's material, labour, lead lifts, plant & machinary,taxes, royalities etc. complete. Item to include providing half perforated HDPE longitudinal drainage pipe (including filter media all around) along the reinforced soil wall as per drawing enclosed with the tender documents.				
		The item also include all accidental work required to complete the job. The wall area shall be measured from top of concrete pad at base level to top of the facia wall. Only the cost of all items except the cost of backfill is included in this item. The cost of backfilling shall be paid extra.				
		Qty. Refer Appendix. C-24(A) ; Rate as per APPENDIX C.30	Sqm.	9444.000	7298.00	68922312.000
35	**13.5**	Providing and fixing M35 grade (using 43/53 grade OPC)using 20mm down stone aggregate and approved quality sand in cast in situ friction slab over the approaches complete with making all joints and their sealing as per the drawings and specifications excluding the cost of reinforcement only				
		h.(i)-Case II-RCC Grade M35	Cum.	733.2500	9169.00	6723169.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
36	**12.4**	**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.)	Cum.	251.400	4964.00	1247949.600
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
37	**14.1**	Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per drawing and Technical Specification' including steel shuttering formwork.				
		E. PSC Grade M-40				
		Case II: Using Batching Plant, Transit Mixer and Concrete Pump				
		(i). For solid slab super-structure				
		b) Height 5m to 10m				
		in crash barriers over precast facia panels of reinforced soil wall	Cum.	1424.600	10920.00	15556632.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
38		**Providing and fixing hand rail over the crash barrier consisting of MS base plate, embedded fastener and nuts, MS vertical plates and pipe etc. as shown in the drawing and as per specifications. All the railing components as mentioned above to be hot dip galvanised with a zinc coating of at least 175gm / sqm. The thickness of plates to be as shown in the drawings and pipe to be 100mm heavy class with a weight not less than 7.92 kg/m and conforming to IS: 1161 - 1979. Item to include all incidental works required to complete the work as directed by the Engineer - In - Charge. Measurement shall be made for the length of the pipe only.**	Meter	2156.000	2316.30	4993941.000
		Qty. Refer Appendix C.24(A); Rate as per Appendix C.28				
39	**4.1**	Plant Mix Method (Construction of granular sub-base by providing close graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density,complete as per cl. 401(with an initial lead of 5 Km.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		A-(i) for grading- I Material	Cum.	3234.000	2428.50	7853769.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
40	**4.12**	**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 in sb-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)				
		Qty. Ref.Appendix C.24(A); Rate as per SOR	Cum.	2991.450	2451.50	7333540.000
41	**5.1B**	Prime coat (Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 1.00 kg/sqm using mechanical means.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(ii) With bitumen emulsion-CSS-1 (IS-8887-2004)	Sqm.	11965.800	75.00	897435.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
42	**5.2**	**Tack Coat:** Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous/granular surface cleaned with mechanical broom.(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(II)With Bitumen emulsion CSS-1 (IS:8887-2004)				
		(c) Granular surfaces treated with primer	Sqm.	23931.600	20.00	478632.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
43	5.6	**Dense Graded Bituminous Macadam:** Providing and laying dense 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% 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 reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 407. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(c) With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982				
		(I)'with 60/70 or VG-30 grade bitumen				
		(ii)for Grading II(19 mm nominal size)	Cum.	718.000	10318.00	7408324.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
44	5.8	**Bituminous Concrete:** Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
		(c) With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
		(II)with Polymer modified bitumen 70				
		(ii) for Grading-II(13 mm nominal size)	Cum.	478.600	12788.50	6120576.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
45	8.13	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @ 250 gms per sqm area, 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. Item to include all labour, materials, machinery / equipment and incidental works required to complete the job. (@ 0.40 sqm / run of the flyover)	Sqm.	970.200	750.00	727650.000
		Qty. Ref.Appendix C.24(A); Rate as per SOR				
46	Analysis based on SOR	Providing and laying 60mm thick precast cement concrete interlocking paver blocks of M35 grade cement concrete in the footpath and median using OPC 43/53 grade, made by block making machine with strong vibratory compaction and of approved design / shape / colour laid in required pattern over and including 25mm thick compacted bed of coarse sand, filling the joint with join sealer containing sand and 10% admixture of marble stone powder complete as per the direction of the Engineer - In - Charge.	Sqm.	970.200	579.00	561746.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Qty. Ref.Appendix C.24(A); Rate as per Appendix C.29				
47	**Analysis based on SOR**	Providing and fixing precast kerb stones of approved size / shape of M35 grade cement concrete using OPC 43/53 grade OPC along both side of the flyover from start of one side valley curve to end of valley curve at the other endand across its width (at ground level). Item to include cost of all materials, T&P and all incidental required to execute the job. The quoted rates shall include the cost of 50mm thick PCC levelling pad (1:3:6) below the precast kerb stones.	Cum.	200.000	7998.00	1599600.000
		Qty. Ref.Appendix C.24(A); Rate as per Appendix C.31				
		Sub total of Approach portion (B) :				**278381007.600**
		Total Cost of Two Nos. of FLY OVERS (A+B) =				**491719020.800**

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
Bill No. 8 : BRIDGES AND STRUCTURES						
8.5		**Construction of 3 Nos. Minor Bridges at Ch. 21935m, at Ch.32800m And Ch. 32800m of proposed 4 lane stretch from Dolabari to Jamgurihat Part**				
1	**12.1B(b)**	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 and backfilling with approved material.				
		(II) With dewatering				
		i) upto 3 m depth	Cum.	9018.347	72.00	649321.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
2	**12.8/(N) A**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		(N) Without plasticiser				
		A) PCC Grade M15	Cum.	266.764	5605.00	1495213.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
3	**12.39**	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification				
		Levelling course below pile cap	Cum.	108.864	5383.00	586015.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
4	**12.38 (P) D (ii)**	Cement concrete for reinforced concrete in pile cap complete as per drawing and Technical Specification.Including steel shuttering form work. With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		D. RCC Grade M35				
		ii) Using Batching Plant, Transit Mixer and Concrete Pump	Cum.	1222.128	9157.00	11191026.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
5	**12.8 (P) B**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		P) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		B. PCC Grade M20	Cum.	123.400	8075.00	996455.000

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
		Qty. Refer Appendix. C-25; Rate as per SOR				
6	**12.8 (P),H,Case II**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		P) With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		H) RCC Grade M35				
		II) Using Batching Plant, Transit Mixer and Concrete Pump				
		Qty. Refer Appendix. C-25; Rate as per SOR	Cum.	392.256	9030.00	3542071.680
7	**12.25 / 1100, 1700 (P)**	Bored cast-in-situ M35 grade R.C.C. pile excluding reinforcement complete as per drawing and technical specifications and removal of excavated earth with all lifts and lead upto 1000 m. including providing plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999 (Pile diameter-1200 mm)				
		Qty. Refer Appendix. C-25; Rate as per SOR	Meter	1600.000	13895.00	22232000.000
8	**12.37 / 1100**	Pile load test on single vertical pile in accordance with IS:2911(Part-IV)				
		a)Initial	MT	1158.000	363.00	420354.000
		b)Routine	MT	872.000	363.00	316536.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
9	**12.40 (a)**	**Reinforcement in Foundation**: Supplying, fitting and placing un-coated TMT bar reinforcement in foundation complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	441.222	73279.00	32332302.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
10	**13.5 (P) (b) / Case II**	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork . Sub structure				
	P	With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser(Masterplast ACPL or equivalent) conforming to IS-9103-1999				
		H) RCC Grade M35; Case - I : Using Batching Plant				
		b) Height 5m to 10m				
		ii) With Batching Plant, Transit Mixer and Concrete Pump	Cum.	925.959	9369.00	8675313.000
		Qty. Refer Appendix. C-25; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
11	**13.6a / 1600, 2200**	**Reinforcement in Sustructure**: Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	176.003	73343.00	12908592.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
12	**14.1 (P) (B) / Case II / (i)(b)**	Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per drawing and Technical Specification' including steel shuttering formwork.				
	(P)	With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999.				
		B. RCC Grade M25				
		Case II: Using Batching plant, Transit mixer and Concrete pump				
		(i) For solid slab super-structure				
		b) Height 5.0m to 10.0m. For solid slab super-structure	Cum.	212.800	10591.00	2253765.000
		ii) For T-beam Super structure	Cum.	827.340	11014.00	9112323.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
13	**14.2 (a)/1600**	**Reinforcement in Super Structure:** Supplying, fitting and placing TMT bar reinforcement in super-structure including splicing complete as per drawing and technical specifications				
		(a) With TATA make TMT CRS (Fe 500 grade) rebar	MT	158.054	77554.00	12257720.000
		Qty. Refer Appendix. C-25; Rate as per SOR				
14	**13.14**	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.				
		Qty. Refer Appendix. C-25; Rate as per SOR	CuCm.	688128.000	1.02	701891.000
15	**14.22**	**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 instruction for installation).	Rm	48.000	11804.00	566592.000
		Qty. Ref. Appendix C.25; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
16	**14.18**	**Filler joint Expansion joint**				
		(i) Providing & fixing 2 mm thick corrugated copper plate in expansion joint complete as per drawing & Technical Specification.	Rm	48.000	1640.00	78720.000
		ii) Providing & fixing 20 mm thick compressible fibre board in expansion joint complete as per drawing & Technical Specification.	Rm	48.000	558.00	26784.000
		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 drawing and technical specification.	Rm	48.000	317.00	15216.000
		iv) Providing and filling joint sealing compound as per drawings and technical specifications with coarse sand and 6% bitumen by weight	Rm	48.000	17.00	816.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
17	**14.9 / 2705**	Drainage Spouts complete as per drawing and Technical specification	Nos.	48.000	10197.00	489456.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
18	**14.10**	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification				
		Qty. Ref. Appendix C.25; Rate as per SOR	Cum.	165.600	5498.00	910469.000
19	**14.11 (a)**	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specifications				
		With TATA make TMT CRS (Fe-500) grade rebar	Cum.	165.600	12025.00	1991340.000
20	**14.6**	Construction of precast RCC railing of M30 Grade, aggregate size not exceeding 12 mm, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications.	Rm	176.8400	2100.00	371364.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
21	**8.22 B**	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 HYSD/TMT reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 enclouser to MOST circular No. RW/NH -33022/1/94-DO III dated June 1994 as per dimension in the approved drawing and at locations directed by the engineer, all as specified.				
		B. M 40 grade concrete	Rm	353.680	4209.00	1488639.000
		Qty. Ref. Appendix C.25; Rate as per SOR				

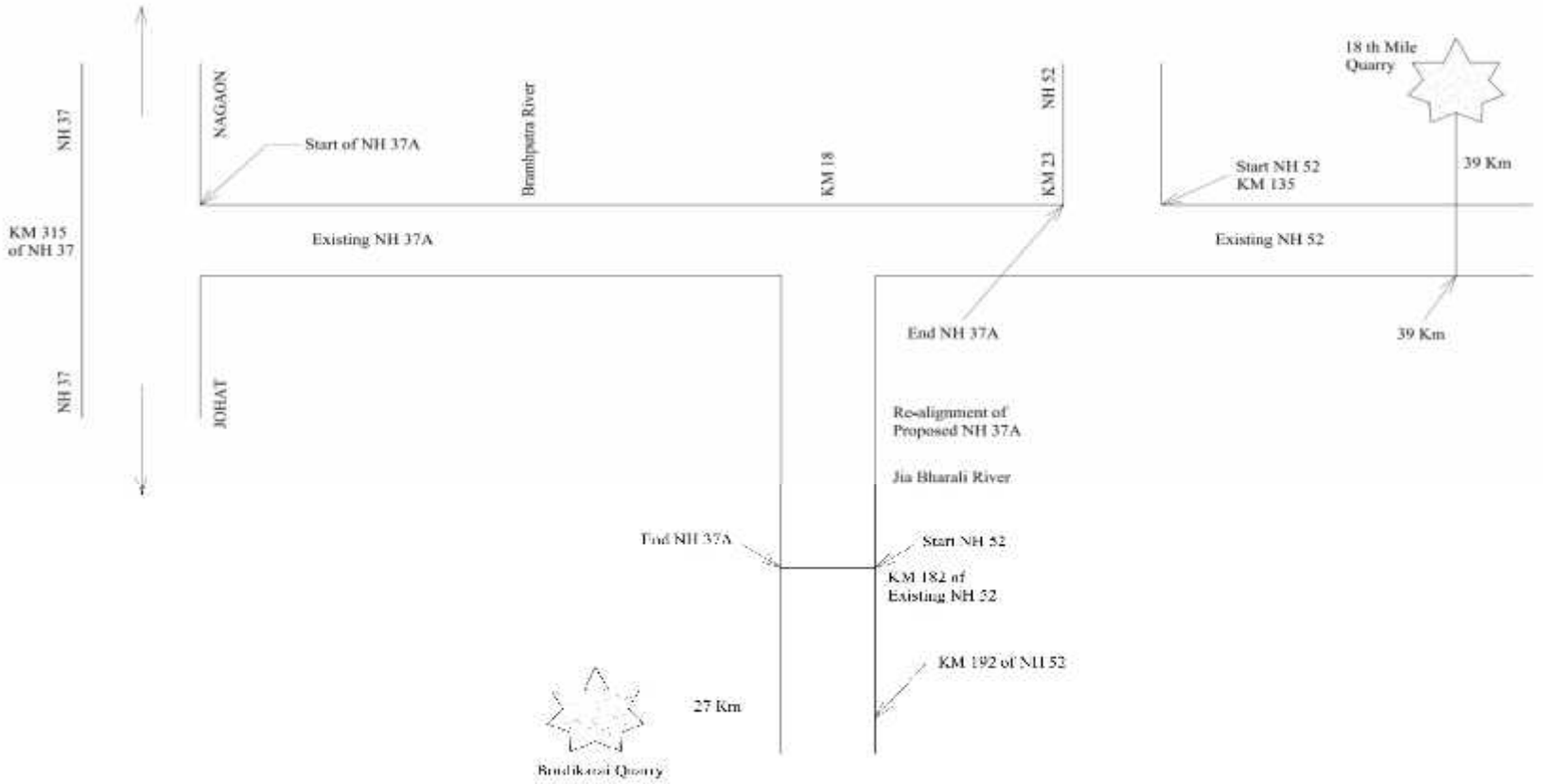
Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
22	**14.5 B**	Providing and laying Bituminous wearing course comprising of tack coat with bitumen emulsion CSS-1h as per APWD SOR item no 5.2 & MOSRT&H Specification Nos 503, 6mm thick mastic asphalt as per APWD SOR item no 14.5 & MOSRT&H Specification Nos 515 & 2702 and 2 layers of 25 mm thick Asphalt concrete including of close Graded Premix Surfacing(CGPS) materials with Type -a aggregate as per APWD SOR tem no 5.11 & MOSRT&H Specification Nos 512 including all lead and lift as directed.				
		Qty. Ref. Appendix C.25; Rate as per SOR	Sqm.	1503.140	688.00	1034160.000
23	**13.9**	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification				
		A. Granular material	Cum.	2264.396	1524.00	3450940.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
24	**14.19**	**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 200mmX 6mm of wiedable structural steel conforming to IS:2062, asphaltic plug consist of polymer modified bitumen binder, carefully selected single size aggregate of 12.5mm nominal size and heat resistant foam caulking/backer rod, all as per approved drawing and specifications.)	Rm	144.000	1861.00	267984.000
		Qty. Ref. Appendix C.25; Rate as per SOR				
25	**13.8**	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical specifications.	Each	432.000	204.00	88128.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
26	**8.51**	Providing reflective pavement marker with Micro prismatic lens in both direction having thermoplastic body adhering to the specification and guidelines of MoSRT&H's fixed to the road surface using the adhesives and the procedures recommended by the manufacturers with three months replacement warranty and free maintenance.	Each	120.000	298.00	35760.000
		Qty. Ref.Appendix C.25; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
27	**8.47 (a)**	Providing 'Sparkle Solar Road Studs, manufactured by Tata B.P. Solar India Ltd. Of size (125mmx125mm), 90mm height (from bottom of shank to the top of stud) with detachable battery, m6LEDs-three on each side for Bi-directional studs/3 LEDs on one side for unidirectional studs, ultra bright LED in amber and red colour, weight per stud 700+25 gms, flash rate of 50-65 times per minute completely water resistant and weather proof with replacement warranty and free maintenance fro one year from the date of installation of stud on road(installation should be made using adhesives and procedures recommended by manufacturer under the supervision of their competent technician).				
		a) Bi-directional Stud-	Each	24.000	3500.00	84000.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
28	**8.5**	**Direction and place identification sign upto 0.9sqm size board:** Providing and erecting direction and place identification retro-Reflectrorised sign as per IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3 fixed over aluminium sheeting, 2mm thick with area not exceeding 0.9sqm fixed on an angle iron of 25x25x4mm supported on a mild steel angle iron post 75mm x 75mm x 6mm firmly fixed to the ground by means of properly design foundation with M-15 grade Cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing and sign. (All the Steel work must be Tata/Sail/or any other approved brand)	Sqm.	51.840	10000.00	518400.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
29	**15.8 (A)**	Providing and laying Flooring complete as per drawing and Technical specifications laid over cement concrete bedding.				
		A. Rubble stone laid in cement mortar 1:3	Cum.	54.662	5273.00	288230.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
30	**15.1 A**	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 Technical specification.				
		A. Boulder laid dry without wire crates.	Cum.	202.500	1463.00	296258.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
31	**13.5 (P) (B)**	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork				
		P. With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser(Masterplast ACPL or equivalent) conforming to IS-9103-1999				
		B. PCC Grade M20 in wing wall	Cum.	1219.220	8120.00	9900066.400
		Qty. Ref.Appendix C.25; Rate as per SOR				

Item No.	MoRT&H's Specification	Item of Works	Unit	Estimated Quantity	Rate in Rs.	Amount in Rs.
32	**12.8 (N) A**	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.				
		N. Without plasticiser				
		A. PCC Grade M15 below wing wall	Cum.	113.231	5605.00	634657.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
33	**15.10 (B)**	Curtain wall complete as per drawing and Technical specification				
		B. Cement concrete Grade M15	Cum.	169.865	7046.00	1196870.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
34	**14.16**	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 Sq.m.)				
		a. For Plain surface	Sqm.	530.520	45.00	23873.000
		Qty. Ref.Appendix C.25; Rate as per SOR				
		Total cost of 3 nos Minor Bridges				**143429620.080**
		Total cost of Bridges and Structures (Bill No. 8)				

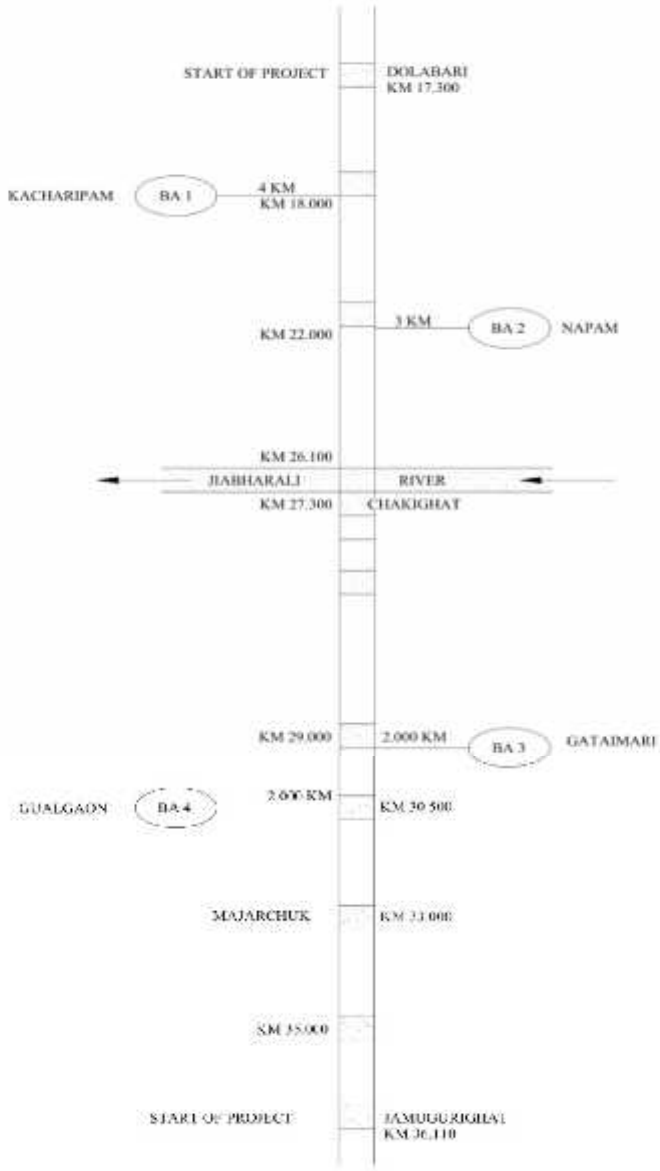
APPENDICES

Appendix C-1:Quarry Map-NH37A



Appendix C.1(A): Location of Borrow Area for Selected Soil

NAME OF WORK: 4 Lane capital Connectivity to Itanagar in Arunachal Pradesh under SARDP NE Phase from KM 17.300(Dolabari Road Junction on NH-37A) to KM 36.110(Jumugurighat Junction) in Sonitpur District in the State of Assam



Appenndix C.2 : Analysis of Rate of Earthwork in core

Sl.No.	Descriptions	Unit	Rate
1	Maximum lead of Borrow Area	Km	5.00
2	Carriege Cost Beyond 3 Km Lead	Rs./Km	7.74
3	Total Extra Lead Beyond 3 Km	Km	2.00
4	Extra Cost Beyond 3 Km	Rs.	15.48
5	Base Cost up to 3 Km Lead	Rs.	201.00
6	Total Cost of Material	Rs.	216.48

Appenndix C.3 : Analysis of Rate for Earthwork in Sub-grade & Shoulder by Selected soil

Sl.No.	Descriptions	Unit	Rate
1	Maximum lead of Borrow Area	Km	5.00
2	Carriege Cost Beyond 3 Km Lead	Rs./Km	8.46
3	Total Extra Lead Beyond 3 Km	Km	2.00
4	Extra Cost Beyond 3 Km	Rs.	16.92
5	Base Cost up to 3 Km Lead	Rs.	235.00
6	Total Cost of Material	Rs.	251.92

Appendix C.4 : Analysis of Rate for Providing GSB, WBM

Rate after extra Rs. 6.37 per KM/cum On Surface Road

6.37 per KM/cum On UnSurface Road

Location km of Work Site	Name of Quarry		LEAD			AVG. LEAD (Km)		Item of Work	Item No of SOR	Unit	Loose Qty. Req. (as per Data Book)	PC. of Voids	Net Qnty (cum)				Base Coat as per SOR with initial lead of 5Km (Rs/cum)	Total Cost with all Lead (Rs/cum)
			Surface Road	UnSurfaced Road	Total Lead (Km)	Surface Road	UnSurfaced Road							On Surface Road @ 6.37 ,/Km	On Surface Road @ 7.64 ,/Km	Total		
1	2		3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19
KM 17	**18 th mile Quarry**	**Via 18th KM of NH-37A**	60	3	63	**65.0**	**3**	GSB Gr.-I (Coarse Graded)	4.2/401 (i)	18th Mile cum Bordikarai cum	1.28	5%	1.216	464.76	27.87	492.63	2040.00	2428.50
KM 18			61	3	64													
KM 19			62	3	65													
KM 20			63	3	66						1.28	5%	1.216	255.62	27.87 Average	283.49	2040.00	
KM 21			64	3	67											388.06	2040.00	
KM 22			65	3	68													
KM 23			66	3	69			Stone Boulder Appron		18th Mile cum Bordikarai cum	1.20	12.5%	1.050	401.31	24.07	425.38	1463.00	1798.50
KM 24			67	3	70													
KM 25			68	3	71													
KM 26			69	3	72						1.20	12.5%	1.050	220.72	24.07 Average	244.79	1463.00	
KM 27			70	3	73											335.06	1463.00	

Appendix C.4 : Analysis of Rate for Providing GSB, WBM

Rate after extra Rs. 6.37 per KM/cum On Surface Road

6.37 per KM/cum On UnSurface Road

Location km of Work Site	Name of Quarry		LEAD			AVG. LEAD (Km)		Item of Work	Item No of SOR	Unit	Loose Qty. Req. (as per Data Book)	PC. of Voids	Net Qnty (cum)				Base Coat as per SOR with initial lead of 5Km (Rs/cum)	Total Cost with all Lead (Rs/cum)
			Surface Road	UnSurfaced Road	Total Lead (Km)	Surface Road	UnSurfaced Road							On Surface Road @ 6.37 ,/Km	On Surface Road @ 7.64 ,/Km	Total		
1	2		3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19
JIA BHARALI RIVER								Stone Masonry		18th Mile cum Bordikarai cum	1.20	12.5%	1.050	401.31	24.07	425.38	4068.00	4403.50
											1.20	12.5%	1.050	220.72	24.07 Average	244.79 335.08	4068.00 4068.00	
KM 1	Bordikarai Quary	Via Jamuguri	42	3	45	**38.0**	**3**	Filter Material		18th Mile cum Bordikarai cum	1.28	5%	1.216	464.76	27.87	492.63	1862.00	2250.50
KM 2			41	3	44													
KM 3			40	3	43						1.28	5%	1.216	255.62	27.87 Average	283.49 388.06	1862.00 1862.00	
KM 4			39	3	42													
KM 5			38	3	41			Stone Pitching		18th Mile cum Bordikarai cum	1.20	12.5%	1.050	401.31	24.07	425.38	1463.00	1798.50
KM 6			37	3	40													
KM 7			36	3	39						1.20	12.5%	1.050	220.72	24.07 Average	244.79 335.08	1463.00 1463.00	
KM 8			35	3	38													
KM 9			34	3	37													

Appenndix C.5 : Analysis of Rate for Providing, WMM, DBM, SDBC &BC

	Name of Quarry	:	18th Mile	Ave	Bordikarai			
	Location of Plant	:	At KM 18		At KM 9			
Lead -	Surface Road (Km)	:	65	51	37	Rate Beyonds extra leads Rs.		
	UnSurface Road (Km)	:	3	3	3	6.37	per Km/cum	On Surface Road
	Total (Km)	:	68	54	40	7.64	per Km/cum	On Un Surface Road

Item of Work	Item No of SOR	Unit	Loose Qty. Req. (as per Data Book)	P.C of Voids	Net Qnty (cum)	Extra Cost of carraige beyond initial lead of 5 Km				Basic rate with initial lead of 5Km (from SOR)	Cost of carriage from plant site to work site (FromAppendix C.6)	Total Rate with all leads (Rs/Cum)
						Average Extra Lead on Surface Road	Surface Road @ 6.37 cum,/Km	UnSurface Road @ 7.64 cum,/Km	Total (Rs.)			
1	2	3	4	5	6	7	8	9	10	11	12	13
WMM	4.12/406	cum	1.32	5%	1.254	46	367.45	28.74	396.19	2055.00	0.00	2451.50
DBM (Gr.-II)	5.6/507 (C) (B) (ii)	cum	1.488	5%	1.414	46	414.21	32.40	446.61	9871.00	0.00	10318.00
BC (Gr.-II)	5.8/509 (C) (II) (ii)	cum	1.507	5%	1.432	46	419.50	32.81	452.32	12336.00	0.00	12788.50
SDBC (Gr.-II)	5.7/508	cum	1.430	5%	1.359	46	398.07	31.14	429.20	0.00	0.00	429.50
Open Graded Pre-mix Surface	5.10/511 (i)	cum	0.027	5%	0.026	46	7.52	0.59	8.10	160.00	0.00	168.50
Liquid Seal Coat (TypeB)	5.12/513 (i)	cum	0.009	5%	0.009	46	2.51	0.20	2.70	57.00	0.00	60.00
Surface Dressing (II)	5.9/510 (ii)	cum	0.010	5%	0.010	46	2.78	0.22	3.00	87.00	0.00	90.50

Appendix C.7 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (For 4-Lane width)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		3.80	26.00	1.00		98.800		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Depth = 1.0 from natural ground level									
		For Key Portion	cum	2	3.80			0.425	3.230		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Area = (0.30x0.67)+(0.50x0.67x0.67) = 0.425 sqm.									
		No. = 2									
		Wing wall	cum	4	3.82	2.73	1.50		62.572		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	183.052	54.00	9884.79
2	13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		With plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser(Masterplast ACPL or equivalent) conforming to IS-9103-1999									
		Box Portion	cum		3.80	26.00	0.15		14.820		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Thick = 0.15 m									
		Wing wall	cum	4	3.82	2.73	0.15		6.257		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	1.50		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	22.922	7453.00	170838.86
3	13.5P/1500,1700 & 2200 (F) (a) Case-II	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification including providing plasticiser (PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or quivalent)and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999 and steel shuttering formwork.	cum						117.000	8917.00	1043289.00
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									
		Box portion									

Appendix C.7 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (For 4-Lane width)

4	13.5P/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Wing wall									
		PCC grade M-20	cum						47.100		
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.4			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
								Total	56.900	8120.00	462028.00
5	14.10/2700	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification	cum	2	3.50	26.00	0.15		27.300	5498.00	150095.40
		Approach slab									
		L = 3.50 m									
		W = 25 m									
		Thick = 0.15 m									
		No. = 2									
6	14.11a/1500,1600, 1700	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification	cum	2	3.50	26.00	0.30		54.600	12025.00	656565.00
		L = 3.50 m									
		W = 25 m									
		Thick = 0.3 m									
		No. = 2									
7	14.7/1500,1700 & 2703	Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications.	Lm	2	9.60				19.200	2044.00	39244.80
		No. = 2									
		L = 2+2x0.3+2x3.5 = 9.60 m									
8	13.5F/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork	cum	2	9.60	0.55	0.30		3.168	8917.00	28249.06
		Railing Kerb (M-25)									
		L = 2+2x0.3+2x3.5 = 9.60 m									
		Width = 0.55 m									
		Thick = 0.30									
		No. = 2									
9	13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.									
		(a) For Box portion	cum	2	0.60	26.00	1.40		43.680		
		No. = 2									
		L = 6 m									
		W = 25 m									
		Ht. = 1.4 m									
		(b) For Wing wall	cum	4	3.82	0.60	2.85		26.129		
		Length of Wing Wall = 3.82 m									
		Ave. Ht. = (3.55+2.15)/2 = 2.85 m									
		Width = 0.60 m									
		No. = 4									
		Total							69.809	1766.00	123282.34

Appendix C.7 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (For 4-Lane width)

10	15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						3.800		
		b) 300 mm thick Concrete	cum						7.600		
		c) 150 mm thick Flag Stone	cum						3.800		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							15.200	1798.50	27337.20
11	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.									
		750 mm thcik Stone	cum						49.900	1798.50	89745.15
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
12	9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						3.700	4535.00	16779.50
13	12.8(P)A/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						14.000	6514.00	91196.00
		b) Concrete for U/S curtain wall	cum						10.900	6514.00	71002.60
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
14		Tar Paper Bearing	sqm	2	26.00	0.30			15.600	150.00	2340.00
15	13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	26.00	3.50	1.70		309.400		
		B) Behind Wing Wall	cum	4	3.82	3.50	1.50		80.22		
		Total							389.620	1524.00	593780.88
16	14.18iii/2605	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 drawing and technical specification.	Mtr.	2	26.00				52.000	317.00	16484.00
17	14.9/2705	Drainage Spouts complete as per drawing and technical specification.	No.						4.000	10197.00	40788.00
18	13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.	No.						50.000	204.00	10200.00
19	13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						7.497	73343.00	549828.02
									TOTAL (Rs.) :		4192958.6

Appendix C.8 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (3m Surcharge)

(Length = 38m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No.1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		3.80	38.00	1.00		144.40		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	3.80			0.425	3.230		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Area = (0.30x0.67)+(0.50x0.67x0.67) = 0.425 sqm.									
		No. = 2									
		Wing wall	cum	4	3.82	2.73	1.50		62.572		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	228.652	54.00	12347.19
2	Item No.2/13.5 (P)(A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		3.80	38.00	0.15		21.660		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Thick = 0.15 m									
		Wing wall	cum	4	3.82	2.73	0.15		6.257		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	29.762	7453.00	221817.38
3	Item No.3/13.5F(a)/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork	cum						171.000	7918.00	1353978.00
		RCC grade M-25									
		Box Portion									
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									
4	Item No.4/13.5B/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20									
		Wing Wall	cum						47.100		
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.4			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
								Total	56.900	6713.000	381969.70

Appendix C.8 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (3m Surcharge)

5	Item No.5/8.22a/809	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 HYSD reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 enclouser to MOST circular No. RW/NH - 33022/1/94-DO III dated June 1994 as per dimension in the approved drawing and at locations directed by	Lm	2	9.60				19.200	3932.00	75494.40
		No. = 2									
		L = 2+2x03+2x3.5 = 9.60 m									
6	Item No.6/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as									
		(a) For Box portion	cum	2	0.60	38.00	1.40		63.840		
		No. = 2									
		L = 6 m									
		W = 25 m									
		Ht. = 1.4 m									
		(b) For Wing wall	cum	4	3.82	0.60	2.85		26.129		
		Length of Wing Wall = 3.82 m									
		Ave. Ht. = (3.55+2.15)/2 = 2.85 m									
		Width = 0.60 m									
		No. = 4									
		Total							89.969	1766.00	158884.90
7	Item No. 7/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						3.800		
		b) 300 mm thick Concrete	cum						7.600		
		c) 150 mm thick Flag Stone	cum						3.800		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							15.200	1798.50	27337.20
8	Item No. 8/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall									
		750 mm thcik Stone	cum						49.900	1798.50	89745.15
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
9	Item No.9/9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						3.700	4535.00	16779.50
10	Item No. 10/12.8(P)/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork									
		a) Concrete for D/S curtain wall	cum						14.000	6514.00	91196.00
		b) Concrete for U/S curtain wall	cum						10.900	6514.00	71002.60
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
11	Item No. 11/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	38.00	3.50	1.70		452.200		
		B) Behind Wing Wall	cum	4	3.82	3.50	1.50		80.220		
		Total							532.420	1524.00	811408.08
12	Item No. 12/13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification	No.						50.000	204.00	10200.00
13	Item No. 13/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						10.957	73343.00	803594.80
									TOTAL (Rs.) :		4125754.90

Appendix C.9 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (6.5m Surcharge)

(Length = 52m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No.1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		3.80	52.00	1.00		197.600		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	3.80			0.425	3.230		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Area = (0.30x0.67)+(0.50x0.67x0.67) = 0.425 sqm.									
		No. = 2									
		Wing wall	cum	4	3.82	2.73	1.50		62.572		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	281.852	54.00	15219.99
2	Item No.2/13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		3.80	52.00	0.15		29.640		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Thick = 0.15 m									
		Wing wall	cum	4	3.82	2.73	0.15		6.257		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	37.742	7453.00	281292.32
3	Item No.2/13.5F(a)/1500 ,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork	cum						234.000	7918.00	1852812.00
		RCC grade M-25									
		Box Portion									
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									

Appendix C.9 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (6.5m Surcharge)

4	Item No.4/13.5B/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20									
		Wing Wall	cum						47.100		
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.40			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
								Total	56.900	6713.000	381969.70
5	Item No.5/8.22a/809	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 HYSD reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 enclouser to MOST circular No. RW/NH - 33022/1/94-DO III dated June 1994 as per dimension in the approved drawing and at locations directed by the engineer, all as specified.	Lm	2	9.60				19.200	3932.00	75494.40
		No. = 2									
		L = 2+2x03+2x3.5 = 9.60 m									
6	Item No.6/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.									
		(a) For Box portion	cum	2	0.60	38.00	1.40		63.840		
		No. = 2									
		L = 6 m									
		W = 25 m									
		Ht. = 1.4 m									
		(b) For Wing wall	cum	4	3.82	0.60	2.85		26.129		
		Length of Wing Wall = 3.82 m									
		Ave. Ht. = (3.55+2.15)/2 = 2.85 m									
		Width = 0.60 m									
		No. = 4									
		Total							89.969	1766.00	158884.90

Appendix C.9 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (6.5m Surcharge)

7	Item No. 7/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						3.800		
		b) 300 mm thick Concrete	cum						7.600		
		c) 150 mm thick Flag Stone	cum						3.800		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							15.200	1798.50	27337.20
8	Item No. 8/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.									
		750 mm thcik Stone	cum						49.900	1798.50	89745.15
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
9	Item No.9/9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						3.700	4535.00	16779.50
10	Item No. 10/12.8(P)/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						14.000	6514.00	91196.00
		b) Concrete for U/S curtain wall	cum						10.900	6514.00	71002.60
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
11	Item No. 11/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	52.00	3.50	1.70		618.800		
		B) Behind Wing Wall	cum	4	3.82	3.50	1.50		80.220		
		Total							699.020	1524.00	1065306.48
12	Item No. 12/13.8/2200 & 2706	P	No.						50.000	204.00	10200.00
13	Item No. 13/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						14.993	73343.00	1099656.05
									TOTAL (Rs.) :		5236896.29

Appendix C.10 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (12m Surcharge)

(Length = 74m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No.1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		3.80	74.00	1.00		281.200		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	3.80			0.425	3.230		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Area = (0.30x0.67)+(0.50x0.67x0.67) = 0.425 sqm.									
		No. = 2									
		Wing wall	cum	4	3.82	2.73	1.50		62.5716		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	365.452	54.00	19734.39
2	Item No.2/13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		3.80	74.00	0.15		42.180		
		L=2.0+2x0.30+2x0.50+2x0.10 = 3.80 m									
		Width = 25 m									
		Thick = 0.15 m									
		Wing wall	cum	4	3.82	2.73	0.15		6.25716		
		Length of wing wall = 3.82 m									
		Depth of Foundation = 1.50 m									
		Width = (2.25+3.2)/2 = 2.73 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	50.282	7453.00	374752.94
3	Item No.2/13.5F(a)/1500 ,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		RCC grade M-25									
		Box Portion	cum						333.000	7918.00	2636694.00
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									

Appendix C.10 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (12m Surcharge)

4	Item No.4/13.5B/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20									
		Wing Wall	cum						47.100		
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.40			1.75	9.800		
		Length = 1.4 m									
		Area=									
		(1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) =									
		0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
								Total	56.900	6713.000	381969.70
5	Item No.5/8.22a/809	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 HYSD reinforcement conforming to IRC:21 and dowel bar 25mm dia, 450mm 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 enclouser to MOST circular No. RW/NH - 33022/1/94-DO III dated June 1994 as per dimension in the approved drawing and at locations directed by the engineer, all as specified.	Lm	2	9.60				19.200	3932.00	75494.40
		No. = 2									
		L = 2+2x03+2x3.5 = 9.60 m									
6	Item No.6/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.									
		(a) For Box portion	cum	2	0.60	74.00	1.40		124.320		
		No. = 2									
		L = 6 m									
		W = 25 m									
		Ht. = 1.4 m									
		(b) For Wing wall	cum	4	3.82	0.60	2.85		26.129		
		Length of Wing Wall = 3.82 m									
		Ave. Ht. = (3.55+2.15)/2 = 2.85 m									
		Width = 0.60 m									
		No. = 4									
		Total							150.449	1766.00	265692.58

Appendix C.10 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x2 (12m Surcharge)

7	Item No. 7/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						3.800		
		b) 300 mm thick Concrete	cum						7.600		
		c) 150 mm thick Flag Stone	cum						3.800		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							15.200	1798.50	27337.20
8	Item No. 8/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.									
		750 mm thcik Stone	cum						49.900	1798.50	89745.15
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
9	Item No.9/9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						3.700	4535.00	16779.50
10	Item No. 10/12.8(P)/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						14.000	6514.00	91196.00
		b) Concrete for U/S curtain wall	cum						10.900	6514.00	71002.60
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
11	Item No. 11/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	74.00	3.50	1.70		880.600		
		B) Behind Wing Wall	cum	4	3.82	3.50	1.50		80.220		
		Total							960.820	1524.00	1464289.68
12	Item No. 12/13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.	No.						50.000	204.00	10200.00
13	Item No. 13/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						21.337	73343.00	1564895.14
									TOTAL (Rs.) :		7089783.28

Appendix C.11 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x3 (Length = 26 m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No. 1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		5.50	26.00	1.00		143.000		
		L=2.0+2x0.35+2x1.30+2x0.10 = 5.50 m									
		Width = 25 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	5.50			0.425	4.675		
		L=2.0+2x0.35+2x1.30+2x0.10 = 5.50 m									
		Area = (0.30x0.67)+(0.50x0.67x0.67) = 0.425 sqm.									
		No. = 2									
		Wing wall	cum	4	6.7	3.68	1.50		147.936		
		Length of wing wall = 6.7 m									
		Depth of Foundation = 1.50 m									
		Width = (3.04+4.31)/2 = 3.68 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		For Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	314.061	52.00	16331.17
2	Item No. 2/13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		5.50	26.00	0.15		21.450		
		L=2.0+2x0.35+2x1.30+2x0.10 = 5.50 m									
		Width = 12 m									
		Thick = 0.15 m									
		Wing wall	cum	4	6.70	3.68	0.15		14.7936		
		Length of wing wall = 6.7 m									
		Depth of PCC = 0.15 m									
		Width = (3.04+4.31)/2 = 3.68 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	38.089	7453.00	283874.34
3	Item No. 3/13.5P/1500,1700 & 2200 (F) (a) Case-II	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification including providing plasticiser (PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or quivalent)and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999 and steel shuttering formwork.	cum						166.833	7918.00	1320986.33
		RCC Grade M-25									
		Box Portion									
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									
4	13.5P/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20	cum						96.000		
		Wing Wall									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.40			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
		Total							105.800	6713.000	710235.40

Appendix C.11 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x3 (Length = 26 m)

5	Item No. 5/14.10/2700	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification	cum	2	3.50	26.00	0.15		27.300	5498.00	150095.40
		Approach slab									
		L = 3.50 m									
		W = 12 m									
		Thick = 0.15 m									
		No. = 2									
6	Item No. 6/14.11a/1500,1600,1700	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification	cum	2	3.50	26.00	0.30		54.600	12025.00	656565.00
		L = 3.50 m									
		W = 12 m									
		Thick = 0.3 m									
		No. = 2									
7	Item No.7/ 14.7/1500,1700 & 2703	Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications.	Lm	2	9.60				19.200	2044.00	39244.80
		No. = 2									
		L = 2+2x0.3+2x3.5 = 9.60 m									
8	Item No. 8/13.5F/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork	cum	2	9.60	0.55	0.30		3.168	7918.00	25084.22
		Railing Kerb (M-25)									
		L = 2+2x0.3+2x3.5 = 9.60 m									
		Width = 0.55 m									
		Thick = 0.30									
		No. = 2									
9	Item No. 9/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.									
		(a) For Box portion	cum	2	0.60	26.00	1.40		43.680		
		No. = 2									
		L = 0.6 m									
		W = 12 m									
		Ht. = 1.4 m									
		(b) For Wing wall	cum	4	3.82	0.60	3.36		30.804		
		Length of Wing Wall = 6.7 m									
		Ave. Ht. = (4.57+2.15)/2 = 3.36 m									
		Width = 0.60 m									
		No. = 4									
		Total							74.484	1766.00	131539.59
10	Item No. 10/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						9.600		
		b) 300 mm thick Concrete	cum						19.200		
		c) 150 mm thick Flag Stone	cum						9.600		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							38.400	1798.50	69062.40
11	Item No. 11/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.									
		750 mm thcik Stone	cum						77.500	1798.50	139383.75
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
12	9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						5.800	4535.00	26303.00

Appendix C.11 : Analysis of rate for Single Cell RCC Box Culvert of Size 2x3 (Length = 26 m)

13	Item No. 13/ 12.8(P)A/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						21.800	6514.00	142005.20
		b) Concrete for U/S curtain wall	cum						16.800	6514.00	109435.20
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
14	Item No. 14/	Tar Paper Bearing	sqm	2	26.00	0.30			15.600	150.00	2340.00
15	Item No. 15/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	26.00	3.50	1.70		309.400		
		B) Behind Wing Wall	cum	4	6.7	3.50	1.50		140.70		
		Total							450.100	1524.00	685952.40
16	Item No. 16/14.18iii/2605	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 drawing and technical specification.	Mtr.	2	26.00				52.000	317.00	16484.00
17	Item No. 17/14.9/2705	Drainage Spouts complete as per drawing and technical specification.	No.						4.000	10197.00	40788.00
18	Item No. 18/13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.	No.						50.000	204.00	10200.00
19	Item No. 19/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						12.242	73343.00	897840.56
									TOTAL (Rs.) :		5473751

Appendix C.12 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x3 (Length = 26 m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No. 1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		5.84	26.00	1.00		151.840		
		L=3.0+2x0.42+2x0.9+2x0.10 = 5.84 m									
		Width = 25 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	5.84			0.388	4.532		
		L=3.0+2x0.42+2x0.9+2x0.10 = 5.84 m									
		Area = (0.30x0.63)+(0.50x0.63x0.63) = 0.388 sqm.									
		No. = 2									
		Wing wall	cum	4	6.85	3.72	1.50		152.892		
		Length of wing wall = 6.85 m									
		Depth of Foundation = 1.50 m									
		Width = (3.07+4.36)/2 = 3.72 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		For Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	327.714	54.00	17696.56
2	Item No. 2/13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		5.84	26.00	0.15		22.776		
		L=3.0+2x0.42+2x0.9+2x0.10 = 5.84 m									
		Width = 12 m									
		Thick = 0.15 m									
		Wing wall	cum	4	6.85	3.72	0.15		15.289		
		Length of wing wall = 6.85 m									
		Depth of PCC = 0.15 m									
		Width = (3.07+4.36)/2 = 3.72 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	39.910	7453.00	297450.72
3	Item No. 3/13.5P/1500,1700 & 2200 (F) (a) Case-II	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification including providing plasticiser (PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or quivalent)and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999 and steel shuttering formwork									
		Box Portion									
		RCC Grade M-25	cum						203.667	7918.00	1612632.67
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									

Appendix C.12 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x3 (Length = 26 m)

4	13.5P/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20	cum						99.800		
		Wing Wall									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.40			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
		Total							109.600	8120.000	889952.00
5	Item No. 5/14.10/2700	PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification									
		Approach slab									
		I. Levelling course M-15 concrete	cum	2	3.50	26.00	0.15		27.300	5498.00	150095.40
		L = 3.50 m									
		W = 25 m									
		Thick = 0.15 m									
		No. = 2									
		II. RCC M-30 Grade concrete	cum	2	3.5	26.00	0.30		54.600	12025.00	656565.00
		L = 3.50 m									
		W = 25 m									
		Thick = 0.30 m									
		No. = 4									
6	Item No. 6/14.11a/1500,1600,1700	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification	Lm	2	10.84				21.680	2044.00	44313.92
		No. = 2									
		L = 3+2x0.42+2x3.5 = 10.84 m									
		No. = 2									
		L = 2+2x0.3+2x3.5 = 9.60 m									
8	Item No. 8/13.5F/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
7		Railing Kerb (M-25)	cum	2	10.84	0.55	0.3		3.577	7918.00	28324.27
		L = 3+2x0.42+2x3.5 = 10.84 m									
		Width = 0.55 m									
		Thick = 0.30									
		No. = 2									
9	Item No. 9/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification.									
		(a) For Box portion	cum	2	0.60	26.00	2.40		74.880		
		No. = 2									
		L = 0.6 m									
		W = 25 m									
		Ht. = 2.4 m									
		(b) For Wing wall	cum	4	6.85	0.60	3.39		55.732		
		Length of Wing Wall = 6.85 m									
		Ave. Ht. = (4.62+2.15)/2 = 3.39 m									
		Width = 0.60 m									
		No. = 4									
		Total							130.612	1766.00	230660.09

Appendix C.12 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x3 (Length = 26 m)

10	Item No. 10/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						11.400		
		b) 300 mm thick Concrete	cum						22.800		
		c) 150 mm thick Flag Stone	cum						11.400		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							45.600	1798.50	82011.60
11	Item No. 11/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.									
		750 mm thcik Stone	cum						85.600	1798.50	153951.60
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
12	9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						6.400	4535.00	29024.00
13	Item No. 13/ 12.8(P)A/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						24.100	6514.00	156987.40
		b) Concrete for U/S curtain wall	cum						18.600	6514.00	121160.40
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
14	Item No. 14/	Tar Paper Bearing	sqm	2	26.00	0.30			15.600	150.00	2340.00
15	Item No. 15/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	26.00	3.50	2.70		491.400		
		B) Behind Wing Wall	cum	4	6.84	3.50	2.30		220.248		
		Total							711.648	1524.00	1084551.55
16	Item No. 16/14.18iii/260	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 drawing and technical specification.	Mtr.	2	26.00				52.000	317.00	16484.00
17	Item No. 17/14.9/2705	Drainage Spouts complete as per drawing and technical specification.	No.						4.000	10197.00	40788.00
18	Item No. 18/13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.	No.						120.000	204.00	24480.00
19	Item No. 19/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						12.35	73343.00	905786.05
									TOTAL (Rs.) :		6545255.22

Appendix C.13 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x4 (Length = 26 m)

Sl.No.		Descriptions	Unit	No.	Length	Width	Ht./Th.	Area	Quantity	Rate	Amount
1	Item No. 1/12.1/304	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 and backfilling with approved material.									
		B)"Mechaninal Means (Depth upto 3 m)) (With dewatering)									
		Box Portion	cum		7.56	26.00	1.00		196.560		
		L=3.0+2x0.48+2x1.70+2x0.10 = 7.56 m									
		Width = 12 m									
		Depth = 1.0 m from natural ground level									
		For Key Portion	cum	2	7.56			0.388	5.867		
		L=3.0+2x0.48+2x1.70+2x0.10 = 7.56 m									
		Area = (0.30x0.63)+(0.50x0.63x0.63) = 0.388 sqm.									
		No. = 2									
		Wing wall	cum	4	9.76	6.56	1.50		384.1536		
		Length of wing wall = 9.76 m									
		Depth of Foundation = 1.50 m									
		Width = (5.44+7.68)/2 = 6.56 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		For Return wall									
		Length of Return wall = 1.4 + 0.1 = 1.5 m	cum	4	1.50	2.05	1.50		18.450		
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	605.030	54.00	32671.63
2	Item No. 2/13.5 (P) (A)/1500, 1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Box Portion	cum		7.56	26.00	0.15		29.484		
		L=3.0+2x0.48+2x1.70+2x0.10 = 7.56 m									
		Width = 12 m									
		Thick = 0.15 m									
		Wing wall	cum	4	9.76	6.56	0.15		38.415		
		Length of wing wall = 9.76 m									
		Depth of PCC = 0.15 m									
		Width = (5.44+7.68)/2 = 6.56 m									
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		No. = 4									
		Return wall	cum	4	1.50	2.05	0.15		1.845		
		Length of Return wall = 1.4 + 0.1 = 1.5 m									
		Width = 2.05 m									
		Depth = 1.50 m									
		No. = 4									
								Total	69.744	7453.00	519804.72
3	Item No. 3/13.5P/1500,1700 & 2200 (F) (a) Case-II	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification including providing plasticiser (PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or quivalent)and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999 and steel shuttering formwork.									
		RCC Grade M-25	cum						268.667	7918.00	2127302.67
		Box Portion									
		(Refer MOST Dwg. No. SD/108 sheet 2 of 6)									

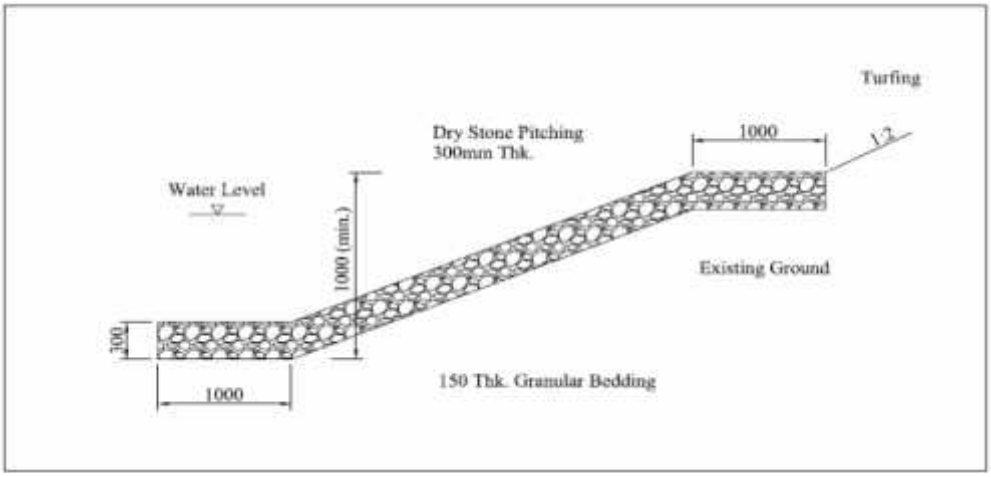
Appendix C.13 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x4 (Length = 26 m)

4	13.5P/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		PCC grade M-20	cum						188.770		
		(Refer MOST Dwg. No. SD/113 sheet 6 of 6)									
		Return Wall	cum	4	1.40			1.75	9.800		
		Length = 1.4 m									
		Area= (1.81x0.50)+(0.50x0.46x0.24)+(0.50x0.85x(0.85+0.3)+(0.50x0.30)+(0.40x0.35) = 0.905+0.055+0.50+0.15+0.14 = 1.75 sqm									
		No. = 4									
		Total							198.570	8120.000	1612388.40
5	Item No. 5/14.10/2700	I. PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification	cum	4	3.50	26.00	0.15		54.600	5498.00	300190.80
		Approach slab									
		L = 3.50 m									
		W = 12 m									
		Thick = 0.15 m									
		No. = 4									
6	Item No. 6/14.11a/1500,1600,1700	Reinforced cement concrete approach slab including reinforcement and formwork complete as per drawing and Technical specification									
		II. RCC M-30 grade concrete	cum	4	3.50	26.00	0.30		109.200	12025.00	1313130.00
		L = 3.50 m									
		W = 12 m									
		Thick = 0.3 m									
		No. = 4									
7	Item No.7/ 14.7/1500,1700 & 2703	Construction of RCC railing of M30 Grade in-situ with 20 mm nominal size aggregate, true to line and grade, tolurence of vertical RCC post not to exceed 1 in 500, centre to centre spacing between vertical post not to exceed 2000 mm, leaving adequat space between vertical posts for expansion, complete as per approved drawings and technical specifications.	Lm	2	10.96				21.920	2044.00	44804.48
		No. = 2									
		L = 2+2x0.3+2x3.5 = 9.60 m									
8	Item No. 8/13.5F/1500,1700 & 2200	Plain/Reinforced cement concrete, in sub structure complete as per drawing and technical specification and steel shuttering formwork									
		Railing Kerb (M-25)	cum	2	10.84	0.55	0.30		3.577	7918.00	28324.27
		L = 3+2x0.48+2x3.5 = 10.96 m									
		Width = 0.55 m									
		Thick = 0.30									
		No. = 2									
9	Item No. 9/13.10/2200	Providing and laying of Filter media with granular materials/stone crushed aggregates satisfying the requirements laid down in clause 2504.2.2. of MoRTH specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size toeards the wall and provided over the entire surfaces behind the abutement, wing wall and return wall to the full height compacted to firm condition complete as per drawing and technical specification									
		(a) For Box portion	cum	2	0.60	26.00	2.40		74.880		
		No. = 2									
		L = 0.6 m									
		W = 12 m									
		Ht. = 2.4 m									
		(b) For Wing wall	cum	4	9.76	0.60	3.90		91.354		
		Length of Wing Wall = 9.76 m									
		Ave. Ht. = (5.65+2.15)/2 = 3.90 m									
		Width = 0.60 m									
		No. = 4									
		Total							166.234	1766.00	293568.54

Appendix C.13 : Analysis of rate for Single Cell RCC Box Culvert of Size 3x4 (Length = 26 m)

10	Item No. 10/15.4/2504	Providing and laying Pitching on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and Technical specifications									
		a) 150 mm thick PCC M-15	cum						20.500		
		b) 300 mm thick Concrete	cum						41.000		
		c) 150 mm thick Flag Stone	cum						20.500		
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)							82.000	1798.50	147477.00
11	Item No. 11/15.11/2507.2	Flexible Apron :Construction of flexible apron 1 m thick comprising of loose stone boulders weighing not less than 40 kg beyond curtain wall.									
		750 mm thcik Stone	cum						113.400	1798.50	203949.90
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
12	9.1/408	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 mix with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)									
		a) PCC under curtain wall	cum						8.400	4535.00	38094.00
13	Item No. 13/ 12.8(P)A/1500,1700 & 2100	Plain/Reinforced cement concrete, in open foundation complete as per drawing and technical specification including steel shuttering formwork.									
		a) Concrete for D/S curtain wall	cum						31.900	6514.00	207796.60
		b) Concrete for U/S curtain wall	cum						24.700	6514.00	160895.80
		(Refer MOST Dwg. No. SD/111 sheet 4 of 4)									
14	Item No. 14/	Tar Paper Bearing	sqm	2	26.00	0.30			15.600	150.00	2340.00
15	Item No. 15/13.9A/2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification									
		a) Behind Abutment	cum	2	26.00	3.50	3.40		618.800		
		B) Behind Wing Wall	cum	4	9.76	3.50	3.50		478.240		
		Total							1097.040	1524.00	1671888.96
16	Item No. 16/14.18iii/260	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 drawing and technical specification.	Mtr.	2	26.00				52.000	317.00	16484.00
17	Item No. 17/14.9/2705	Drainage Spouts complete as per drawing and technical specification.	No.						4.000	10197.00	40788.00
18	Item No. 18/13.8/2200 & 2706	Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment, wing wall/return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing foce. Complete as per drawing and Technical specification.	No.						120.000	204.00	24480.00
19	Item No. 19/13.6(a)/1600 & 2200	Supplying, fitting and placing TMT bar reinforcement in sub-structure complete as per drawing and technical specifications									
		a) For Box Portion	MT						16.337	73343.00	1198180.14
									TOTAL (Rs.) :		9984559.90

Appendix C. 14 :- Analysis of rate for Embankment Protection



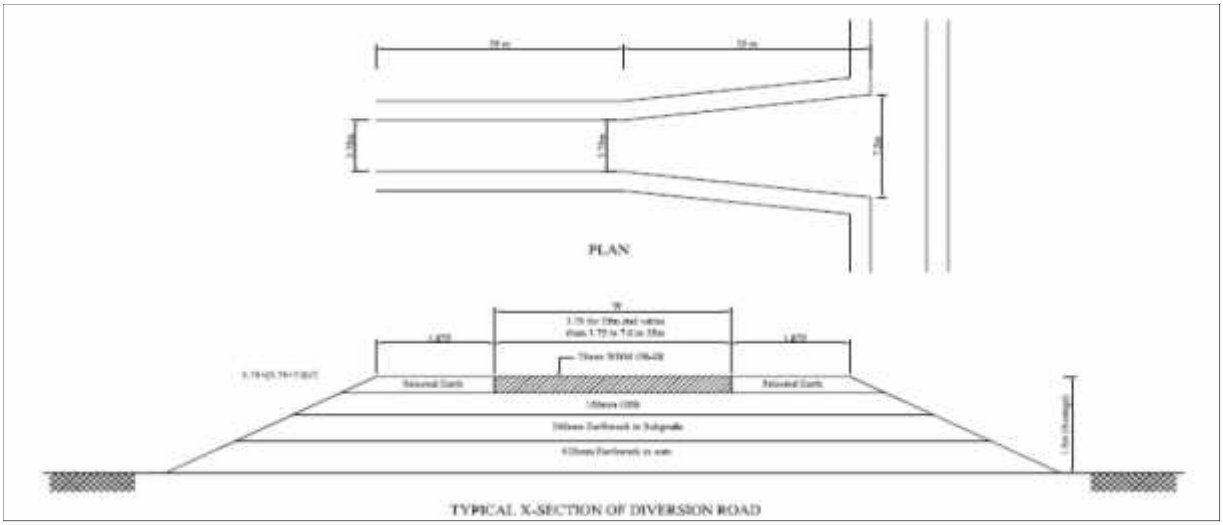
Assume HFL = 0.5M above ground

Out put = 1 Running Metre

Sl. No.	Descriptions	Unit	Quantity	*Rate*	*Amount*
1	Providing and laying filter material underneath pitching in slopes complete as per drawing and technical specifications including cost of stone aggregates and with lead of initial 5km for carriage from quarry.	Cum	0.825	2250.50	1856.663
	Q'ty. = 5.5 sqm x 0.15m = 0.525 cum				
2	Providing and laying pitching on slope laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per drawing and drawing technical specifications including lead of initial 5km.	Cum	1.650	1798.50	2967.525
	(a) from private land				
	Q'ty. = 5.5 sqm x 0.3m = 1.05 cum				
				Total Cost per 1 m (Rs.)	**4824**

Appendix C. 15 :- Cost Estimate for one Feeder Road

Average Height of Embankment for Road is 3m. Feeder roads meeting project road needs to be regraded so as to match with project road level. 50m length is considered for the estimation purpose. Embankment for feeder road varies from o to 3m. So, 1.5m average height is considered in the estimate



TYPICAL X-SECTION OF DIVERSION ROAD

<u>Quantities for One X- road (L= 50m, H=1.5m)</u>		
Average Width (w) = [3.75+ (3.75+7.0)/2]/2 =	4.5625	m
Quantity of WMM = 4.6 X 0.150 X 50 =	34.5	Cum
Quantity of GSB = [4.6+2 x 2.325] x 0.15 x 50 =	69.375	Cum
Quantity of Subgrade = [4.6+2 x 3.025] x 0.35 x 50 =	186.375	Cum
Quantity of E/ W = [4.6+2 x 3.95] x 1.5 x 50 =	937.5	Cum
Quantity of PMC = 4.6 X 50 =	230	Cum

Appendix C. 15 : Cost Estimate for one Feeder Road

Item No.	Descriptions	Unit	Quantity	*Rate*	*Amount*
1	Construction of embankment with approved materials deposited from roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of Table 300-2	Cum	937.500	216.48	202950.00
2	Construction of Subgrade with approved materials obtained from borrow pits, with initial lead up to 3.00 km transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-2 (including land compensation of earth)	Cum	186.375	251.92	46951.59
3	Construction of Granular Sub Base (GSB) providing close graded materials, spreading in uniform layers with motor grader in prepared surface, mixing by mix in place method with vibratory roller to achieve the desired density, complete as per clause 401 (with an initial lead of 5 kg)	Cum	69.375	2428.50	168477.19
4	Providing, laying spreading and compacting graded stone aggregate to wet mix macadam (WMM) specification including premixing the material's with water at OMC in mechanical mix plant carriage of mixed material by tipper top site laying in uniform layers with paver in sub base/ base course on well prepared surface and compacting with vibratory roller to achieve the desired density including carriage up to initial lead 5.0 km.	cum	34.500	2451.50	84576.75
5	Providing, laying and rolling of open- graded premix surfacing of 20 mm thickness of 13.2mm to 5.6 mm aggregates either using penetration grade bitumen or cutback or emulsion to req. 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 tone capacity finished to required level and grades (including carriage up to initial lead of 5 km from quarry and carriage of mixed materials up to 10 km lead from mixing plant	sqm	230.00	168.50	38755.00
6	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 coat (including to 5.0 km initial lead from quarry)	Cum	230.000	60.00	13800.00
	Total Cost per one feeder road (Rs.)				**555510.53**

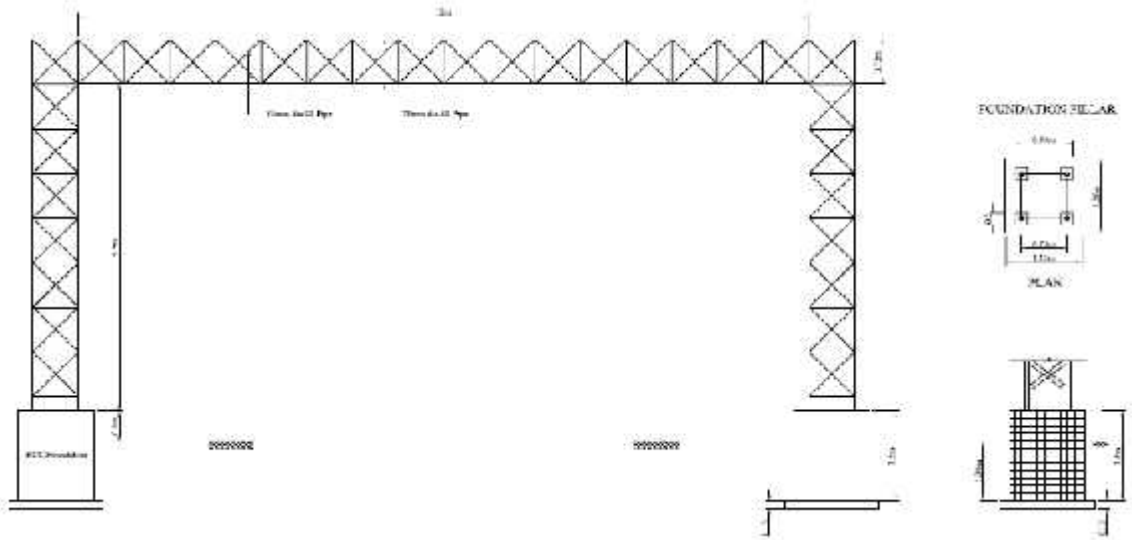
Appendix C. 16 : Analysis of rate for Overhead Gantry Sign Board

Providing and erecting overhead signs with a corrosion resistant aluminum alloy sheet reflected with high intensity retro- reflective sheeting 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 galvanized steel trusses of section and type to be mounted by bolts and nuts over RCC structure as per drawing

1	(A) 76.10 mm outside dia G. I. pipe			
	(i) Vertical post	2 x 4 x 6.25 =	50.00	*Rm*
	(ii) Horizontal post	1 x 4 x 24 =	96.00	*Rm*
		Total :	146.00	*Rm*
	Quantity @ 7.92 kg/ Rm =	1156.32 kg		
	(B) 42.5 mm outside G.I pipe for cross & bracing			
	(i) Vertical portion	2 x 4 x 8 x (1.06+ 1.06+0.75) =	183.68	*Rm*
	(ii) Horizontal portion	1 x 4 x 24 x (1.06+ 1.06+0.75) =	275.52	*Rm*
		Total :	459.20	*Rm*
	Quantity @ 3.86 kg/ Rm =	1772.512 kg		
	(C) Base plate of size 100mm x 200mm x 12mm			
	2 x 4 x 0.2 =	1.6 Rm		
	Quantity @ 18.8 kg/ Rm =	30.08 kg		
	Total (A + B+ C) =	**1156.32+1772.512+30.08 =**	**2958.912**	***kg***
		i.e.,	**2.96**	***MT***
	Rates per MT (as per SOR 2013-14)		98500.00	
	Cost of Truss structures		**291560.00**	
2	Retro-- reflective sheet			
	Area =	2 x 24 x 1.2 =	57.60	*Sqm*
	Rate per Sqm (as per SOR 2013-14)		11000.00	
	Cost of Retro-- reflecting Sheet		633600	
3	E/ W om excavation			
	Quantity =	2 x 1.55 x 1.55x 1.65 =	7.93	*Cum*
	Rate per Cum (as per SOR 2013-14)		58.00	
	Cost of Excavation		459.84	
4	P. C. C. work (M-15)			
	Quantity =	1.55 x 1.55 x 0.15 =	0.360	*Cum*
	Rate per Cum (as per SOR 2013-14)		5605.00	
	Cost of PCC M -15		**2019.90**	
5	16 mm dia. TMT @ 150 MM c/c			
		2 x 7 x (2x 1.15+2x1.40)	71.40	*Rm*
		2 x 7 x (2x 1.15+2x1.40)	71.40	*Rm*
		Total :	142.80	*Rm*
	@ 1.60 kg per Rm……		228.48	*Kg*
			0.2284	*MT*
	Rates per MT(as per SOR 2013-14)		73343.00	
	Cost of Reinforcement		**16751.54**	
6	M 20 grade of RCC work			
	Quantity =	1.25 x 1.25 x 1.5 =	2.344	*Cum*
	Rates per MT (as per SOR 2013-14)		7356.00	
	Cost of RCC M-20		17240.63	
7	Nut and bolts	2x 16 = 32 Nos.		

	@ of Rs 25.00/ Nos. …… (Rs.)		800.00	
8	(i) Mason 2 nos. for 2 days			
	@ of Rs 160.00/ No. / day (as per SOR 2013-14) …… (Rs.)		1000.00	
	(ii) Skilled labour 2 nos. for 2 days			
	@ of Rs 119.00/ No. / day (as per SOR 2013-14) …… (Rs.)		832.00	
	(iii) Ordinary labour 4 nos. for 2 days			
	@ of Rs 114.00/ No. / day (as per SOR 2013-14) …… (Rs.)		1040.00	
		Total (Rs.)	**965304**	

(Ruppes Nine lakhs sixty five thousand three hundred four only)



Appendix C. 17 : Cost Estimate for Junction Improvement at Ch 17.865

				BT Area	Earthen	Total
(i)		Area to be improved	Sqm	4450	476	4926
		Median & Island Area	Sqm			255

Item No.	MORT & H's Specificatio	Descriptions	Unit	Quantity	*Rate*	*Amount*
1	3.16/305	**Construction of embankment Construction with Material Obtained from Borrow Pits (Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	1096.500	216.48	237370.32
		(a) from private land				
		Q'ty = 731 × 1.5 = 1096.5 cum				
2	3.18/305	**Construction of Subgrade and Earthen Shoulders (Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)(a), (Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	365.500	251.92	92076.76
		(a) from private land				
		Q'ty = 731 × 0.5 = 365.5 cum				
3	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 cl. 401(with an initial lead of 5 Km.)**	Cum	119.000	2428.50	288991.50
		(i) 'for grading- I Material				
		Q'ty = 476 × 0.25 = 119 cum				
4	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 in sb-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)**	cum	119.000	2451.50	291728.50
		Q'ty = 476 × 0.25 = 119 cum				
5	5.6/507	**Dense Graded Bituminous Macadam (Providing and laying dense 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% by weight of total mix and filler transporting the hot miox to work site,laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 507. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	267.00	10318.00	2754906.00
C		**With hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS: 14982 (Refer Appendix.5 of Mosrt & H specification)**				
		(ii) for GradingII(19 mm nominal size)				
		Q'ty = 4450 × 0.06 = 267 cum				

6	**5.8/509**	**Bituminous Concrete (Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	178.000	12788.50	2276353.00
C		**(c) With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)**				
		(a)'with 60/70 or VG-30 grade bitumen				
		(ii) for Grading-II (13 mm nominal size)				
		Q'ty = 4450 × 0.04 = 178 cum				
7	**Misc**	**Providing and Laying of with approved tiles excluding of kerb.**	sqm	255.000	650.00	165750.00
		Area = 255 sqm				
		for Grading-II(13 mm nominal size)				
8	**8.1/408**	**Cast in Situ Cement Concrete M20 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 clause 408.**	m	225.00	314.00	70650.00
		B. 'Using Concrete Batching and Mixing Plant				
		Length = 225 m				
					Total Cost of Improvement of Junction	**6177826.08**

Appendix C. 18 : Cost Estimate for Junction Improvement at Ch 23.840

			BT Area	Earthen	Total
	Area to be improved	Sqm	1250	376	1626
	Median & Island Area	Sqm			275

Item No.	Descriptions	Unit	Quantity	*Rate*	*Amount*
1	**Item No. 1/3.16/305:-**				
	Construction of embankment Construction with Material Obtained from Borrow Pits (Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	2851.500	216.48	617292.72
	(a) from private land				
	Q'ty = 1901 X 1.5 = 2851.500 cum				
2	**Item No. 2/3.18/305:-**				
	Construction of Subgrade and Earthen Shoulders (Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)(a), (Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	950.500	251.92	239449.96
	from private land				
	Q'ty = 1901 X 0.5 = 950.5 cum				
3	**Item No. 3/4.2/401:-**				
	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 cl. 401(with an initial lead of 5 Km.)	Cum	406.500	2428.50	987185.25
	(i) 'for grading- I Material				
	Q'ty = 1626 X 0.25 = 406.50 cum				
4	**Item No. 4/4.12/406:-**				
	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 in sb-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)	cum	406.500	2451.50	996534.75
	Q'ty = 1626 x 0.25 = 406.5 cum				
5	**Item No. 5/5.6/507:-**				
	Dense Graded Bituminous Macadam (Providing and laying dense 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% by weight of total mix and filler transporting the hot miox to work site,laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 507. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)				
	With hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS: 14982 (Refer Appendix.5 of Mosrt & H specification)				
	(ii) for GradingII(19 mm nominal size)				

	Q'ty = 1250 x 0.06 = 75 cum		75.000	10318.00	773850.00
6	**Item No. 6/5.8/509:-**				
	Bituminous Concrete (Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	75.000	10318.00	773850.00
	With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982(Refer Appendix-5 of MoSRT&H specification)				
	(a)'with 60/70 grade bitumen	Cum	50.000	12788.50	639425.00
	(ii) for Grading-II (13 mm nominal size)				
	Q'ty = 1250x 0.04 = 50 cum				
7	**Providing and Laying of with approved tiles excluding of kerb.**	sqm	275.000	650.00	178750.00
	Area = 275 sqm				
8	**Item No. 8/8.1 B/408:-**				
	Cast in Situ Cement Concrete M20 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 clause 408.	m	255.00	314.00	80070.00
	Length = 225 m				
	Total Cost of Improvement of Junction				**5286408.00**

Appendix C. 19 : Cost Estimate for Junction Improvement at Ch 34.930 at NH- 52

			BT Area	Earthen	Total
	Area to be improved	Sqm	1150	376	1526
	Median & Island Area	Sqm			375

Item No.	Descriptions	Unit	Quantity	*Rate*	*Amount*
1	**Item No. 1/3.16/305:-**				
	Construction of embankment Construction with Material Obtained from Borrow Pits (Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	2851.500	216.48	617292.72
	(a) from private land				
2	**Item No. 2/3.18/305:-**				
	Construction of Subgrade and Earthen Shoulders (Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)(a), (Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	950.500	251.92	239449.96
	Q'ty = 1901 X 0.5 = 950.5 cum				
3	**Item No. 3/4.2/401:-**				
	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 cl. 401(with an initial lead of 5 Km.)	Cum	381.500	2428.50	926472.75
	(i) 'for grading- I Material				
4	**Item No. 4/4.12/406:-**				
	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 in sb-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)	cum	381.500	2451.50	935247.25
	Q'ty = 1526 x 0.25 = 381.5 cum				
5	**Item No. 5/5.6/507:-**				
	Dense Graded Bituminous Macadam (Providing and laying dense 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% by weight of total mix and filler transporting the hot miox to work site,laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 507. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	69.00	10318.00	711942.00
	With hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS: 14982 (Refer Appendix.5 of Mosrt & H specification)				
	(ii) for GradingII(19 mm nominal size)				
	Q'ty = 1150 x 0.06 = 69 cum	Cum	46.000	12788.50	588271.00
6	**Item No. 6/5.8/509:-**				

	Bituminous Concrete (Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	15.000	12788.50	191827.50
	With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982 (Refer Appendix-5 of MoSRT&H specification)				
	(a)'with 60/70 grade bitumen				
7	**Providing and Laying of with approved tiles excluding of kerb.**	sqm	375.000	650.00	243750.00
	Area = 375 sqm				
8	**Item No. 8/8.1 B/408:-**				
	Cast in Situ Cement Concrete M20 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 clause 408.				
	B. Using Concrete Batching and Mixing Plant	m	675.00	314.00	211950.00
	Length = 675 m				
	Total Cost of Improvement of Junction				**4666203.00**

Appendix C. 20 : Cost Estimate for Junction Improvement at Ch 35.700 at NH- 52

			BT Area	Earthen	Total
	Area to be improved	Sqm	575	156	731
	Median & Island Area	Sqm			125

Item No.	Descriptions	Unit	Quantity	*Rate*	*Amount*
	Item No. 1/3.16/305:-				
1	**Construction of embankment Construction with Material Obtained from Borrow Pits (Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.)(Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	1284.000	216.48	277960.32
	(a) from private land				
	Q'ty = 856 x 1.5 = 1284 cum				
	Item No. 2/3.18/305:-				
2	**Construction of Subgrade and Earthen Shoulders (Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)(a), (Including cost of testing of materials at site and laboratory as directed by the deptt.)**	Cum	428.000	251.92	107821.76
	(a) from private land				
	Q'ty = 856 x 0.5 =428 cum				
	Item No. 3/4.2/401:-				
3	**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 cl. 401(with an initial lead of 5 Km.)**	Cum	182.750	2428.50	443808.38
	(i) 'for grading- I Material				
	Q'ty = 731 x 0.25 = 182.75 cum				
	Item No. 4/4.12/406:-				
4	**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 in sb-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)**	cum	182.750	2451.50	448011.63
	Q'ty = 731 x 0.25 = 182.75 cum				
5	**Item No. 5/5.6/507:-**				
	Dense Graded Bituminous Macadam (Providing and laying dense 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% by weight of total mix and filler transporting the hot miox to work site,laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no. 507. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	34.50	10318.00	355971.00
	With hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS: 14982 (Refer Appendix.5 of Mosrt & H specification)				
	(ii) for GradingII(19 mm nominal size)				

	Q'ty = 575 x 0.06 = 34.5 cum				
6	**Item No. 6/5.8/509:-**				
	Bituminous Concrete (Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, lavel and alignment,rolling with smooth wheeled,vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. no.509. complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 Km initial lead from mixing plant)(Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	23.000	12788.50	294135.50
	With hydrated lime / cement as filler (refer table 500-9 of MoSRT&H specification) & anti stripping agent as per IS:14982 (Refer Appendix-5 of MoSRT&H specification)				
	(a)'with 60/70 grade bitumen				
	(ii) for GradingII(13 mm nominal size)				
	Q'ty = 575 x 0.04 = 23 cum				
7	**Providing and Laying of with approved tiles excluding of kerb.**	sqm	125.000	650.00	81250.00
	Area = 125 sqm				
8	**Item No. 8/8.1 B/408:-**				
	Cast in Situ Cement Concrete M20 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 clause 408.	m	675.000	314.00	211950.00
	B. Using Concrete Batching and Mixing Plant				
	Length = 675 m				
	Total Cost of Improvement of Junction				**2220909.00**

Appendix C. 21 : Cost Estimate for Junction Improvement at (i) Ch. 17.865, (ii) Ch 23.840, 9iii) Ch. 34.93 and (iv) Ch. 35.700m, (Dolabari to Jamugurihat)

			BT Area	Earthen	Total
(i)	Area to be improved	Sqm	4450	476	4926
	Median & Island Area	Sqm			255
					5181

			BT Area	Earthen	Total
(ii)	Area to be improved	Sqm	1250	376	1626
	Median & Island Area	Sqm			275
					1901

			BT Area	Earthen	Total
(iii)	Area to be improved	Sqm	1150	376	1526
	Median & Island Area	Sqm			375
					1901

			BT Area	Earthen	Total
(iv)	Area to be improved	Sqm	575	156	731
	Median & Island Area	Sqm			125
					856

Item	Description	Unit	Quantity	Rate	Amount
	Item No.1/3.16/305				
1	Construction of embankment Construction with Material Obtained from Borrow Pits (Construction of embankment with approved material obtained from borrow pits with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirment of table 300-2 (including compensation of earth.) (Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	14758.500	216.48	3194920.08
	(a) from private land				
	Q'ty = (5181+1901+1901+856) x 1.5= 14758.5				
	Item No.1/3.18/305:-				
2	Construction of Subgrade and Earthen Shoulders (Construction of subgrade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table (300-2) (including compensation of earth.)(a), (Including cost of testing of materials at site and laboratory as directed by the deptt.)	Cum	4919.500	251.92	1239320.44
	(a) from private land				
	Q'ty = (5181+1901+1901+856) x 0.5= 4919.50				
	Item No. 3/4.2/401:-				
3	Granular Sub-Base with Coarse Graded Material (Table:- 400- 2) (Construction of granular sub-base by providing coarse graded material, s		2202.250	2428.50	5348164.13
	(i) for grading- I Material				
	Q'ty = (4926+1626+1526+731) x 0.25= 4919.50				
	Item No. 4/4.12/406:-				
4	Wet Mix Macadam (Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including ead from mixing plant)	Cum	2202.250	2451.50	5398815.88
	Q'ty = (4926+1626+1526+731) x 0.25= 4919.50				
5	Primer Coat				

	Q'ty = (4450+1250+1150+575) = 7425 sqm	Sqm	7425.000	46.00	341550.00
6	Tack coat				
	Q'ty = (4450+1250+1150+575) = 7425 sqm	Sqm	7425.000	12.00	89100.00
7	Item No. 5/5.6/507:-				
	Providing and laying Dense Bituminous Macadam (DBM)				
	Q'ty = (4450+1250+1150+575) X 0.06 = 445.50 cum	Cum	445.500	10318.00	4596669.00
	Item No. 6/5.8/509:-				
8	Bituminous Concrete (Providing and laying bituminous concrete with 100-120 TPH batch type hot mix plant	Cum	297.000	12788.50	3798184.50
	(i) for grading- II (13 mm normal size)				
	Q'ty = (4450+1250+1150+575) x 0.04= 297 cum				
9	Providing and laying of with approved tiles excluding of kerb	Sqm	1030.000	650.00	669500.00
	Area = (255+275+375+125) 1030 Sqm				
	Item No. 8/8.1/408:-				
10	Cast in Situ Cement Concrete M20 kerb (Construction of cement concrete kerb with top and bottom w	m	1830.000	314.00	574620.00
	B, 'Using Concrete Batching and Mixing Plant				
	Length = (225+255+675+675) = 1830 m				

Appendix C.22

Construction of Guide Bund, Channel Closing Dyke and embankment for construction of RCC Bridge over river Jia Bharali on proposed 4 Lane Stretch from Dolabari to Jamugurihat under Nagaon NH division.

a)Earth work:

QUANTITY	2218310.86	m^3
RATE	493.02	Rs
AMOUNT	1093671622.36	Rs

b)Pitching with Wire Crates :

QUANTITY	334561.46	m^3
RATE	2916.00	Rs
AMOUNT	975581214.50	Rs

c)Pitching without Wire Crates(Including Toe Drain) :

QUANTITY	82978.48	m^3
RATE	1463.00	Rs
AMOUNT	121397511.98	Rs

d)Turfing :

QUANTITY	2182.67	m^2
RATE	99.80	Rs
AMOUNT	212816.13	Rs

e)Filter media :

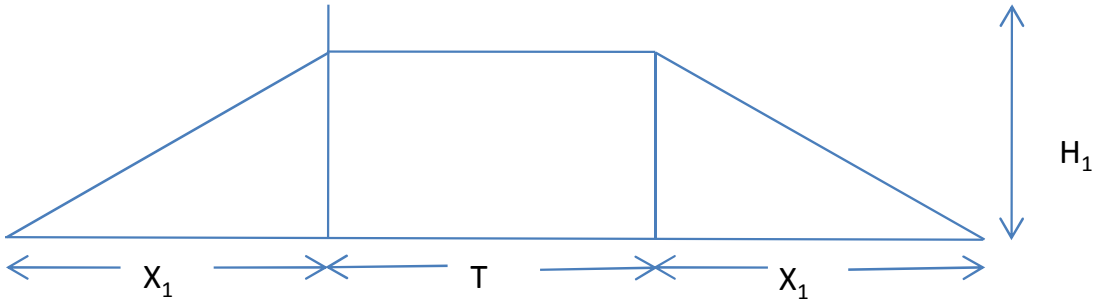
QUANTITY	134728.23	m^3
RATE	1862.00	Rs
AMOUNT	250863956.60	Rs

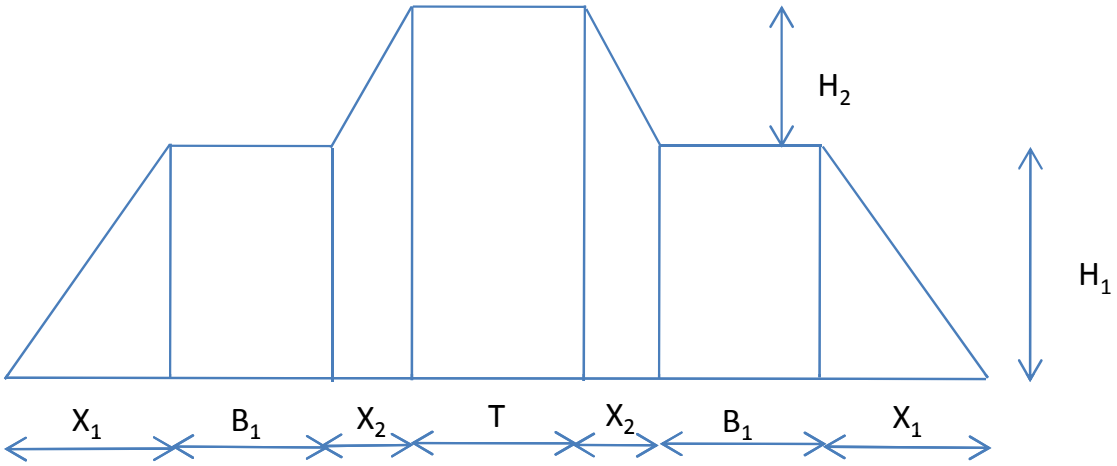
f)Launching Apron(With Wirecrates)

QUANTITY	486540.00	m^3
RATE	1798.50	Rs
AMOUNT	875042190.00	Rs

TOTAL	**3316769311.58**	Rs

TYPICAL EMBANKMENT





DETAILED CALCULATIONS-LEFT BANK-U/S

RD	NSL	TOP OF BNK.	X_1	X_2	B_1	H_1	H_2	T	EARTH		FILTER MEDIA(300 MM THICK)		PITCHING(0.9 m thick for Guide Bund on river side ,river side of Embankment and countryside of Dyke; 1.5 m for river side of Dyke) with Wire Crates		PITCHING(0.45 m thick for country side of guide bund) without wire crates		TURFING	TOE DRAIN(0.9 m depth,0.9 bottom width and 1H:1V slope for Guide Bund and Embankment and 1.5 m depth,1.5 bottom width and 1H:1V slope for Dyke)		LAUNCHING APRON				Remarks
									AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	AREA	VOLUME	WIDTH	HICKNES	AREA	VOLUME	
GUIDE BUND																								
0+000	69.42	6.34	8.00	4.68	3.00	4.00	2.34	6.00	142.46		10.67		16.00		8.00			1.62		21.00	1.20	25.20		
0+100	69.69	6.13	8.00	4.25	3.00	4.00	2.13	6.00	135.83	13914.78	10.38	1052.36	15.57	1578.54	7.78	789.27		1.62	162.00	21.00	1.20	25.20	2520.00	
0+200	69.65	6.21	8.00	4.42	3.00	4.00	2.21	6.00	138.43	13713.38	10.49	1043.67	15.74	1565.51	7.87	782.75		1.62	162.00	21.00	1.20	25.20	2520.00	
0+300	69.56	6.36	8.00	4.72	3.00	4.00	2.36	6.00	143.06	14074.84	10.69	1059.33	16.04	1588.99	8.02	794.50		1.62	162.00	21.00	1.20	25.20	2520.00	
0+400	70.48	5.49	8.00	2.99	3.00	4.00	1.49	6.00	117.32	13019.02	9.53	1011.16	14.30	1516.75	7.15	758.37		1.62	162.00	21.00	1.20	25.20	2520.00	
0+500	70.94	5.09	8.00	2.17	3.00	4.00	1.09	6.00	106.29	11180.29	8.99	925.79	13.48	1388.68	6.74	694.34		1.62	162.00	21.00	1.20	25.20	2520.00	
0+600	71.04	5.03	8.00	2.06	3.00	4.00	1.03	6.00	104.83	10555.69	8.91	894.81	13.37	1342.21	6.68	671.11		1.62	162.00	21.00	1.20	25.20	2520.00	
0+700	70.92	5.21	8.00	2.42	3.00	4.00	1.21	6.00	109.56	10719.39	9.15	903.07	13.73	1354.60	6.86	677.30		1.62	162.00	21.00	1.20	25.20	2520.00	
0+800	70.73	5.45	8.00	2.90	3.00	4.00	1.45	6.00	116.04	11280.13	9.47	930.97	14.20	1396.46	7.10	698.23		1.62	162.00	21.00	1.20	25.20	2520.00	
0+900	70.82	5.42	8.00	2.84	3.00	4.00	1.42	6.00	115.21	11562.37	9.43	944.87	14.14	1417.30	7.07	708.65		1.62	162.00	21.00	1.20	25.20	2520.00	
1+000	70.96	5.33	8.00	2.66	3.00	4.00	1.33	6.00	112.73	11396.93	9.31	936.81	13.96	1405.21	6.98	702.61		1.62	162.00	21.00	1.20	25.20	2520.00	
1+100	70.90	5.44	8.00	2.89	3.00	4.00	1.44	6.00	115.91	11432.14	9.46	938.51	14.19	1407.77	7.10	703.89		1.62	162.00	21.00	1.20	25.20	2520.00	
1+200	70.42	5.97	8.00	3.94	3.00	4.00	1.97	6.00	131.12	12351.36	10.17	981.64	15.26	1472.46	7.63	736.23		1.62	162.00	21.00	1.20	25.20	2520.00	
1+300	70.98	5.46	8.00	2.93	3.00	4.00	1.46	6.00	116.47	12379.17	9.49	982.98	14.23	1474.47	7.12	737.24		1.62	162.00	21.00	1.20	25.20	2520.00	
1+400	71.15	5.35	8.00	2.70	3.00	4.00	1.35	6.00	113.33	11489.90	9.34	941.32	14.01	1411.99	7.00	705.99		1.62	162.00	21.00	1.20	25.20	2520.00	
1+500	71.25	5.30	8.00	2.61	3.00	4.00	1.30	6.00	112.08	11270.33	9.28	930.62	13.91	1395.94	6.96	697.97		1.62	162.00	21.00	1.20	25.20	2520.00	
EMBANKMENT																								
1+600	71.31	5.29	8.00	2.58	3.00	4.00	1.29	6.00	111.71	11189.04	4.63	695.20	13.89	1389.94			13.89	1.62	162.00	12.00	1.20	14.40	1980.00	
1+700	71.36	5.29	8.00	2.59	3.00	4.00	1.29	6.00	111.79	11174.62	4.63	462.96	13.89	1388.87			13.89	1.62	162.00	12.00	1.20	14.40	1440.00	
1+800	71.42	5.28	8.00	2.57	3.00	4.00	1.28	6.00	111.52	11165.39	4.62	462.73	13.87	1388.19			13.87	1.62	162.00	12.00	1.20	14.40	1440.00	
1+900	71.49	5.27	8.00	2.53	3.00	4.00	1.27	6.00	111.03	11127.70	4.61	461.80	13.84	1385.39			13.84	1.62	162.00	12.00	1.20	14.40	1440.00	
2+000	71.56	5.25	8.00	2.49	3.00	4.00	1.25	8.00	110.52	11077.64	4.60	460.56	13.80	1381.67			13.80	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
2+100	71.76	5.10	8.00	2.20	3.00	4.00	1.10	6.00	106.62	10856.85	4.50	455.02	13.50	1365.05			13.50	1.62	162.00	12.00	1.20	14.40	1440.00	
2+200	71.90	5.01	8.00	2.03	3.00	4.00	1.01	6.00	104.33	10547.26	4.44	447.18	13.33	1341.55			13.33	1.62	162.00	12.00	1.20	14.40	1440.00	
2+300	71.96	5.00	8.00	2.01	3.00	4.00	1.00	6.00	104.11	10422.12	4.44	443.98	13.31	1331.94			13.31	1.62	162.00	12.00	1.20	14.40	1440.00	
2+400	72.01	5.01	8.00	2.02	3.00	4.00	1.01	6.00	104.26	10418.73	4.44	443.89	13.32	1331.68			13.32	1.62	162.00	12.00	1.20	14.40	1440.00	
2+500	72.09	4.98	9.97			4.98		6.00	39.78	7201.84	3.52	398.17	10.57	1194.51			10.57	1.62	162.00	12.00	1.20	14.40	1440.00	
2+600	72.19	4.94	9.88			4.94		6.00	39.25	3951.11	3.49	350.88	10.48	1052.63			10.48	1.62	162.00	12.00	1.20	14.40	1440.00	
2+700	72.28	4.90	9.79			4.90		6.00	38.67	3895.54	3.46	347.98	10.39	1043.95			10.39	1.62	162.00	12.00	1.20	14.40	1440.00	
2+800	72.37	4.86	9.72			4.86		6.00	38.22	3844.19	3.44	345.29	10.32	1035.88			10.32	1.62	162.00	12.00	1.20	14.40	1440.00	
2+900	72.44	4.84	9.68			4.84		6.00	37.94	3807.96	3.43	343.38	10.28	1030.15			10.28	1.62	162.00	12.00	1.20	14.40	1440.00	
3+000	72.26	5.08	8.00	2.16	3.00	4.00	1.08	6.00	106.13	7203.51	4.49	395.76	13.47	1187.28			13.47	1.62	162.00	12.00	1.20	14.40	1440.00	
3+100	72.31	5.08	8.00	2.16	3.00	4.00	1.08	6.00	106.08	10610.60	4.49	448.81	13.46	1346.43			13.46	1.62	162.00	12.00	1.20	14.40	1440.00	
3+200	72.59	4.85	9.70			4.85		6.00	38.04	7206.34	3.43	395.98	10.30	1187.93			10.30	1.62	162.00	12.00	1.20	14.40	1440.00	
3+300	72.67	4.82	9.65			4.82		6.00	37.73	3788.81	3.42	342.37	10.25	1027.12			10.25	1.62	162.00	12.00	1.20	14.40	1440.00	
3+400	72.79	4.76	9.51			4.76		6.00	36.89	3730.96	3.37	339.29	10.11	1017.88			10.11	1.62	162.00	12.00	1.20	14.40	1440.00	
3+500	72.88	4.72	9.44			4.72		6.00	36.43	3665.92	3.35	335.81	10.04	1007.44			10.04	1.62	162.00	12.00	1.20	14.40	1440.00	
3+600	72.89	4.76	9.52			4.76		6.00	36.91	3667.11	3.37	335.88	10.12	1007.63			10.12	1.62	162.00	12.00	1.20	14.40	1440.00	
3+700	72.39	5.31	8.00	2.62	3.00	4.00	1.31	6.00	112.31	7461.31	4.64	400.76	13.93	1202.29			13.93	1.62	162.00	12.00	1.20	14.40	1440.00	
3+800	72.23	5.53	8.00	3.05	3.00	4.00	1.53	6.00	118.24	11527.91	4.79	471.54	14.36	1414.63			14.36	1.62	162.00	12.00	1.20	14.40	1440.00	
3+900	72.25	5.56	8.00	3.13	3.00	4.00	1.56	6.00	119.30	11877.32	4.81	479.99	14.44	1439.97			14.44	1.62	162.00	12.00	1.20	14.40	1440.00	
4+000	72.39	5.48	8.00	2.95	3.00	4.00	1.48	8.00	116.85	11807.59	4.75	478.32	14.26	1434.96			14.26	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
4+100	72.53	5.39	8.00	2.78	3.00	4.00	1.39	6.00	114.40	11562.44	4.69	472.43	14.08	1417.28			14.08	1.62	162.00	12.00	1.20	14.40	1440.00	
4+200	72.66	5.31	8.00	2.62	3.00	4.00	1.31	6.00	112.25	11332.62	4.64	466.84	13.93	1400.51			13.93	1.62	162.00	12.00	1.20	14.40	1440.00	
4+300	72.77	5.25	8.00	2.50	3.00	4.00	1.25	6.00	110.65	11145.35	4.60	462.23	13.81	1386.69			13.81	1.62	162.00	12.00	1.20	14.40	1440.00	
4+400	72.82	5.25	8.00	2.51	3.00	4.00	1.25	6.00	110.70	11067.50	4.60	460.30	13.81	1380.91			13.81	1.62	162.00	12.00	1.20	14.40	1440.00	
4+500	72.85	5.28	8.00	2.56	3.00	4.00	1.28	6.00	111.39	11104.43	4.62	461.22	13.86	1383.66			13.86	1.62	162.00	12.00	1.20	14.40	1440.00	
4+600	73.02	5.15	8.00	2.31	3.00	4.00	1.15	6.00	108.06	10972.77	4.54	457.93	13.61	1373.78			13.61	1.62	162.00	12.00	1.20	14.40	1440.00	
4+700	73.17	5.06	8.00	2.11	3.00	4.00	1.06	6.00	105.48	10677.14	4.47	450.49	13.42	1351.47			13.42	1.62	162.00	12.00	1.20	14.40	1440.00	
4+800	73.23	5.06	8.00	2.11	3.00	4.00	1.06	6.00	105.45	10546.36	4.47	447.17	13.41	1341.51			13.41	1.62	162.00	12.00	1.20	14.40	1440.00	
4+900	73.21	5.12	8.00	2.25	3.00	4.00	1.12	6.00	107.25	10634.80	4.52	449.42	13.55	1348.26			13.55	1.62	162.00	12.00	1.20	14.40	1440.00	
5+000	73.13	5.26	8.00	2.52	3.00	4.00	1.26	6.00	110.86	10905.34	4.61	456.24	13.82	1368.71			13.82	1.62	162.00	12.00	1.20	14.40	1440.00	
5+100	73.15	5.29	8.00	2.58	3.00	4.00	1.29	6.00	111.76	11130.99	4.63	461.88	13.89	1385.63			13.89	1.62	162.00	12.00	1.20	14.40	1440.00	

5+200	73.24	5.25	8.00	2.50	3.00	4.00	1.25	6.00	110.58	11117.35	4.60	461.54	13.80	1384.62			13.80	1.62	162.00	12.00	1.20	14.40	1440.00	
5+300	73.37	5.17	8.00	2.35	3.00	4.00	1.17	6.00	108.56	10957.25	4.55	457.55	13.65	1372.65			13.65	1.62	162.00	12.00	1.20	14.40	1440.00	
5+400	73.47	5.13	8.00	2.26	3.00	4.00	1.13	6.00	107.36	10796.20	4.52	453.51	13.56	1360.54			13.56	1.62	162.00	12.00	1.20	14.40	1440.00	
5+500	73.55	5.10	8.00	2.21	3.00	4.00	1.10	6.00	106.71	10703.66	4.50	451.17	13.51	1353.52			13.51	1.62	162.00	12.00	1.20	14.40	1440.00	
5+600	73.62	5.09	8.00	2.17	3.00	4.00	1.09	6.00	106.23	10647.24	4.49	449.74	13.47	1349.23			13.47	1.62	162.00	12.00	1.20	14.40	1440.00	
5+700	73.69	5.07	8.00	2.14	3.00	4.00	1.07	6.00	105.79	10601.14	4.48	448.57	13.44	1345.71			13.44	1.62	162.00	12.00	1.20	14.40	1440.00	
5+800	73.68	5.12	8.00	2.25	3.00	4.00	1.12	6.00	107.26	10652.52	4.52	449.87	13.55	1349.62			13.55	1.62	162.00	12.00	1.20	14.40	1440.00	
5+900	73.70	5.16	8.00	2.33	3.00	4.00	1.16	6.00	108.30	10778.36	4.54	453.06	13.63	1359.19			13.63	1.62	162.00	12.00	1.20	14.40	1440.00	
CHANNEL CLOSING DYKE																								
6+000	73.74	5.18	8.00	2.35	3.00	4.00	1.18	8.00	108.65	10847.65	9.10	682.43	36.42	2502.54				4.50	306.00	39.00	2.00	78.00	4620.00	Turning Platform
6+100	73.81	5.16	8.00	2.31	3.00	4.00	1.16	6.00	108.12	10838.60	9.08	909.17	36.31	3636.66				4.50	450.00	39.00	2.00	78.00	7800.00	
6+200	73.88	5.14	8.00	2.27	3.00	4.00	1.14	6.00	107.60	10786.14	9.05	906.52	36.21	3626.09				4.50	450.00	39.00	2.00	78.00	7800.00	
6+300	73.95	5.12	8.00	2.25	3.00	4.00	1.12	6.00	107.25	10742.32	9.03	904.31	36.14	3617.23				4.50	450.00	39.00	2.00	78.00	7800.00	
6+400	74.07	5.06	8.00	2.11	3.00	4.00	1.06	6.00	105.47	10635.85	8.94	898.90	35.77	3595.58				4.50	450.00	39.00	2.00	78.00	7800.00	
6+500	74.17	5.00	8.00	2.00	3.00	4.00	1.00	6.00	104.06	10476.63	8.87	890.76	35.49	3563.03				4.50	450.00	39.00	2.00	78.00	7800.00	
6+600	74.27	4.96	9.93			4.96		6.00	39.53	7179.72	7.02	794.56	28.08	3178.24				4.50	450.00	39.00	2.00	78.00	7800.00	
6+700	74.35	4.93	9.87			4.93		6.00	39.14	3933.72	6.98	699.95	27.92	2799.80				4.50	450.00	39.00	2.00	78.00	7800.00	
6+800	74.50	4.84	9.67			4.84		6.00	37.91	3852.44	6.85	691.43	27.40	2765.73				4.50	450.00	39.00	2.00	78.00	7800.00	
6+900	74.62	4.77	9.54			4.77		6.00	37.05	3747.96	6.76	680.40	27.03	2721.59				4.50	450.00	39.00	2.00	78.00	7800.00	
7+000	74.69	4.75	9.50			4.75		6.00	36.79	3692.21	6.73	674.45	26.92	2697.81				4.50	450.00	39.00	2.00	78.00	7800.00	
EMBANKMENT																								
7+100	74.76	4.73	9.46			4.73		6.00	36.54	3666.71	3.35	504.12	10.06	1848.89			10.06	1.62	306.00	12.00	1.20	14.40	4620.00	
7+200	74.80	4.74	9.49			4.74		6.00	36.74	3664.03	3.36	335.71	10.09	1007.14			10.09	1.62	162.00	12.00	1.20	14.40	1440.00	
7+300	74.89	4.71	9.42			4.71		6.00	36.31	3652.27	3.34	335.08	10.02	1005.24			10.02	1.62	162.00	12.00	1.20	14.40	1440.00	
7+400	74.98	4.67	9.34			4.67		6.00	35.81	3605.66	3.31	332.56	9.94	997.68			9.94	1.62	162.00	12.00	1.20	14.40	1440.00	
7+500	74.93	4.77	9.55			4.77		6.00	37.10	3645.29	3.38	334.69	10.15	1004.07			10.15	1.62	162.00	12.00	1.20	14.40	1440.00	
7+600	75.06	4.69	9.38			4.69		6.00	36.09	3659.57	3.33	335.47	9.98	1006.40			9.98	1.62	162.00	12.00	1.20	14.40	1440.00	
7+700	75.20	4.61	9.22			4.61		6.00	35.11	3559.93	3.27	330.07	9.82	990.21			9.82	1.62	162.00	12.00	1.20	14.40	1440.00	
7+800	75.30	4.56	9.12			4.56		6.00	34.46	3478.16	3.24	325.59	9.71	976.77			9.71	1.62	162.00	12.00	1.20	14.40	1440.00	
7+900	75.42	4.50	9.00			4.50		6.00	33.72	3408.95	3.20	321.76	9.59	965.27			9.59	1.62	162.00	12.00	1.20	14.40	1440.00	
8+000	75.54	4.42	8.84			4.42		8.00	37.23	3547.90	3.15	317.16	9.44	951.48			9.44	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
8+100	75.65	4.37	8.75			4.37		6.00	32.24	3473.53	3.11	312.96	9.34	938.87			9.34	1.62	162.00	12.00	1.20	14.40	1440.00	
8+200	75.70	4.37	8.74			4.37		6.00	32.23	3223.10	3.11	311.29	9.34	933.86			9.34	1.62	162.00	12.00	1.20	14.40	1440.00	
8+300	75.60	4.53	9.05			4.53		6.00	34.06	3314.30	3.22	316.43	9.65	949.28			9.65	1.62	162.00	12.00	1.20	14.40	1440.00	
8+400	75.34	4.84	9.68			4.84		6.00	37.94	3599.91	3.43	332.12	10.28	996.36			10.28	1.62	162.00	12.00	1.20	14.40	1440.00	
8+500	75.08	5.15	8.00	2.30	3.00	4.00	1.15	6.00	108.00	7296.81	2.86	314.48	13.61	1194.37			13.61	1.62	162.00	12.00	1.20	14.40	1440.00	
8+600	75.22	5.06	8.00	2.11	3.00	4.00	1.06	6.00	105.48	10673.68	2.86	286.33	13.42	1351.21			13.42	1.62	162.00	12.00	1.20	14.40	1440.00	
8+700	75.40	4.93	9.87			4.93		6.00	39.14	7230.64	3.49	317.63	10.47	1194.20			10.47	1.62	162.00	12.00	1.20	14.40	1440.00	
8+800	75.54	4.84	9.68			4.84		6.00	37.97	3855.61	3.43	345.88	10.28	1037.65			10.28	1.62	162.00	12.00	1.20	14.40	1440.00	
8+900	75.72	4.72	9.44			4.72		6.00	36.43	3720.04	3.35	338.70	10.04	1016.09			10.04	1.62	162.00	12.00	1.20	14.40	1440.00	
9+000	75.89	4.60	9.20			4.60		6.00	34.95	3568.69	3.27	330.54	9.80	991.61			9.80	1.62	162.00	12.00	1.20	14.40	1440.00	
9+100	76.17	4.37	8.74			4.37		6.00	32.20	3357.56	3.11	318.82	9.33	956.46			9.33	1.62	162.00	12.00	1.20	14.40	1440.00	
9+200	75.20	5.39	8.00	2.78	3.00	4.00	1.39	6.00	114.49	7334.45	2.86	298.73	14.09	1171.20			14.09	1.62	162.00	12.00	1.20	14.40	1440.00	
9+300	74.57	6.08	8.00	4.16	3.00	4.00	2.08	6.00	134.46	12447.34	2.86	286.33	15.48	1478.46			15.48	1.62	162.00	12.00	1.20	14.40	1440.00	
9+400	74.40	6.30	8.00	4.59	3.00	4.00	2.30	6.00	141.06	13776.14	2.86	286.33	15.91	1569.49			15.91	1.62	162.00	12.00	1.20	14.40	1440.00	
9+500	76.53	4.23	8.45			4.23		6.00	30.53	8579.76	3.01	293.90	9.04	1247.75			9.04	1.62	162.00	12.00	1.20	14.40	1440.00	
9+600	76.81	4.00	8.00			4.00		6.00	27.98	2925.80	2.86	293.84	8.59	881.53			8.59	1.62	162.00	12.00	1.20	14.40	1440.00	
9+700	76.85	4.01	8.01			4.01		6.00	28.07	2802.81	2.87	286.50	8.60	859.50			8.60	1.62	162.00	12.00	1.20	14.40	1440.00	
9+800	77.03	3.89	7.77			3.89		6.00	26.77	2742.18	2.79	282.76	8.36	848.29			8.36	1.62	162.00	12.00	1.20	14.40	1440.00	
9+900	77.12	3.84	7.68			3.84		6.00	26.29	2652.94	2.76	277.25	8.27	831.74			8.27	1.62	162.00	12.00	1.20	14.40	1440.00	
10+000	77.20	3.82	7.64			3.82		8.00	29.88	2808.37	2.74	275.01	8.23	825.04			8.23	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
10+100	76.78	4.29	8.59			4.29		6.00	31.32	3059.70	3.06	290.16	9.18	870.47			9.18	1.62	162.00	12.00	1.20	14.40	1440.00	
10+200	76.38	4.74	9.48			4.74		6.00	36.67	3399.48	3.36	320.96	10.08	962.88			10.08	1.62	162.00	12.00	1.20	14.40	1440.00	
10+300	76.52	4.65	9.31			4.65		6.00	35.61	3614.10	3.30	333.01	9.90	999.03			9.90	1.62	162.00	12.00	1.20	14.40	1440.00	
10+400	76.73	4.50	9.00			4.50		6.00	33.73	3466.77	3.20	324.93	9.59	974.80			9.59	1.62	162.00	12.00	1.20	14.40	1440.00	
10+500	76.85	4.43	8.85			4.43		6.00	32.86	3329.44	3.15	317.31	9.45	951.92			9.45	1.62	162.00	12.00	1.20	14.40	1440.00	
10+600	76.67	4.66	9.33			4.66		6.00	35.75	3430.57	3.31	322.88	9.93	968.65			9.93	1.62	162.00	12.00	1.20	14.40	1440.00	
10+700	77.16	4.23	8.46			4.23		6.00	30.57	3315.89	3.02	316.28	9.05	948.85			9.05	1.62	162.00	12.00	1.20	14.40	1440.00	
10+800	77.29	4.14	8.28			4.14		6.00	29.58	3007.56	2.96	298.77	8.88	896.30			8.88	1.62	162.00	12.00	1.20	14.40	1440.00	
10+900	77.97	3.52	7.05			3.52		6.00	23.00	2629.05	2.54	275.15	7.63	825.46			7.63	1.62	162.00	12.00	1.20	14.40	1440.00	
11+000	78.42	3.12	6.24			3.12		6.00	19.10	2104.92	2.27	240.89	6.82	722.68			6.82	1.62	162.00	12.00	1.20	14.40	1440.00	
11+100	78.62	2.98	5.96			2.98		6.00	17.80	1845.03	2.18	222.55	6.53	667.64			6.53	1.62	162.00	12.00	1.20	14.40	1440.00	

11+200	77.28	4.37	8.74			4.37		6.00	32.22	2501.04	3.11	264.49	9.34	793.47			9.34	1.62	162.00	12.00	1.20	14.40	1440.00	
11+300	78.43	3.27	6.53			3.27		6.00	20.46	2634.10	2.37	274.15	7.11	822.44			7.11	1.62	162.00	12.00	1.20	14.40	1440.00	
11+400	77.68	4.07	8.15			4.07		6.00	28.81	2463.74	2.91	264.16	8.74	792.48			8.74	1.62	162.00	12.00	1.20	14.40	1440.00	
11+500	77.36	4.44	8.88			4.44		6.00	33.04	3092.61	3.16	303.56	9.48	910.69			9.48	1.62	162.00	12.00	1.20	14.40	1440.00	
11+600	77.19	4.67	9.33			4.67		6.00	35.76	3440.09	3.31	323.42	9.93	970.26			9.93	1.62	162.00	12.00	1.20	14.40	1440.00	
11+700	76.99	4.92	9.83			4.92		6.00	38.93	3734.76	3.48	339.42	10.44	1018.25			10.44	1.62	162.00	12.00	1.20	14.40	1440.00	
11+800	76.85	5.11	8.00	2.22	3.00	4.00	1.11	6.00	106.86	7289.34	2.86	317.10	13.52	1197.87			13.52	1.62	162.00	12.00	1.20	14.40	1440.00	
11+900	76.48	5.54	8.00	3.08	3.00	4.00	1.54	6.00	118.59	11272.23	2.86	286.33	14.39	1395.40			14.39	1.62	162.00	12.00	1.20	14.40	1440.00	
11+984	76.13	5.94	8.00	3.87	3.00	4.00	1.94	6.00	130.06	12432.39	2.86	286.33	15.18	1478.53			15.18	1.62	162.00	12.00	1.20	14.40	1440.00	
TOTAL										**904968.73**		**57925.38**		**164563.84**		**10858.44**	**1075.42**		**22608.00**				**259500.00**	

DETAILED CALCULATIONS-LEFT BANK-D/S

RD	NSL	TOP OF BNK.	X_1	X_2	B_1	H_1	H_2	T	EARTH		FILTER MEDIA(0.3 m thick)		PITCHING(0.9 m thick for Guide Bund on river side ,river side of Embankment and countryside of Dyke; 1.5 m for river side of Dyke) with Wire Crates		PITCHING(0.45 m thick for country side of guide bund) without Wire crates		TOE DRAIN(0.9 m depth,0.9 bottom width and 1H:1V slope for Guide Bund and Embankment and 1.5 m depth,1.5 bottom width and 1H:1V slope for Dyke)		LAUNCHING APRON				Remarks
									AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	WIDTH	THICKNESS	AREA	VOLUME	
GUIDE BUND																							
0+000	69.42	6.34	8.00	4.68	3.00	4.00	2.34	6.00	142.46		10.67		16.00		8.00		1.62		21.00	1.20	25.20		
0+100	69.31	6.43	8.00	4.85	3.00	4.00	2.43	6.00	145.14	14380.28	10.78	1072.44	16.17	1608.65	8.09	804.33	1.62	162.00	21.00	1.20	25.20	2520.00	
0+200	69.20	6.51	8.00	5.02	3.00	4.00	2.51	6.00	147.85	14649.76	10.90	1083.84	16.34	1625.76	8.17	812.88	1.62	162.00	21.00	1.20	25.20	2520.00	
0+300	69.29	6.40	8.00	4.81	3.00	4.00	2.40	6.00	144.45	14614.93	10.75	1082.36	16.13	1623.55	8.06	811.77	1.62	162.00	21.00	1.20	25.20	2520.00	
0+400	69.49	6.18	8.00	4.35	3.00	4.00	2.18	6.00	137.37	14090.95	10.45	1059.96	15.67	1589.94	7.84	794.97	1.62	162.00	21.00	1.20	25.20	2520.00	
0+500	69.56	6.09	8.00	4.17	3.00	4.00	2.09	6.00	134.56	13596.86	10.32	1038.56	15.49	1557.84	7.74	778.92	1.62	162.00	21.00	1.20	25.20	2520.00	
0+600	69.32	6.30	8.00	4.61	3.00	4.00	2.30	6.00	141.27	13791.90	10.62	1047.01	15.92	1570.52	7.96	785.26	1.62	162.00	31.00	1.20	37.20	3120.00	
0+700	69.08	6.52	8.00	5.04	3.00	4.00	2.52	6.00	148.17	14472.33	10.91	1076.26	16.36	1614.39	8.18	807.20	1.62	162.00	31.00	1.20	37.20	3720.00	
0+800	69.02	6.56	8.00	5.11	3.00	4.00	2.56	6.00	149.30	14873.56	10.96	1093.23	16.43	1639.85	8.22	819.92	1.62	162.00	31.00	1.20	37.20	3720.00	
0+864	68.99	6.57	8.00	5.14	3.00	4.00	2.57	6.00	149.81	14955.63	10.98	1096.65	16.47	1644.98	8.23	822.49	1.62	162.00	31.00	1.20	37.20	3720.00	
TOTAL										**129426.20**		**9650.32**		**14475.48**		**7237.74**		**1458.00**				**26880.00**	

DETAILED CALCULATIONS-RIGHT BANK-U/S

RD	NSL	TOP OF BNK.	X_1	X_2	B_1	H_1	H_2	T	EARTH		FILTER MEDIA(300 MM THICK)		PITCHING(0.9 m thick for Guide Bund on river side ,river side of Embankment and countryside of Dyke; 1.5 m for river side of Dyke) with Wire Crates		PITCHING(0.45 m thick for country side of guide bund) without wire crates		TURFING	TOE DRAIN(0.9 m depth,0.9 bottom width and 1H:1V slope for Guide Bund and Embankment and 1.5 m depth,1.5 bottom width and 1H:1V slope for Dyke)		LAUNCHING APRON				Remarks
									AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	AREA	VOLUME	WIDTH	THICKNESS	AREA	VOLUME	
GUIDE BUND																								
0+000	70.59	5.17	8.00	2.34	3.00	4.00	1.17	6.00	108.53		9.10		13.65		6.82			1.62		21.00	1.20	25.20		
0+100	70.20	5.61	8.00	3.22	3.00	4.00	1.61	6.00	120.66	11459.61	9.69	939.41	14.53	1409.12	7.27	704.56		1.62	162.00	21.00	1.20	25.20	2520.00	
0+200	69.99	5.87	8.00	3.73	3.00	4.00	1.87	6.00	128.05	12435.62	10.03	986.05	15.05	1479.07	7.52	739.54		1.62	162.00	21.00	1.20	25.20	2520.00	
0+300	70.24	5.67	8.00	3.35	3.00	4.00	1.67	6.00	122.40	12522.61	9.77	990.13	14.66	1485.20	7.33	742.60		1.62	162.00	21.00	1.20	25.20	2520.00	
0+400	70.63	5.33	8.00	2.66	3.00	4.00	1.33	6.00	112.84	11761.85	9.31	954.19	13.97	1431.29	6.98	715.64		1.62	162.00	21.00	1.20	25.20	2520.00	
0+500	70.48	5.53	8.00	3.06	3.00	4.00	1.53	6.00	118.36	11560.02	9.58	944.66	14.37	1416.99	7.19	708.49		1.62	162.00	21.00	1.20	25.20	2520.00	
0+600	70.57	5.50	8.00	2.99	3.00	4.00	1.50	6.00	117.37	11786.78	9.53	955.66	14.30	1433.49	7.15	716.74		1.62	162.00	21.00	1.20	25.20	2520.00	
0+700	70.66	5.46	8.00	2.92	3.00	4.00	1.46	6.00	116.38	11687.72	9.49	950.91	14.23	1426.37	7.11	713.18		1.62	162.00	21.00	1.20	25.20	2520.00	
0+800	70.74	5.42	8.00	2.85	3.00	4.00	1.42	6.00	115.40	11589.17	9.44	946.16	14.16	1419.24	7.08	709.62		1.62	162.00	21.00	1.20	25.20	2520.00	
0+900	70.83	5.39	8.00	2.78	3.00	4.00	1.39	6.00	114.42	11490.98	9.39	941.41	14.09	1412.11	7.04	706.05		1.62	162.00	21.00	1.20	25.20	2520.00	
1+000	70.92	5.34	8.00	2.69	3.00	4.00	1.34	6.00	113.20	11381.10	9.33	936.05	14.00	1404.08	7.00	702.04		1.62	162.00	21.00	1.20	25.20	2520.00	
1+100	71.04	5.28	8.00	2.57	3.00	4.00	1.28	6.00	111.55	11237.39	9.25	929.00	13.87	1393.50	6.94	696.75		1.62	162.00	21.00	1.20	25.20	2520.00	
1+200	71.18	5.19	8.00	2.39	3.00	4.00	1.19	6.00	109.09	11031.76	9.13	918.81	13.69	1378.22	6.85	689.11		1.62	162.00	21.00	1.20	25.20	2520.00	
1+300	71.44	4.98	9.97			4.98		6.00	39.78	7443.39	7.05	808.61	10.57	1212.92	5.28	606.46		1.62	162.00	21.00	1.20	25.20	2520.00	
1+400	71.62	4.85	9.71			4.85		6.00	38.13	3895.32	6.87	695.91	10.31	1043.86	5.15	521.93		1.62	162.00	21.00	1.20	25.20	2520.00	
1+500	71.36	5.16	8.00	2.33	3.00	4.00	1.16	6.00	108.34	7323.64	9.09	798.12	13.63	1197.18	6.82	598.59		1.62	162.00	21.00	1.20	25.20	2520.00	
EMBANKMENT																								
1+600	71.38	5.20	8.00	2.39	3.00	4.00	1.20	6.00	109.18	10876.13	4.57	682.76	13.70	1366.58			13.70	1.62	162.00	12.00	1.20	14.40	1980.00	
1+700	71.59	5.04	8.00	2.07	3.00	4.00	1.04	6.00	104.93	10705.45	4.46	451.19	13.37	1353.57			13.37	1.62	81.00	12.00	1.20	14.40	1440.00	
1+800	71.64	5.04	8.00	2.07	3.00	4.00	1.04	6.00	104.92	10492.55	4.46	445.79	13.37	1337.37			13.37	1.62	162.00	12.00	1.20	14.40	1440.00	
1+900	71.63	5.09	8.00	2.19	3.00	4.00	1.09	6.00	106.46	10568.83	4.50	447.74	13.49	1343.22			13.49	1.62	162.00	12.00	1.20	14.40	1440.00	
2+000	71.25	5.52	8.00	3.05	3.00	4.00	1.52	8.00	118.15	11230.07	4.78	464.10	14.35	1392.29			14.35	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
2+100	71.12	5.70	8.00	3.41	3.00	4.00	1.70	6.00	123.28	12071.44	4.91	484.55	14.72	1453.65			14.72	1.62	162.00	12.00	1.20	14.40	1440.00	
2+200	71.61	5.27	8.00	2.53	3.00	4.00	1.27	6.00	111.08	11718.14	4.61	475.96	13.84	1427.88			13.84	1.62	162.00	12.00	1.20	14.40	1440.00	
2+300	71.88	5.05	8.00	2.09	3.00	4.00	1.05	6.00	105.22	10814.89	4.47	453.93	13.40	1361.78			13.40	1.62	162.00	12.00	1.20	14.40	1440.00	
2+400	71.96	5.02	8.00	2.04	3.00	4.00	1.02	6.00	104.50	10485.79	4.45	445.62	13.34	1336.85			13.34	1.62	162.00	12.00	1.20	14.40	1440.00	
2+500	71.52	5.51	8.00	3.01	3.00	4.00	1.51	6.00	117.69	11109.25	4.77	461.05	14.32	1383.14			14.32	1.62	162.00	12.00	1.20	14.40	1440.00	
2+600	71.32	5.76	8.00	3.52	3.00	4.00	1.76	6.00	124.96	12132.32	4.94	485.95	14.83	1457.84			14.83	1.62	162.00	12.00	1.20	14.40	1440.00	
2+700	71.50	5.63	8.00	3.27	3.00	4.00	1.63	6.00	121.28	12312.05	4.86	490.21	14.58	1470.63			14.58	1.62	162.00	12.00	1.20	14.40	1440.00	
2+800	71.68	5.50	8.00	3.00	3.00	4.00	1.50	6.00	117.52	11939.95	4.77	481.46	14.31	1444.38			14.31	1.62	162.00	12.00	1.20	14.40	1440.00	
2+900	72.09	5.14	8.00	2.28	3.00	4.00	1.14	6.00	107.69	11260.20	4.53	464.91	13.58	1394.72			13.58	1.62	162.00	12.00	1.20	14.40	1440.00	
3+000	72.59	4.70	9.39			4.70		6.00	36.15	7191.81	3.33	392.94	9.99	1178.83			9.99	1.62	162.00	12.00	1.20	14.40	1440.00	
3+100	72.65	4.68	9.37			4.68		6.00	36.00	3607.29	3.32	332.65	9.97	997.95			9.97	1.62	162.00	12.00	1.20	14.40	1440.00	
3+200	72.46	4.93	9.85			4.93		6.00	39.03	3751.37	3.48	340.31	10.45	1020.93			10.45	1.62	162.00	12.00	1.20	14.40	1440.00	
3+300	72.09	5.35	8.00	2.69	3.00	4.00	1.35	6.00	113.24	7613.71	4.67	407.51	14.00	1222.53			14.00	1.62	162.00	12.00	1.20	14.40	1440.00	
3+400	71.45	6.03	8.00	4.07	3.00	4.00	2.03	6.00	133.04	12314.20	5.13	489.73	15.38	1469.18			15.38	1.62	162.00	12.00	1.20	14.40	1440.00	
3+500	71.48	6.06	8.00	4.12	3.00	4.00	2.06	6.00	133.81	13342.53	5.15	513.67	15.44	1541.01			15.44	1.62	162.00	12.00	1.20	14.40	1440.00	
3+600	71.94	5.65	8.00	3.31	3.00	4.00	1.65	6.00	121.84	12782.62	4.87	500.88	14.62	1502.65			14.62	1.62	162.00	12.00	1.20	14.40	1440.00	
3+700	72.22	5.42	8.00	2.84	3.00	4.00	1.42	6.00	115.32	11858.11	4.72	479.47	14.15	1438.41			14.15	1.62	162.00	12.00	1.20	14.40	1440.00	
3+800	72.47	5.23	8.00	2.45	3.00	4.00	1.23	6.00	109.96	11264.23	4.59	465.12	13.76	1395.35			13.76	1.62	162.00	12.00	1.20	14.40	1440.00	
3+900	72.42	5.32	8.00	2.64	3.00	4.00	1.32	6.00	112.52	11124.48	4.65	461.71	13.95	1385.12			13.95	1.62	162.00	12.00	1.20	14.40	1440.00	
4+000	72.39	5.41	8.00	2.81	3.00	4.00	1.41	8.00	114.91	11371.63	4.71	467.79	14.12	1403.36			14.12	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
4+100	72.39	5.46	8.00	2.92	3.00	4.00	1.46	6.00	116.35	11563.02	4.74	472.45	14.23	1417.34			14.23	1.62	162.00	12.00	1.20	14.40	1440.00	
4+200	72.38	5.51	8.00	3.02	3.00	4.00	1.51	6.00	117.81	11708.32	4.78	475.95	14.33	1427.85			14.33	1.62	162.00	12.00	1.20	14.40	1440.00	
4+300	72.34	5.61	8.00	3.21	3.00	4.00	1.61	6.00	120.47	11914.36	4.84	480.86	14.52	1442.59			14.52	1.62	162.00	12.00	1.20	14.40	1440.00	
4+400	72.30	5.70	8.00	3.40	3.00	4.00	1.70	6.00	123.17	12181.95	4.90	487.18	14.71	1461.53			14.71	1.62	162.00	12.00	1.20	14.40	1440.00	
4+500	72.32	5.73	8.00	3.45	3.00	4.00	1.73	6.00	123.96	12356.23	4.92	491.26	14.77	1473.77			14.77	1.62	162.00	12.00	1.20	14.40	1440.00	
4+600	72.34	5.75	8.00	3.51	3.00	4.00	1.75	6.00	124.75	12435.29	4.94	493.09	14.82	1479.27			14.82	1.62	162.00	12.00	1.20	14.40	1440.00	
4+700	71.85	6.30	8.00	4.59	3.00	4.00	2.30	6.00	141.09	13291.66	5.30	512.21	15.91	1536.63			15.91	1.62	162.00	12.00	1.20	14.40	1440.00	
4+800	71.30	6.91	8.00	5.81	3.00	4.00	2.91	6.00	160.79	15093.72	5.71	550.81	17.14	1652.43			17.14	1.62	162.00	12.00	1.20	14.40	1440.00	
4+900	70.87	7.38	8.00	6.76	3.00	4.00	3.38	6.00	177.13	16895.94	6.03	587.06	18.09	1761.18			18.09	1.62	162.00	12.00	1.20	14.40	1440.00	

5+000	70.88	7.42	8.00	6.85	3.00	4.00	3.42	6.00	178.76	17794.42	6.06	604.45	18.18	1813.35			18.18	1.62	162.00	12.00	1.20	14.40	1440.00	
5+100	71.09	7.26	8.00	6.53	3.00	4.00	3.26	6.00	173.07	17591.20	5.95	600.59	17.86	1801.76			17.86	1.62	162.00	12.00	1.20	14.40	1440.00	
5+200	71.83	6.58	8.00	5.16	3.00	4.00	2.58	6.00	150.02	16154.37	5.49	572.24	16.48	1716.72			16.48	1.62	162.00	12.00	1.20	14.40	1440.00	
5+300	71.25	7.20	8.00	6.40	3.00	4.00	3.20	6.00	170.93	16047.66	5.91	570.19	17.73	1710.58			17.73	1.62	162.00	12.00	1.20	14.40	1440.00	
5+400	72.06	6.45	8.00	4.89	3.00	4.00	2.45	6.00	145.78	15835.66	5.40	565.75	16.21	1697.26			16.21	1.62	162.00	12.00	1.20	14.40	1440.00	
5+500	72.90	5.65	8.00	3.30	3.00	4.00	1.65	6.00	121.81	13379.73	4.87	513.80	14.62	1541.39			14.62	1.62	162.00	12.00	1.20	14.40	1440.00	
5+584	73.51	5.09	8.00	2.18	3.00	4.00	1.09	6.00	106.30	11405.86	4.49	468.24	13.48	1404.73			13.48	1.62	162.00	12.00	1.20	14.40	1440.00	
TOTAL										**648195**		**33728.19**		**79960.23**		**10271.32**	**594.10**		**8991.00**				**97380.00**	

DETAILED CALCULATIONS-RIGHT BANK-D/S

RD	NSL	TOP OF BNK.	X_1	X_2	B_1	H_1	H_2	T	EARTH		FILTER MEDIA(300 MM THICK)		PITCHING(0.9 m thick for Guide Bund on river side ,river side of Embankment and countryside of Dyke; 1.5 m for river side of Dyke) with Wire Crates		PITCHING(0.45 m thick for country side of guide bund) without wire crates		TURFING	TOE DRAIN(0.9 m depth,0.9 bottom width and 1H:1V slope for Guide Bund and Embankment and 1.5 m depth,1.5 bottom width and 1H:1V slope for Dyke)		LAUNCHING APRON				Remarks
									AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	VOLUME	AREA	AREA	VOLUME	WIDTH	THICKNESS	AREA	VOLUME	
GUIDE BUND																								
0+000	70.59	5.17	8.00	2.34	3.00	4.00	1.17	6.00	108.53		9.10		13.65		6.82			1.62		21.00	1.20	25.20		
0+100	69.21	6.53	8.00	5.05	3.00	4.00	2.53	6.00	148.33	12843.23	10.92	1000.73	16.37	1501.09	8.19	750.54		1.62	162.00	21.00	1.20	25.20	2520.00	
0+200	69.05	6.65	8.00	5.30	3.00	4.00	2.65	6.00	152.31	15032.29	11.08	1099.81	16.62	1649.71	8.31	824.85		1.62	162.00	21.00	1.20	25.20	2520.00	
0+300	68.96	6.71	8.00	5.42	3.00	4.00	2.71	6.00	154.34	15332.67	11.16	1112.22	16.75	1668.32	8.37	834.16		1.62	162.00	21.00	1.20	25.20	2520.00	
0+400	68.98	6.67	8.00	5.34	3.00	4.00	2.67	6.00	152.97	15365.31	11.11	1113.56	16.66	1670.34	8.33	835.17		1.62	162.00	21.00	1.20	25.20	2520.00	
0+500	69.94	5.68	8.00	3.35	3.00	4.00	1.68	6.00	122.49	13772.75	9.78	1044.13	14.66	1566.19	7.33	783.10		1.62	162.00	21.00	1.20	25.20	2520.00	
0+600	70.28	5.31	8.00	2.62	3.00	4.00	1.31	6.00	112.20	11734.38	9.28	952.83	13.92	1429.24	6.96	714.62		1.62	162.00	21.00	1.20	25.20	2520.00	
0+700	70.17	5.39	8.00	2.79	3.00	4.00	1.39	6.00	114.55	11337.61	9.40	933.91	14.10	1400.87	7.05	700.43		1.62	162.00	21.00	1.20	25.20	2520.00	
0+800	69.73	5.74	8.00	3.48	3.00	4.00	1.74	6.00	124.34	11944.48	9.86	962.89	14.79	1444.34	7.40	722.17		1.62	162.00	21.00	1.20	25.20	2520.00	
0+900	69.70	5.67	8.00	3.35	3.00	4.00	1.67	6.00	122.43	12338.39	9.77	981.67	14.66	1472.51	7.33	736.26		1.62	162.00	21.00	1.20	25.20	2520.00	
1+000	69.69	5.59	8.00	3.18	3.00	4.00	1.59	6.00	120.09	12126.27	9.66	971.75	14.49	1457.62	7.25	728.81		1.62	162.00	21.00	1.20	25.20	2520.00	
1+100	69.57	5.61	8.00	3.23	3.00	4.00	1.61	6.00	120.72	12040.55	9.69	967.72	14.54	1451.58	7.27	725.79		1.62	162.00	21.00	1.20	25.20	2520.00	
1+200	69.45	5.64	8.00	3.27	3.00	4.00	1.64	6.00	121.37	12104.58	9.72	970.74	14.58	1456.11	7.29	728.06		1.62	162.00	21.00	1.20	25.20	2520.00	
1+300	69.34	5.66	8.00	3.32	3.00	4.00	1.66	6.00	122.00	12168.81	9.75	973.76	14.63	1460.64	7.31	730.32		1.62	162.00	21.00	1.20	25.20	2520.00	
1+400	69.25	5.66	8.00	3.31	3.00	4.00	1.66	6.00	121.95	12197.39	9.75	975.10	14.62	1462.65	7.31	731.33		1.62	162.00	21.00	1.20	25.20	2520.00	
1+500	69.21	5.60	8.00	3.19	3.00	4.00	1.60	6.00	120.23	12109.01	9.67	970.94	14.50	1456.41	7.25	728.21		1.62	162.00	21.00	1.20	25.20	2520.00	
1+600	69.18	5.54	8.00	3.07	3.00	4.00	1.54	6.00	118.54	11938.68	9.59	962.89	14.38	1444.34	7.19	722.17		1.62	162.00	21.00	1.20	25.20	2520.00	
EMBANKMENT																								
1+700	69.15	5.48	8.00	2.95	3.00	4.00	1.48	6.00	116.86	11769.79	4.75	717.14	14.26	1432.26			14.26	1.62	162.00	12.00	1.20	14.40	1980.00	
1+800	69.12	5.41	8.00	2.83	3.00	4.00	1.41	6.00	115.08	11596.81	4.71	473.26	14.13	1419.79			14.13	1.62	162.00	12.00	1.20	14.40	1440.00	
1+900	69.09	5.35	8.00	2.70	3.00	4.00	1.35	6.00	113.29	11418.47	4.67	468.93	14.00	1406.80			14.00	1.62	162.00	12.00	1.20	14.40	1440.00	
2+000	69.06	5.28	8.00	2.57	3.00	4.00	1.28	8.00	111.52	11240.42	4.62	464.57	13.87	1393.72			13.87	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
2+100	69.04	5.21	8.00	2.42	3.00	4.00	1.21	6.00	109.60	11056.00	4.58	460.01	13.73	1380.04			13.73	1.62	162.00	12.00	1.20	14.40	1440.00	
2+200	69.03	5.13	8.00	2.25	3.00	4.00	1.13	6.00	107.33	10846.81	4.52	454.78	13.56	1364.34			13.56	1.62	162.00	12.00	1.20	14.40	1440.00	
2+300	69.02	5.04	8.00	2.08	3.00	4.00	1.04	6.00	105.04	10618.87	4.46	449.01	13.38	1347.03			13.38	1.62	162.00	12.00	1.20	14.40	1440.00	
2+400	69.01	4.96	9.91			4.96		6.00	39.42	7223.01	3.50	398.24	10.51	1194.73			10.51	1.62	162.00	12.00	1.20	14.40	1440.00	
2+500	68.92	4.95	9.90			4.95		6.00	39.33	3937.19	3.50	350.16	10.50	1050.47			10.50	1.62	162.00	12.00	1.20	14.40	1440.00	
2+600	68.84	4.94	9.88			4.94		6.00	39.24	3928.16	3.49	349.69	10.48	1049.06			10.48	1.62	162.00	12.00	1.20	14.40	1440.00	
2+700	68.75	4.93	9.87			4.93		6.00	39.15	3919.14	3.49	349.22	10.47	1047.65			10.47	1.62	162.00	12.00	1.20	14.40	1440.00	
2+800	68.67	4.93	9.85			4.93		6.00	39.04	3909.49	3.48	348.71	10.45	1046.14			10.45	1.62	162.00	12.00	1.20	14.40	1440.00	
2+900	68.58	4.92	9.84			4.92		6.00	38.94	3899.21	3.48	348.18	10.44	1044.53			10.44	1.62	162.00	12.00	1.20	14.40	1440.00	
3+000	68.58	4.83	9.66			4.83		6.00	37.81	3837.35	3.42	344.92	10.26	1034.77			10.26	1.62	162.00	12.00	1.20	14.40	1440.00	
3+100	67.55	5.76	8.00	3.53	3.00	4.00	1.76	6.00	125.03	8141.88	4.95	418.30	14.84	1254.90			14.84	1.62	162.00	12.00	1.20	14.40	1440.00	
3+200	67.94	5.27	8.00	2.55	3.00	4.00	1.27	6.00	111.27	11815.28	4.62	478.23	13.85	1434.68			13.85	1.62	162.00	12.00	1.20	14.40	1440.00	
3+300	67.77	5.36	8.00	2.71	3.00	4.00	1.36	6.00	113.54	11240.55	4.67	464.57	14.02	1393.72			14.02	1.62	162.00	12.00	1.20	14.40	1440.00	
3+400	67.71	5.32	8.00	2.65	3.00	4.00	1.32	6.00	112.63	11308.54	4.65	466.25	13.95	1398.75			13.95	1.62	162.00	12.00	1.20	14.40	1440.00	
3+500	67.12	5.82	8.00	3.64	3.00	4.00	1.82	6.00	126.61	11962.01	4.98	481.71	14.95	1445.14			14.95	1.62	162.00	12.00	1.20	14.40	1440.00	
3+600	67.08	5.76	8.00	3.51	3.00	4.00	1.76	6.00	124.83	12571.72	4.94	496.24	14.83	1488.71			14.83	1.62	162.00	12.00	1.20	14.40	1440.00	
3+700	67.26	5.49	8.00	2.97	3.00	4.00	1.49	6.00	117.11	12096.82	4.76	485.10	14.28	1455.31			14.28	1.62	162.00	12.00	1.20	14.40	1440.00	
3+800	67.28	5.38	8.00	2.75	3.00	4.00	1.38	6.00	114.06	11558.36	4.69	472.32	14.06	1416.97			14.06	1.62	162.00	12.00	1.20	14.40	1440.00	
3+900	67.45	5.11	8.00	2.23	3.00	4.00	1.11	6.00	106.96	11051.11	4.51	459.81	13.53	1379.44			13.53	1.62	162.00	12.00	1.20	14.40	1440.00	
4+000	69.17	3.29	6.59			3.29		8.00	24.02	6548.97	2.39	344.95	7.17	1034.84			7.17	1.62	162.00	12.00	1.20	14.40	1440.00	Turning Platform
4+100	68.88	3.49	6.98			3.49		6.00	22.67	2334.30	2.52	245.58	7.57	736.73			7.57	1.62	162.00	12.00	1.20	14.40	1440.00	
4+200	67.11	5.17	8.00	2.35	3.00	4.00	1.17	6.00	108.58	6562.73	4.55	353.67	13.65	1061.00			13.65	1.62	162.00	12.00	1.20	14.40	1440.00	
4+300	66.98	5.21	8.00	2.42	3.00	4.00	1.21	6.00	109.55	10906.64	4.57	456.29	13.72	1368.87			13.72	1.62	162.00	12.00	1.20	14.40	1440.00	

4+400	66.88	5.21	8.00	2.42	3.00	4.00	1.21	6.00	109.52	10953.48	4.57	457.46	13.72	1372.39			13.72	1.62	162.00	12.00	1.20	14.40	1440.00	
4+500	66.87	5.13	8.00	2.26	3.00	4.00	1.13	6.00	107.47	10849.41	4.52	454.85	13.57	1364.54			13.57	1.62	162.00	12.00	1.20	14.40	1440.00	
4+600	66.88	5.03	8.00	2.06	3.00	4.00	1.03	6.00	104.76	10611.13	4.45	448.81	13.36	1346.43			13.36	1.62	162.00	12.00	1.20	14.40	1440.00	
4+700	66.75	5.06	8.00	2.13	3.00	4.00	1.06	6.00	105.65	10520.08	4.48	446.50	13.43	1339.49			13.43	1.62	162.00	12.00	1.20	14.40	1440.00	
4+800	66.71	5.00	8.00	2.01	3.00	4.00	1.00	6.00	104.08	10486.20	4.44	445.62	13.31	1336.87			13.31	1.62	162.00	12.00	1.20	14.40	1440.00	
4+900	66.85	4.78	9.55			4.78		6.00	37.15	7061.44	3.38	391.03	10.15	1173.09			10.15	1.62	162.00	12.00	1.20	14.40	1440.00	
5+000	66.84	4.69	9.38			4.69		6.00	36.04	3659.60	3.32	335.47	9.97	1006.40			9.97	1.62	162.00	12.00	1.20	14.40	1440.00	
5+100	66.84	4.59	9.19			4.59		6.00	34.87	3545.80	3.26	329.29	9.78	987.88			9.78	1.62	162.00	12.00	1.20	14.40	1440.00	
5+200	66.59	4.75	9.50			4.75		6.00	36.79	3583.11	3.37	331.31	10.10	993.92			10.10	1.62	162.00	12.00	1.20	14.40	1440.00	
5+300	66.71	4.54	9.07			4.54		6.00	34.17	3547.94	3.22	329.36	9.67	988.08			9.67	1.62	162.00	12.00	1.20	14.40	1440.00	
5+400	66.71	4.44	8.89			4.44		6.00	33.07	3362.02	3.16	319.13	9.48	957.39			9.48	1.62	162.00	12.00	1.20	14.40	1440.00	
5+500	66.61	4.45	8.91			4.45		6.00	33.20	3313.47	3.17	316.41	9.50	949.24			9.50	1.62	162.00	12.00	1.20	14.40	1440.00	
5+600	66.57	4.40	8.80			4.40		6.00	32.57	3288.60	3.13	315.01	9.40	945.02			9.40	1.62	162.00	12.00	1.20	14.40	1440.00	
5+700	66.613	4.259	8.52			4.26		6.00	30.92	3174.39	3.04	308.47	9.11	925.40			9.11	1.62	162.00	12.00	1.20	14.40	1440.00	
5+800	66.658	4.121	8.24			4.12		6.00	29.35	3013.09	2.94	299.07	8.83	897.22			8.83	1.62	162.00	12.00	1.20	14.40	1440.00	
5+894	66.385	4.348	8.70			4.35		6.00	31.95	3064.74	3.10	302.06	9.29	906.18			9.29	1.62	162.00	12.00	1.20	14.40	1440.00	
TOTAL										**535720.50**		**33424.34**		**75561.91**		**11995.98**	**513.15**		**9558.00**				**102780.00**	

APPENDIX -C-23

Statement of Quantity (Morabharali Bridge at Ch.21710m)

Name of Work :- Cost Estimate (CE) for construction of pmt R.C.C Bridge across river Morabharali at Ch.2710m of Dolabari- Jamugurihat section of the 4-lane highway connecting Itanagar with Nagaon in Assam, under Nagaon PWD NH Division.

1.Earthwork in excavation for foundation(Hard soil)

For Abutments

Nos.	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
2	67.90	8.44	8.84	13.00	13.40
	Bot Lvl.	Depth(m)	Vol(Cum)		
	67.5	0.4	**91.25**		

For Piers

Nos	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
4	66.50	9.40	11.07	13.00	14.67
	Bot Lvl.	Depth(m)	Vol(Cum)		
	64.928	1.67	**948.68**		

Total of abutment & piers: **1476.32** Cum

Earthwork without dewatering(70%) **1033.42** Cum

Earthwork withdewatering(30%) **442.89** Cum

Pile foundation

2.Levelling course:PCC M-15

Description	Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
Abutments	4	8.14	12.70	0.15	62.03
Piers	4	9.10	12.70	0.15	62.03
				Total	**191.80**

3.Pile Cap:RCC M-35

Description	Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
Abutments	4	7.84	12.40	1.80	699.96
Piers	4	8.80	12.40	1.80	785.66
				Total	**2169.00**

4.Pile :RCC M-35 Dia= 1.2 m

Description	Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
Abutments	4	7.84	12.40	1.80	699.96
Piers	4	8.80	12.40	1.80	785.66
				Total	**2169.00**

5.Reiforcement in Pile Foundation(TMT CRS)

(a)Pile Cap

At Abutments & Pier locations

Conc Vol=	2169.00	
Percentage=	0.80%	
Wt=	136213.45	Kg

(b)Piles

At Abutments & Pier locations

Conc Vol=	4543.17	
Percentage=	1.50%	
Wt=	534958.24	Kg
Grand Total=	671171.69	Kg
Say,	979.91112	MT

6.Pile load test

(Test-Load corresponding to theoratically calculated pile load capacities)

Provisions of load testing of piles for Vertical and lateral Load carrying capacities are made as per stipulations of Cl.No.709.2.2 of IRC:78-2000,considering the theoratically estimated load capacities

Allowable Load

Vertical= 250 t Lateral= 50 t

Test Load for Vertical Load

	Load(t)	Nos	Total load(t)
(a)Initial load test for ultimate load=	625.00	4	2500
(b)Routine load test for allowable load=	375.00	4	1500
		Total	**4000**

Test Load for Lateral Load

	Load(t)	Nos	Total load(t)
(a)Initial load test for ultimate load=	125.00	4	500
(b)Routine load test for allowable load=	75.00	4	300
		Total	**800**

7.Sub structure(RCC M-35)

(a)Abutment shaft(RCC M-35)

Nos	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)	Height(m)	Vol(Cum)
4	1.05	1.05	11.6	11.6	5.344	**260.36**

(b)Pier shaft (i)Straight part(RCC M-35)

Nos	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)	Height(m)	Vol(Cum)
4	1.1	1.1	8.91	8.91	7.716	**302.5**

(b)Pier shaft (ii)Round part(RCC M-35)

Nos	Radius(m)	Height(m)	Vol(Cum)
4	0.55	7.716	58.66
		Total of Pier	**361.16**

(b)Abutment Cap(RCC M-35)

Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)

4	1.05	11.6	0.3	**14.62**

(d)Pier cap (i)Top Straight part(RCC M-35)

Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
4	1.6	8.91	0.25	14.26

(b)Pier cap(ii)Round part(RCC M-35)

Nos	Radius(m)	Height(m)	Vol(Cum)
4	0.8	0.25	4.02

(d)Pier cap(iii)Bottom tapered central part(RCC M-35)

Nos	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)	Height(m)	Vol(Cum)
4	1.1	1.6	8.91	8.91	0.25	9.65

(d)Pier cap(iv)Bottom tapered round part(RCC M-35)

Nos	Bot Radius(m)	Top Radius(m)	Bot Area(m)	Top Area(m)	Height(m)	Vol(Cum)
4	0.55	0.8	0.95	2.01	0.25	2.9
				Total of pier cap		**30.83**

(c)Dirt Wall(RCC M-35)

Nos	Width(m)	Length(m)	Height(m)	Vol(Cum)
4	0.35	11.6	2.918	**47.39**

(d)Return Wall(RCC M-35)

Part	Nos	Width(m)	Length(m)	Height(m)	Vol(Cum)
a	8	0.35	4	0.6	6.72
b	8	0.35	4	2.7	15.12
				Total	**21.84**

(g)Pedestral (RCC M-35)

Nos	Width(m)	Length(m)	Height(m)	Vol(Cum)
6	0.700	0.86	0.3	**1.08**
6	0.700	0.86	0.368	1.33
6	0.700	0.86	0.437	1.58
6	0.700	0.86	0.505	1.82
				5.81

Girder Spacing : 2.65

(e)Bracket (RCC M-35)

Nos	Width(m)	Height(m)	Length(m)	Vol(Cum)
6	0.300	0.3	11.6	2.09
6	0.300	0.3	11.6	4.18
				6.27

(e)U-Type Return Wall (RCC M-35)

Nos	Item	Bottom Width(m)	Top Width(m)	Length(m)	Height(m)	Vol(Cum)
0	Vertical Wall	1	0.4	2.500	7.035	0
0	Curb over Wall	0.55	0.55	2.500	0.60	0
0	Raft Slab	12.9	12.9	2.500	1.20	0
					Total =	**0**

(f)Riding return (RCC M-35)

Nos	Width(m)	Length(m)	Height(m)	Vol(Cum)
4	0.350	1.75	8.795	21.55
4	0.350	1.75	8.516	20.86
				42.41

(g)Road Curb (RCC M-35)

Nos	Width(m)	Length(m)	Height(m)	Vol(Cum)
8	0.450	6.1	0.75	**16.47**

Total of Sub-structures(Up to 5m)= 630.072 Cum

Total of Sub-structures(5m-10m)= 375.597 Cum

Total of Sub-structures(Above 10m)= Cum

8.Reinforcement in sub-structure(TMT CRS):

Total Conc.Vol of Sub-structure= **1005.67 Cum**

Percentage= **1.50%**

Wt = **118417.557 kg**

Say, 172.89028 MT

9.Elastomeric Bearing

Nos	Width(cm)	Length(cm)	Height(cm)	Vol(Cucm)
32	40.000	56	9.6	**688128**
16	40.000	56	9.6	**344064**
				1507000

10.Super structure

a)In RCC M-25 in Superstructure

Span Length(m)	Span nos	Volume per span(Cum)	Total Vol(Cum)
24.000	4	175.52	702.08
24.000	2	175.52	351.04
		Total=	**1537.56** Cum

a)In RCC M-40 in Crash Barrier

Length(m)	Nos of Sides	Qty per RM(Cum/RM)	Total(Cum)
85.880	4	0.25	85.88
		Total=	**125.38** Cum

11.Reinforcement bar in superstructure(TMT CRS):

Description	Length(m)	Nos of Span/Sides	Qty per SpanRM(MT)/ (MT/RM)	Total(Cum)
a)In Superstructure	24	4	29.5	118.00
	24	2	29.5	59.00
b)In Crash barrier	85.88	4	0.06	20.61
			G/Total	**288.512**

12.Wearing coat(Mastic Asphalt):

Nos	Width(m)	Overall Length(m)	Area(Sqm)
2	9.000	86.04	**1130.57**

13.Strip Seal Expansion Joint:

Nos	Width(m)	Total Length(m)
8	11.600	**135.49**

14.Pipe Railing over Crash Barrier:

Nos	Width(m)	Total Length(m)
4	85.880	**501.54**

15.Hand Railing:

No of Sides	Overall Length(m)	Total Length(m)
2	85.880	**250.77**

16.Drainage Spout:

Nos	Overall Length(m)	Nos per Span	Total Nos
4	24	8	32
2	24	8	16
			70.08

17.Back fill behind Abutment

Nos	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)	Height(m)	Vol(Cum)
4	11.6	11.6	1.00	9.80	8.795	**2335.51**

18.Filter media behind Abutment

Nos	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)	Height(m)	Vol(Cum)
4	11.6	11.6	0.60	0.60	8.795	**302.20**

19.Levelling course(M-15):

	Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
App Slab	4	11.6	3.65	0.15	**25.4**
U-RW	0	12.2	2.7	0.1	**0**
					37.09

20. Weep holes

	Nos	Width(m)	Height(m)	Spacing(mm)	Total Nos
Abt	4	11.6	5.344	1500	**28**
RRW	8	1.75	8.795	1000	**15**
					62.78

21.Approach slab(M-25):

	Nos	Width(m)	Length(m)	Depth(m)	Vol(Cum)
App Slab	4	12.00	3.5	0.300	**50.4**
Kerb	0	0.75	3.5	0.300	**0**
					73.58

22.Painting on Crash Barrier & Kerbs:

Edge depth of slab= 0.250 m

	Length(m)	Width(m)	Height(m)	Area(Sqm)
C/Barrier	85.880	0.450	0.900	216.770
Kerb	86.040	0.000	0.000	0.000
			Total	216.770
			Total for 4 sides of bridge	1265.940 Sqm

23.Crash Barrier

2x4x30 = **350.4** m

24.Guard Post

2x2x30 = **120** m

PROTECTION WORKS

25.Earthwork in excavation

(a)Apron in front of pile cap

Nos	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
2	66.8	13.6	14.536	26.8	26.8
		Depth(m)	Vol(Cum)		
		1.872	**1411.311**		

(b)Curved Portion of Apron at sides of pile cap

Nos	Avg.Existing RL	Inner Radius(front)(m)	Outer Radius(front)(m)	Inner Radius(side)(m)	Outer Radius(side)(m)
4	66.8	19.513	33.113	19.173	39.298

Depth(m)	Vol(Cum)
0.386	**2328.74**

(c)Base key in front of pile cap

Nos	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
2	66.8	1	3.463	26.8	26.8
		Depth(m)	Vol(Cum)		
		2.463	**278.355**		

(d)Curved Portion of Base key at sides of pile cap

Nos	Avg.Existing RL	Inner Radius(front)(m)	Outer Radius(front)(m)	Inner Radius(side)(m)	Outer Radius(side)(m)
4	66.8	19.513	20.513	19.173	20.173
		Depth(m)	Vol(Cum)		
		0.948	**291.479**		

(e)Apron along Approach Apron Bot.RL=67.90 m

Nos	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
4	68.4	18	18.25	15	15.25
		Depth(m)	Vol(Cum)		
		0.5	**548.291**		

(f)Base key along Approach

Nos	Avg.Existing RL	Bot Width(m)	Top Width(m)	Bot Length(m)	Top Length(m)
4	68.4	1	2.033	15	15.516
		Depth(m)	Vol(Cum)		
		1.033	**94.023**		

Total Vol of Earthwork = 4952.202 Cum

Earthwork without dewatering (50%) = 2476.10 Cum

Earthwork with dewatering (50%) = 2476.10 Cum

26.Filter Media

(a)In front of pile cap

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
2	26.8	5.238	**280.752**

(b) At curved portion at sides of pile cap

Nos	Inclined Length in front (m)	Inner Radius (front) (m)	Outer Radius (front) (m)	Inclined Length(side) (m)	Inner Radius (side) (m)	Outer Radius (side) (m)
4	17.46	5.528	19.513	15.007	7.345	20.291
		Thickness (m)	Vol (cum)			

0.3	**802.939**

(c) Along approach

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
4	15	4.502	**270.13**

Total Vol of Filter Media = 1353.824 cum

27.Slope Pitching

(a)In front of pile cap

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
2	26.80	11.463	**614.432**

(b) At curved portion at sides of pile cap

Nos	Inclined Length in front (m)	Inner Radius (front) (m)	Outer Radius (front) (m)	Inclined Length(side) (m)	Inner Radius (side) (m)	Outer Radius (side) (m)
4	16.376	6.429	19.513	13.664	8.463	19.173
		Thickness (m)	Vol (cum)			
		0.3	**1764.644**			

(c) Along approach

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
4	15	9.564	**573.868**

(d) Base Key in front of Pile Cap

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
2	26.80	1.444	**77.374**

(e) Base Key : Curved portion at sides of pile cap

Nos	X-sec Area (sqm)	Inner Radius (front) (m)	Outer Radius (front) (m)	Inner Radius (side) (m)	Outer Radius (side) (m)	Vol (cum)
4	1.444	19.513	20.513	19.173	20.173	359.949

(f) Base Key : Along approach

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
4	15	1.444	**86.613**

Total Vol of Pitching = 3476.879 cum

28. Boulder Apron

(a)In front of pile cap

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
2	26.80	14.625	**783.9**

(b) Curved portion at sides of pile cap

Nos	X-sec Area (sqm)	Inner Radius (front) (m)	Outer Radius (front) (m)	Inner Radius (side) (m)	Outer Radius (side) (m)	Vol (cum)
4	17.375	19.513	33.113	19.173	39.298	**6064.164**

(c) Along approach

Nos	Length (m)	X-sec Area (sqm)	Vol (cum)
4	15	20.125	**1207.5**

Total Vol of Apron = 8055.564 cum

ROAD FURNITURE WORKS

1. Solar studs :

2 x 4 = **8** nos.

2.Retro-reflective sign board:

1.2 x 1.8 x 2 = **4.32** sqm

3.Pavement marker (From 40m on both sides of bridge) @1.5m c/c.

Bridge length (m) = 86.04 **111** Nos.

4. Reflectorised sign board :

2 x 1.3 x 0.65 = **1.69** sqm

APPENDIX -C-24

Quantity Calculation For Construction of one FLY OVER out of two proposed at Ch. 17865 m and at Ch. 34835m

Sl No.	Item Of Works	Unit	Nos.	Length	Width	Depth	Qty.	Wt./m	Total Wt.
	Bridge Proper								
			2	9.3	3.3	27.6	1694.088		
1/12.1 B (a)	Earthwork in excavation upto 3		1	6	2.25	27.6	372.6		
(i)	m (with dewatering)	cum				Total	**2066.688**		
			2	9	0.15	27.3	73.71		
	Levelling course below pile cap		1	5.7	0.15	27.3	23.342		
2/12.4	(M-15)	cum				Total	**97.052**		
	Below Wing Wall	cum	4	18.5			74		
			2	3	8	16	768		
	Bored cast in situ pile		1	2	8	16	256		
4/12.25(P)	(1200mm dia)	cum				Total	**1024.000**		
			2	8.7	1.8	27	845.64		
			1	5.4	1.8	27	262.44		
5/12.38	Pile Cap (M-35) (P)	cum				Total	**1108.080**		
6/12.8 (P) H Case- II	R.C.C M35 in open foundation for median wall	cum	4	135.6			**542.400**		
7/12.40(a)	Reinforcement in foundation with TATA make TMT CRS Pile								
	32Ø		2	24	25	17.1	20520	6.321	129706.67
	32Ø		1	16	20	17.1	5472	6.321	34588.44

		10Ø		2	24	107	3.9	20030.4	0.617	12364.44
		10Ø	kg	1	16	107	3.9	6676.8	0.617	4121.48
	Pile Cap									
		28Ø		2	216	10.7		4622.4	4.84	22370.13
		28Ø		2	135	10.7		2889	4.84	13981.33
		28Ø		1	225	7.4		1665	4.84	8057.78
		20Ø		1	270	7.4		1998	2.469	4933.33
		16Ø	kg	2	44	29		2552	1.58	4032.79
		16Ø		2	27	29		1566	1.58	2474.67
		16Ø		2	4	71.4		571.2	1.58	902.64
		16Ø		1	4	65		260	1.58	410.86
			kg						**Total in Kg. =**	**237944.56**
									Total in MT =	**237.94**
		Wing Wall			2	17.55				35.10
			MT						**Grand Total in MT =**	**273.04**
8/12.37	Pile Load Test									
	(a) Initial				1	399		399		
	(b) Routine				1	105		220		
							Total =	**619.000**		
	Lateral		MT		1			60		
9/13.5 (P) H (b) Case - II	Substructure M-35 (Ht. 5 to 10m)									
	Dirt Wall			2	1.581	27	0.3	25.612		
	Abutment Cap			2	1	0.225	27	12.150		
	Abutment			2	(1.0+2.0)/2	8.956	27	725.436		
	Pier Cap			2	0.225	27		12.150		
					(1.5+2.0)/2	0.45	27	21.263		
	Pire			1	8.506	1.5	27	344.493		
	Wing Wall			4	107.86			431.44		
			cum				**Total =**	**1572.544**		
10/13.6 (a)	Reinforcement in Substructure with TATA make TMT CRS									

	Dirt Wall								
	12Ø		2	246	4.47		2199.24	0.889	1954.88
	12Ø	kg	2	54.75	14		1533	0.889	1362.67
	Abutment Cap								
	12Ø		2	2	6	27.5	660	0.889	586.67
	12Ø	kg	2	180	2.8		1008	0.889	896
	Pier Cap								
	12Ø		1	28	27.5		770	0.889	684.44
	12Ø	kg	1	180	4.95		891	0.889	792
	Abutment								
	32Ø		2	270	11.98		6469.2	6.321	40891.73
	32Ø		2	270	12.35		6669	6.321	42154.67
	12Ø		2	57	60		6840	0.889	6080
	12Ø	kg	2	16200	1.8		58320	0.889	51840
	Pier								
	32Ø		2	270	11.98	90	6469.2	6.321	40891.73
	33Ø		2	6	11.98	90	143.76	6.722	966.39
	12Ø		1	56	57.2		3203.2	0.889	2847.23
	12Ø	kg	1	56	27	1.8	2721.6	0.889	2419.2
								Total in Kg. =	194367.61
								Total in MT =	**194.37**
	Wing Wall								
		MT		4	6.2				**24.8**
								Grand Total in MT =	**219.17**
11/14.1 (P) D Case- II (a) (b)	RCC in T-Beam Superstructure RCC M-35 (height 5 to 10 m)		2	279.15			558.3		
			2	3	0.2	33.8	40.56		
		cum				**Total =**	**598.860**		
12/14.2	Reinforcement in super structure with TATA made CRS (Fe 500) Rebar	MT	2	64.2		**Total =**	128.4		
							128.400		

13/14.9	Drainage Spout	no.	2	4		**Total =**	**8**		
14/14.22	Expansion Joint (Strip seal)	Rm	2	3	12		72		
			1	4	6	88.5	2124		
15/13.16	POT-PTFE bearing	MT				**Total =**	**2124.000**		
16/14.5B	Wearing coat (Aspheltic)	sqm	2	33.8	8.5		574.600		
17/14.6	Railing	Rm	2	33.8			67.600		
18/8.22B	Crash Barrier	Rm	4	33.8			135.200		
19/14.19	Asphaltic Plug Joint	m	2	2	12		48.000		
20/14.16A	Painting	sqm	6	33.8			202.800		
21/14.10	Levelling course below approach slab	cum	4	12	4	0.15	**28.800**		
22/14.11(a)	Approach slab	cum	4	12	3.5	0.3	**50.400**		
23/15.5	Filter Material	cum	2	27	3	10.312	1670.544		
24/8.47	Solar Studd	no.	2	4			8.000		
25/8.51	RPM	no.	2	40			80.000		
26/13.8	Weep hole	no.	2	2	60		240.000		
27/8.5	Sign Board	sqm	4	4.32			17.280		

APPENDIX -C-24(A)

Name Of Work : Construction of 2 Nos. Fly Over at Ch. 17860m (Dolabari Junction on NH 37A) and at Ch. 34930m (Jamugurihat Junction on NH 52)

Item No.	Description of Item	Unit	Quantity
1	2	3	4
B.	**APPROACH PORTION**		
15/12.1	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 and back filling with approved material).		
	I) Ordinary soil by mechanical means II) With dewatering i) depth up to 3m	cum	1632
16/12.4	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) (RCC Retaining Walls)	cum	435.66
17/12.8B	Plain / Reinforced cement concrete , in open foundation complete as per drawing and technical specification including providing plasticiser (Masterplast PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999. and steel shuttering formwork. (RCC Retaining walls)		
H	Case II RCC Grade M35		
	Using Batching Plant, Transit Mixer and Concrete Pump	cum	216

18/13.5B	Plain / Reinforced cement concrete, in sub structure as per drawing and technical specification including providing plasticiser (Masterplant PL-1/SPL-2 or equivalent), air entraining and water reducing plasticiser (Masterplast PAE or equivalent) and accelerating plasticiser (Masterplast ACPL or equivalent) conforming to IS-9103-1999. and steel shuttering formwork.		
H	RCC Grade M35		
(p)	Height upto 5 m		
Case II	With Batching Plant, Transit Mixer and Concrete Pump	cum	576
19/14.2	Reinforcement in Super Structure : Supplying , fitting and placing TMT bar reinforcement in super-structure including splicing complete as per drawing and technical specification.		
(a)	With TATA make TMT CRS (Fe 500 grade) rebar	tonne	221.24
20/12.3	Providing , placing and compacting approved fill material in the embankment / approaches as per the specifications. Item to include 500 mm thick sub-grade construction as per MoRTH&H's specification with CBR under soaked condition not less then 5%. The filling shall be well compacted in layers not exceeding 200 mm in thickness and to atleast 97% of modified proctor densty as per IS:2720 (pert 8) . Item to include breaking clods, watering, rolling and compacting with 10 tonne vibratory roller as per the MoRTH&H's specification. All incidental work required to complete the job shall be included in that quoted rates. The item shall be measured and paid for the finished volume of fill and subgrade placed in position.		
		cum	67956

21	Providing and laying M 35 grade (using 43/53 grade OPC) precast concrete face wall (area of each face panel shall not be less than 0.80 sqm, height shall not be less than 600 mm) including design and getting the approval, excavation, providing each "levelling pad". TMT reinforcement steel in precast facia panels. geotextile filter fabric behind precast facia panels, including filter media as required by designs behind the facia wall, supplying and laying in position the specified and approved galvanised steel strips soil reinforcement , including cutting in required length, placing in position and connecting with the precast facia panels as per the design and drawings and direction of the Engineer-In-Charge and nailing with filled up surface of earth complete including all arrangement for drainage complete with all contractor's material, labour lead lifts, plant machinary taxes, royalties etc. complete. Item to include providing half perforated HDPE longitudinal drainage pipe (including filter media all around) along the reinforced soil wall as per drawing enclosed with the tender documents.		
	The item also include all accidental work required to complete the job. The wall area shall be measured from top of concrete pad at base level to top of the facia wall. Only the cost of all items except the cost of backfill is included in this item. The cost of backfilling shall be paid extra.		
		sqm	9444
22/1500,1700 & 2100	Providing and fixing M 35 grade (using 43/53 grade OPC) using 20 mm down stone aggregate and approved qulaity sand in cast in situ friction slab over the approaches complete with making all joints and their sealing as per the drawings and specifications excluding the cost of reinforcement only. (approach slab/ friction slab)		
		cum	733.25
23/12.4	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)		
		cum	251.4

24/14.1	Providing and fixing M 40 grade cement concrete with 43/53 grade OPC using 20 mm down stone aggregate and approved qulaity sand in crash barriers over precast facia panels of reinforced soil wall as per the drawings and specifications excluding the cost of reinforcement only.		
		cum	1424.6
25	Providing and fixing Hand Rail over the crash barrier consisting of MS Base plate embeded fastener and nuts. MS vertical plates and pipe etc. as shown in the drawing and as per specifications. All the railing components as mentioned above to be hot. Dip, galvanised with a zinc coating of atleast 175 gm/sqm. The thickness of plates to be as shown in the drawings and pipe to be 65NB heavy class with a weight not less than 7.92 kg/metre and conforming to IS:1161-1979. Item to include all incidental works required to complete the work as directed by Engineer-In-Charge. Measurement shall be made for the length of the pipe only.		
		metre	2156
26/4.1	Plant Mix Method (Construction of ganular sub-base by providing close graded material, mixing in a mechanical mix plant at OMC, carriage of mixed material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per cl. 401 (with an initial lead of 5 km.) (Including cost of testing of material at site and laboratory as directed by the deptt.) for grading - II Material		
		cum	3234
27/4.12	Wet Mix Mcadam (Providing, laying, spreading and compacting grded 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 (Including carriage up to initial led of 5.0 km from quarry and carriage of mixed materials up to 10.0 km initial lead from mixing plant)		
		cum	2991.45

28/5.1B	Prime coat (Providing and applying prime coat with bitumen emulsion on prepared surface of Granular Base including clearing of road surface and spraying primer at the rate of 1.00kg/sqm using mechanical means.) (Including cost of testing o material at site and laboratory as directed by the deptt.)		
	(ii) with bitumen emulsion - CSS-1 (IS-8887-2004)	sqm	11965.8
29/5.2	Tack coat (Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous / granular surface cleaned with mechanical broom. (Including cost of testing of material at site and laboratory as directed by the deptt.)		
	(ii) with bitumen emulsion - CSS-1 (IS-8887-2004) C) Granular sufaces treated with primer	sqm	23931.6
30/5.6	Dense Graded Bituminous Macadam (Providing and laying Dense Bituminous Macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hours using crushed aggregates of specified grading, premixed with bituminous binder @4.0 to 4.5% 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 a per MoSRT&H cl. no. 407. complete in all respect. (Including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 km initial lead from mixing plant) (Including cost of testing of material at site and laboratory as directed by the deptt.) (a) with hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification & anti stripping agent as per IS: 14982)		
	(1) With 60/70 or VG-30 grade bitumen for grading II (19 mm nominal size)	cum	718

31/5.8	Bituminous concrete (Providing and laying Bituminous concrete with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hours using crushed aggregates of specified grading, premixed with bituminous binder @5.4 to 5.6% 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 a per MoSRT&H cl. no. 509. complete in all respect. (Including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 km initial lead from mixing plant) (Including cost of testing of material at site and laboratory as directed by the deptt.) (c) with hydrated lime/cement as filler (refer table 500-9 of MoSRT&H specification & anti stripping agent as per IS: 14982) (b) (ii) with polymer modified bitumen 70		
	for Grading -II (13 mm nominal size)	cum	478.6
32/8.13	Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads @250 gms per sqm area, 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. Item to include all materials, labour, machinery/ quipment and incidental works required to complete the job. (@0.40 sqm/run of the flyover)		
		sqm	600
33	Providing and laying 60 mm thick precast cement concrete interlocking paver blocks of M35 grade cement concrete in the footpath and median using OPC 43/53 grade, made by block making machine with strong vibratory compaction and of approved design/shape/colour laid in required pattern over and including 25 mm thick compacted bed of coarse sand, filling the joint with join sealer containing sand and 10% admixture of marble stone powder complete as per the direction of the Engineer- In-Charge. Item to include all labour, material,equipment and works required to execute the job.		
		sqm	970.2

34	Providing and fixing precast kerb stones of approved size/shape of M35 grade cement concrete using OPC 43/53 grade OPC along bothsides of the flyover from start of one side valley curve to end of valley curve at the other end and across its width (at ground level). Item to include cost of all materials, T&P and all incidental required to execute the job. The quoted rates shall include the cost of 50 mm thick PCC levelling pad)1:3:6) below the precast kerb stones.		
		cum	200

Combined Quantity Statement for 3 Nos. Minor Bridges, at Ch. 21935m, 31365m, and Ch. 32800m of (4 Lane from Dolabari to Jamurighat)

Sl.No.	Item of Works in short	Unit	Nos.	Combined Qntty.	Remarks
1	2	3	4	5	6
1/12.1B(b)	E/W in excavation in foundation	Cum	3	**9018.347**	
2/12.8/(N) A	P.C.C. M15	Cum	1	**266.764**	
3/14.10	Levelling coarse below pile cap (M-15)	Cum	2	**108.864**	
4/12.38 (P) D (ii)	Pile Cap (M-35) (P)	Cum	2	**1222.128**	
5/12.8/(P) B	P.C.C. M20	Cum	1	**123.400**	
6/12.8/(P) H,Case II	R.C.C. M35 in open foundation	Cum	3	**392.256**	
7/12.25 (P)	Bored cast in situ pile (1200mm dia)		2	**1600.000**	
8/12.37	Pile Load test		2		
	(i) Initial			**1158.000**	
	(ii) Routine			**872.000**	
9/12.40 (a)	Reinforcement in foundation With TATA make TMT CRS	MT	3	**441..222**	
10/13.5/(P) (b) /Case II	Sub Structure RCC M-35 (P)	Cum	3	**925.959**	
11/13.6 (a)	Reinforcement in Substructure With TATA make TMT CRS	MT		**176.003**	
12/14.1 (P) /(B) Case - II/(i) (b)	R.C.C. (M-25) in Solid Slab Superstructure	Cum	1	**212.800**	
	R.C.C. M-25 in T-Beam Superstructure RCC	Cum	2	**827.340**	
13/14.2 (a)	Reinforcement (Fe-500 CRS) in Superstructure	MT	3	**158.054**	
14/13.14	Elastomaric Bearing	Cucm	3	**688128.000**	
15/14.21	Expansion Joint (strip seal)	RM	2	**96.000**	
16/14.18/2605	Filler Joint Exapnsion Joint	RM	1		
	(i)			**48.000**	
	(ii)			**48.000**	
	(iii)			**48.000**	
	(iv)			**48.000**	
17/14.9	Drainage Spout	No.	3	**48.000**	
18/14.10	Levelling course below approach slab	Cum	3	**165.600**	
19/14.11 (a)	Approach Slab	Cum	3	**165.600**	
20/14.6	Railling	m	3	**176.840**	
21/8.22	Crash Barrier (M-40)	m	3	**353.680**	
22/5.14	Asphaltic Wearing Coat	Sqm	3	**1503.140**	
23/13.9	Back Fill				
	(A) Granular Material	Cum	3	**2264.396**	
24/14.19	Asphaltic Plug Joint	m	3	**144.000**	
25/13.8	Weep Hole	No.	3	**432.000**	
26/8.51	RPM	No.	3	**120.000**	
27/8.47	Solar Studd	No.	3	**24.000**	
28/8.5	Sign Board	Sqm	3	**51.840**	

29/15.8 (A)	Flooring (Rubble stone laing in cement morter (1:3)	Cum	1	**54.662**	
30/15.1	Boulder apron without wire crate	Cum	1	**202.500**	
31/13.5 (P) (B	Wing Wall (PCC M 20)	Cum	2	**1219.220**	
32/12.8 (N)A	P.C.C. M15 in open foundation below wing wall	Cum		**113.231**	
33/15.10 (B)	Curtain Wall complete in CC M15	Cum	1	**169.865**	
34/14.16/800	Painting	Sqm	3	**530.520**	

Quantity Calculation for Br. At Ch.(32800m)L=10m, on New alignment

APPENDIX-C-25 A

Sl. No.	Item of Works	Unit	Nos.	Nos.	Length	Width	Depth	Qty.	Wt./m	Total Wt.
1/12.1 B(b)	E/W in excavation in foundation 1.			2	10.940	3.470	12.000	**911.083 m3**		
	upto 3m		2	2	10.940	0.300	1.000	**13.128 m3**		
	with dewatering		2	2	11.400	0.300	1.000	**13.680 m3**		
			2	4	2.000	(3.718+1.85)/2	(8.00+0.882)	**395.64 m3**		
				2	25.240	2.300	1.800	**208.987 m3**		
				2	25.240	2.300	1.800	**208.987 m3**		
				2	25.240	3.000	0.750	**113.580 m3**		
				2	25.240	6.000	0.750	**227.160 m3**		
				2	15.000	0.450	10.000	**135.000 m3**		
			2	2	(10.4+25.24)/2	0.450	7.500	**240.570 m3**		
		Cum					**Total**	**2467.815 m3**		
2/12.8 (N)	P.C.C. M15			2	25.240	1.850	0.150	**14.008 m3**		
A				2	25.240	1.500	0.150	**11.358 m3**		
				2	(25.240+10.4)/2	0.300	0.750	**160.380 m3**		
			2	2	10.440	11.500	0.150	**36.018 m3**		
				2	15.000	10.000	0.150	**45.000 m3**		
		Cum					**Total**	**267.764 m3**		
3/12.8 (P)	P.C.C. M20			1	123.400			123.400 m3		
B		Cum					**Total**	**123.400 m3**		
4/12.8 (P)	R.C.C. M35			2	10.940	12.000	0.950	**249.432 m3**		
H Case-II	In open foundation		2	2	10.940	1.000	0.250	**10.940 m3**		
			2	2	11.500	1.000	0.250	**11.500 m3**		
							Total	**271.872 m3**		
	for median wall			2	5.870	3.000	12.000	**42.264 m3**		
		Cum					**Total**	**314.136 m3**		
5/12.40 (a)	Reinforcement in foundation									
	22ϕ			2x120	12.840			**3081.600 m**	**2.988**	**9206.76 kg**
	22ϕ			2x120	12.840			**3081.600 m**	**2.988**	**9206.76 kg**
	22ϕ			2x305	2.750			**1677.500 m**	**0.889**	**1491.11 kg**
	22ϕ			2x10	45.688			**913.760 m**	**0.889**	**812.23 kg**
									Total	**20716.85 kg**
								42.260m	**100.000**	**4226.00 kg**
	for median wall								Total	**24942.85 kg**
		MT							**Total in MT**	**24.94 MT**

6/13.5 (P) (b) Case II	Sub Structure RCC M-35 (P) Height 5 to 10m									
	1) Abutment			2	(0.70+0.95)/2	3.175	12.000	**62.865 m3**		
	2) Abutment Cap			2	0.700	0.225	12.000	**3.780 m3**		
	3)Dirt Wall			2	0.250	0.900	12.000	**5.400 m3**		
							Total	**72.045 m3**		
	4) Median Wall			2	3.000	4.975	1.250	**37.313 m3**		
		Cum					**G. Total =**	**109.358 m3**		
7/13.6 (a)	Reinforcement in Substructure									
	1) Abutment									
	22ϕ		2	4	5.450	120.000		**5232.000 m**	**2.988**	**15631.41 kg**
	12ϕ		2	2	26.500	22.000		**2332.000 m**	**0.889**	**2072.89 kg**
	12ϕ		2	2	22.000	120.000	1.450	**15312.000 m**	**0.889**	**13610.67 kg**
	2) Dirt wall									
	12ϕ		2	18	24.500			**882.000 m**	**0.889**	**784.00 kg**
	12ϕ		2	240	2.800			**1344.000 m**	**0.889**	**1194.67 kg**
	3) Abutment Cap									
	12ϕ		2	24	12.500			**600.000 m**	**0.889**	**533.33 kg**
	12ϕ		2	240	1.950			**936.000 m**	**0.889**	**832.00 kg**
	4) Median Wall							**37.310 kg**	**100.000**	**3731.00 kg**
									Total in KG	**38389.96 kg**
		MT							**Total in MT**	**38.39 MT**
8/14.1 (P) (B) Case - II (i) (b)	R.C.C. (M-25) in solid slab superstructure (Ht. 5 to 10m)	Cum	2	1	106.400			**212.800 m3**		
9/14.2 (a)	Reinforcement (Fe-500 CRS) in Superstructure	MT	2	1	7.047			**14.094 MT**		
10/14.9	Drainage Spout	No.	2	1	4.000			**8.000 Nos.**		
11/14.18/2605										
	Filler Joint Expansion Joint									
	(i)	m	2	2	12.000			**48.000 m**		
	(ii)	m	2	2	12.000			**48.000 m**		
	(iii)	m	2	2	12.000			**48.000 m**		
	(iv)	m	2	2	12.000			**48.000 m**		
12/14.10	Levelling course below approach slab	Cum	2	2	11.500	4.000	0.300	**55.200 m3**		
13/14.11 (a)	Approach slab	Cum	3	2	11.500	4.000	0.300	**55.200 m3**		
14/14.6	Railling	m	2	1	18.940			**37.880**		
15/8.22	Crash Barrier (M-40)	m	2	2	18.940			**75.760**		

16/5.14	Asphaltic Wearing Coat	Sqm		2	18.940	8.500		**321.980 m2**		
17/13.9	Back Fill									
	(A) Granular Material	Cum	2	2	2.000	11.500	4.300	**395.600 m3**		
18/14.19	Asphaltic Plug Joint	m	2	2	12.000			**48.000 m**		
19/13.8	Weep Hole	No.	2	60				**120 nos.**		
20/8.51	RPM	No.	2	20				**40 nos.**		
21/8.47	Solar Studd	No.	2	4				**8 nos.**		
22/8.5	Sign Board	Sqm	2	2				**17.280 m2**		
23/15.8 (A)	Flooring (Rubble stone laing in cement morter (1:3)			2	(25.24+10.94)/2	7.500	0.150	**40.703 m3**		
				3	10.340	3.000	0.150	**13.959 m3**		
		Cum					**Total =**	**54.662 m3**		
24/15.1	Boulder apron without wire crate			1	30.000	6.000	0.750	**135.000 m3**		
				1	30.000	3.000	0.750	**67.500 m3**		
		Cum					**Total =**	**202.500 m3**		
25/15.10(B)	M15									
			2	1	25.240	1.898	1	**95.786**		
			2	1	25.240	1.468	1	**74.079**		
		Cum					**Total =**	**169.865**		
26/14.16/800	Painting	Sqm	2	3	18.940			**113.640 m2**		

Quantity Calculation for construction of Bridge at Ch. 31365m C/L, L=27m, on New alignment APPENDIX-C-25 B

Sl. No.	Item of Works	Unit	Nos.	Length	Width	Depth	Qty.	Wt./m	Total Wt.
	Bridge Proper								
1/12.1 B (a) (i)	Earthwork in excavation upto 3m (with dewatering)		2	9.300	12.900	4.860	1166.108 m3		
			2	9.300	12.900	6.660	1598.000 m3		
			4	(1.85+12.342)/2	5.670	2.690	432.921 m3		
		Cum				**Total**	**3197.030 m3**		
2/14.10	Levelling coarse below pile cap (M-15)	Cum	4	9.000	12.600	0.150	68.040 m3		
3/12.38 (P) D (ii)	Pile Cap (M-35) (P)	Cum	4	8.700	12.300	1.800	770.472 m3		
4/12.25 (P)	Bored cast in situ pile (1200mm dia)	Cum	4	12.000	16.500		792.000 m3		
5/12.37	Pile Load test								
	(i) Initial		2	285.000			570.000		
	(ii) Routine		2	210.000			420.000		
6/12.8/(P) H,Case II	R.C.C. M35 in open foundation median wall	Cum	2	5.900	3.000	1.200	**42.480 m3**		
7/12.40 (a)	Reinforcement in foundation With TATA make TMT CRS								
	Pile								
	32ϕ		4	12.000	25.000	18.900	22680.000 m	6.321	143360.00 kg
	10ϕ		4	12.000	110.000	3.950	20856.000 m	0.617	12874.07 kg
	Pile Cap								
	28ϕ		4	123.000	10.800		5313.600 m	4.840	25715.20 kg
	28ϕ		4	123.000	10.800		5313.600 m	4.840	25715.20 kg
	16ϕ		4	58.000	14.500		3364.000 m	1.580	5315.95 kg
	16ϕ		4	58.000	14.500		3364.000 m	1.580	5315.95 kg
	Median Wall			42.480	100.000				4248.00 kg
								Total in kg. =	**222544.38 kg**
		MT						**Total in MT =**	**222.54 MT**

8/13.5 (P) H (b) Case-II	Substructure M-35 (Ht. 5 to 10m)								
	Dirt Wall		4	12.000	0.300	2.618	37.699 m3		
	Abutment		4	(1.000+1.50)/2	5.610	12.000	336.600 m3		
	Abutment Cap		4	0.225	1.000	12.000	10.800 m3		
	Riding Return		4	3.600	8.462	0.450	53.950 m3		
	Median Wall		2	3.000	8.462	(1+0.45)/2	8.896 m3		
		Cum				**Total =**	447.945 m3		
9/13.6 (a)	Reinforcement in Substructure With TATA make TMT CRS								
	Abutment								
	32ϕ		8	120.000	8.800		8448.000 m	6.321	53399.70 kg
	12ϕ		4	26.500	38.000		4028.000 m	0.889	3580.44 kg
	12ϕ		4	38.000	12.000	1.500	2736.000 m	0.889	2432.00 kg
	Abutment Cap								
	12ϕ		4	2.000	6.000	12.500	48.000 m	0.889	
	12ϕ		2	2.000	2.500	82.000	820.000 m	0.889	
	Dirt Wall								
	12ϕ		4	6.800	82.000		2230.400 m	0.889	
	12ϕ		4	22.000	24.500		2156.000 m	0.889	
	Median Wall								
				36.800	100.000				3680.00 kg
	Riding Return								
	20ϕ		4	24.000	11.120		1067.520 m	2.469	2635.85 kg
	16ϕ		4	4.400	68.000		1196.800 m	1.580	1891.24 kg
	12ϕ		4	24.000	11.120		1067.520 m	0.889	948.91 kg
	12ϕ		4	4.400	68.000		1196.800 m	0.889	1063.82 kg
								Total in kg. =	**74302.55 kg**
		MT						**Total in MT =**	**74.30 MT**

10/14.1 (P) /(B) Case - II/(i) (b)	R.C.C. in T-Beam Superstructure RCC M-25 (height 5 to 10m)	Cum	2	185.600			371.200 m3		
						Total =	**371.200 m3**		
11/14.2	Reinforcement in Super Structure With TATA made TMT CRS (FE-500gr.) Rebar		2	32.650			65.300 MT		
		MT				**Total =**	**65.300 MT**		
12/13.14	Elastomaric Bearing		16	56.000	40.000	9.600	344064.000		
		Cucm				**Total =**	**344064.000 cm3**		
13/14.21	Expansion Joint (strip seal)	RM	4	12.000			48.000 m		
14/13.8	Weep Hole	No.	4	38.000			152.000 nos.		
15/14.9	Drainage Spout		4	4.000			16.000 nos.		
			1	8.000			8.000 nos		
		No.				**Total =**	**24.000 nos.**		
16/14.6	Railling	Rm	2	33.240			66.480 m		
17/8.22 B	Crash Barrier	RM	4	33.240			132.960 rm		
18/14.11 (a)	Approach slab	Cum	4	11.500	4.000	0.300	**55.200 m3**		
19/14.10	Levelling course below approach slab	Cum	4	11.500	4.000	0.300	**55.200 m3**		
20/5.14	Wearing Coat (Asphaltic)	Sqm	2	33.240	8.500		565.080 m2		
21/8.47	Solar Studd	No.	2	4.000			8.000 nos.		
22/8.51	RPM	No.	2	20.000			40.000 nos.		
23/8.5	Sign Board	Sqm	2	8.640			17.280 m2		
24/14.16A	Painting	Sqm	6	33.240			199.440 m2		
25/14.19	Asphaltic Plug Joint	m	4	12.000			48.000 m		
26/13.6 A	Back Fill behind abutment with granular material	Cum	4	11.500	3.6	8.46	1400.976 m3		
27/13.5 (P)	Wing Wall (PCC M 20)	Cum	1	737.010			737.010 m3		
28/12.8 (N)A	P.C.C. M15 in open foundation below wing wall	Cum	4	(1.85+12.342)/ 2	11.274	0.150	**48.000 m3**		

Quantity Calculation for construction of Bridge, L=24m, at Ch. 21935m on New alignment APPENDIX-C-25 C

Sl. No.	Item of Works	Unit	Nos.	Length	Width	Depth	Qty.	Wt./m	Total Wt.
	Bridge Proper								
1/12.1 B (a) (i)	Earthwork in excavation upto 3m (with dewatering)		2	5.700	12.900	3.560	523.534 m3		
			2	5.700	12.900	2.880	423.533 m3		
			4	(1.85+12.38)/2	11.274	3.750	2406.435 m3		
		Cum				**Total**	**3353.502 m3**		
2/14.10	Levelling coarse below pile cap (M-15)	Cum	4	5.400	12.600	0.150	40.824 m3		
3/12.38 (P) D (ii)	Pile Cap (M-35) (P)	Cum	4	5.100	12.300	1.800	451.656 m3		
4/12.25 (P)	Bored cast in situ pile (1200mm dia)	Cum	4	8.000	25.250		808.000 m3		
5/12.37	Pile Load test	MT							
	(i) Initial		2	294.000			588.000		
	(ii) Routine		2	226.000			452.000		
6/12.8/(P) H,Case II	R.C.C. M35 in open foundation median wall	Cum	2	1.200	4.950	3.000	**35.640 m3**		
7/12.40 (a)	Reinforcement in foundation With TATA make TMT CRS								
	Pile								
	32ϕ		4	8.000	26.000	27.050	22505.600 m	6.321	142257.62 kg
	10ϕ		4	8.000	3.950	168.000	21235.200 m	0.617	13108.15 kg
	Pile Cap								
	28ϕ		4	123.000	7.200		3542.400 m	4.840	17143.47 kg
	28ϕ		4	82.000	7.200		2361.600 m	4.840	11428.98 kg
	16ϕ		4	34.000	14.500		1972.000 m	1.580	3116.25 kg
	16ϕ		4	34.000	14.500		1972.000 m	1.580	3116.25 kg
	Median Wall								

				35.640	100.000				3564.00 kg
								Total in kg. =	**193734.71 kg**
		MT						**Total in MT =**	**193.73 MT**
8/13.5 (P) H (b) Case-II	Substructure M-35 (Ht. 5 to 10m)								
	Dirt Wall		4	2.752	12.000	0.300	39.629 m3		
	Abutment		4	12.000	4.460	(1+1.5)/2	267.600 m3		
	Abutment Cap		4	12.000	1.000	0.225	10.800 m3		
	Riding Return		4	5.637	1.800	0.450	18.264 m3		
	Median Wall		2	(0.45+1.00)/2	3.000	7.440	32.364 m3		
		Cum				**Total =**	368.657 m3		
9/13.6 (a)	Reinforcement in Substructure With TATA make TMT CRS								
	Abutment								
	32ϕ		8	90.000	7.600		5472.000 m	6.321	34588.44 kg
	12ϕ		4	26.500	30.000		3180.000 m	0.889	2826.67 kg
	12ϕ		4	90.000	30.000	1.500	16200.000 m	0.889	14400.00 kg
	Abutment Cap								
	12ϕ		4	6.000	12.500	2.000	600.000 m	0.889	533.33 kg
	12ϕ		4	82.000	2.500		820.000 m	0.889	728.89 kg
	Dirt Wall								
	12ϕ		4	6.500	82.000		2132.000 m	0.889	1895.11 kg
	12ϕ		4	20.000	24.500		1960.000 m	0.889	1724.22 kg
	Median Wall								
				32.360	100.000				3236.00 kg
	Riding Return								
	20ϕ		4	8.040	20.000		643.200 m	2.469	1588.15 kg
	16ϕ		4	2.250	54.000		486.000 m	1.580	768.00 kg
	12ϕ		4	8.040	20.000		643.200 m	0.889	571.73 kg

	12ϕ		4	2.250	54.000		486.000 m	0.889	432.00 kg
								Total in kg. =	**63310.55 kg**
		MT						**Total in MT =**	**63.31 MT**
10/14.1 (P) /(B) Case - II/(i) (b)	R.C.C. in T-Beam Superstructure RCC M-25 (height 5 to 10m)	Cum	2	228.070			456.140 m3		
						Total =	**371.200 m3**		
11/14.2	Reinforcement in Super Structure With TATA made TMT CRS (FE-500gr.) Rebar	MT	2	39.330			78.660 MT		
						Total =	**65.300 MT**		
12/13.14	Elastomaric Bearing		16	56.000	40.000	9.600	344064.000		
						Total =	**344064**		
13/14.21	Expansion Joint (strip seal)	RM	4	12.000			48.000 m		
14/13.8	Weep Hole	No.	4	40.000			160.000 nos.		
15/14.9	Drainage Spout	No.	4	4.000		**Total =**	16.000 nos. **16.000 nos.**		
16/14.6	Railling	Rm	2	36.240			72.480 m		
17/8.22 B	Crash Barrier	RM	4	36.240			144.960 rm		
18/14.11 (a)	Approach slab	Cum	4	11.500	4.000	0.300	**55.200 m3**		
19/14.10	Levelling course below approach slab	Cum	4	11.500	4.000	0.300	**55.200 m3**		
20/5.14	Wearing Coat (Asphaltic)	Sqm	2	36.240	8.500		616.080 m2		
21/8.47	Solar Studd	No.	2	4.000			8.000 nos.		
22/8.51	RPM	No.	2	20.000			40.000 nos.		
23/8.5	Sign Board	Sqm	2	8.640			17.280 m2		
24/14.16A	Painting	Sqm	6	36.240			217.440 m2		
25/14.19	Asphaltic Plug Joint	m	4	12.000			**48.000 m**		

26/13.6 A	Back Fill behind abutment with granular material	Cum	4	11.500	1.800	5.650	467.820 m3		
27/13.5 (P)	Wing Wall (PCC M 20)	Cum	1	482.210			482.210 m3		
28/12.8 (N)A	P.C.C. M15 in open foundation below wing wall	Cum	4	(1.85+12.38)/2	15.280	0.150	**65.230 m3**		

SCOPE: SUPPLY AND LAYING OF PAVING FABRIC (GEOTEXTILE)

BASIS:

1- laying of 12,000 sqm of PF / day of 8 working hours; 12000

2- machines deployed - FDF (Fabric Dispensing Frame),

3- labour component: 4 unskilled labourers and one technical supervisor;

4- VAT/ CST any other local levies excluded from the rates, have to be added separately;

ITEM	DESCRIPTION	UNIT	RATE (ex-Assam/ unit)	*AMOUNT (INR)/ DAY (@ 8 working hours / day for 24 days in a month)*
1	Hiring of FDF on returnable basic (1 no) including freight - to & fro	month	315000	10500
2	Techinical supervisor (1 no)	month	40000	1333
3	Labourers (unskilled, 2)	day	1200	28800
4	Machine hiring (for loading FDF) - JCB or multi - tyred vehicle	month	200000	6667
	HIRING AND LABOUR COMPONENT PER DAY =			47300

ITEM	DESCRIPTION	UNIT	RATE (ex-Assam/ unit)	*AMOUNT (INR)/ DAY (@ 8 working hours / day for 24 days in a month)*
1	Supply of Paving Fabric	sqm	110	1320000
2	supply of bitumen (80-100) in molten condition @ 155 dergee C	Lit	42	504000
	PER DAY SUPPLY COST FOR 12,000 SQM of PF			1824000
	TOTAL COST/ 12,000 SQM OF PAVING FABRIC - SUPPLY AND LAYING PER DAY			1871300
	RATE PER SQM (supply & laying, ex- Assam) =			155.99
	Add 10% Contractors Profit			15.60
	RATE PER SQM =			171.59

Appendix C. 27 QUANTITY & COST CALCULATIONS							
TRAFFIC MANAGEMENT DURING EXECUTION							
Item	**Description**	**Unit**	**Estimated Quantity**	**Unit Rate in Rs.**	**Amount in Rs.**	**Ref. of SOR**	**Ref. of MoRTH & H**
1	**Providing and applying tack coat** with bitumen emulsion pressure distributor at the rate of 0.20 kg. Per sqm on the prepared bituminous / granular surface cleaned with mechanical broom.	Sqm	23989.63	12.00	287875.56	5.2	503
2	**Bituminous Concrete** (Providing and laying semi dense bituminous concrete with 100-120 TPH batch type HMP producing an average output of 75 ton per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 % of mix and filler transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the reqd. grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoSRT&H cl. No. 509 complete in all respect. (including carriage up to initial lead of 5.0 km from quarry and carriage of mixed materials up to 10.0 km initial lead from mixing plant) (Including cost of testing of materials at site and laboratory as directed by the deptt.)(a)With hydrated lime/cement as filler(Refer Table 500-9 of MoSRT&H specification)i)With 60/70 Grade Bitumen, for Grading II	Cum	599.74	10536.00	6318860.64	5.8 (a) (b) (i)	509
3	Construction of Granular Sub Base (GSB) providing coarse graded materials, spreading in uniform layers with motor grader in prepared surface, mixing by mix in place method with vibratory roller to achieve the desired density, complete as per clause 401 (with an initial lead of 5 km) – For Grading I material						
	During costruction of halfwidth culverts **(50x5x0.15) = 36.00 cum**	Cum	37.5			4.2/401	
	For 40 Nos. of Culverts (37.5 m^3 x 40) = 1440 m^3		1500.00	2428.500	3642750.00		
				Total Cost (Rs.) :	10249493.00		

ANALYSIS OF RATE FOR HAND RAIL

(A) Name of item: 4 Lane Capital Connectivity to itanagar in Arunachal Pradesh under SARDP NE Work (Phase A). 4 Laning from Km 17.300 (Dolabari Road Junction on NH-37A) to KM 36.110 (Jamugurihat Road Junction; KM-182.00 OF NH-52) in Sonitpur District in the state of Assam.

Providing and fixing hand rail over the crash barrier consisting of MS base plate, Embedded fastener and nuts, M vertical plates and pipes etc. as shown in the Drawings and as per Specifications. All the railing components as mentioned above to be hot dip galvanized with a zinc coating of at least 175 gm/ sqm. The thickness of plates to be as shown in the Drawings and pipe to be 65NB heavy class with a weight not less than 7.92 kg/m and conforming to IS: 1161-1979 item to include al incidental works required to complete the work as directed by Engineer in charge. Measurement shall be made for the length of the pipe only.

Material	Unit	Quantity per sqm.	Rate (in Rs.)/ sqm of face area	Amount (in Rs.)
1. MS Plates : 1 x6x0.14x0.15x0.010x7850 = 9.89 kg (base plate) 1 x6x0.14x0.15x0.010x7850 = 9.89 kg (template) 1 x6x0.14x0.35x0.016x7850 = 36.93 kg (vertical plate) Total = 56.71 kg + 10% wastage = 62.38 kg.	kg	62.38	65.00	4054.70
2. Fastner: MS Bar 16mm 1x2x6x0.70x1.578 kg/m = 13.26 kg + wastage 10% = 14.59 kg.	kg	14.59	74.55	1087.68
3. MS Nuts and washer: = 4x6 = 24 nos. @ 0.125kg = 3.00 kg	kg	3.00	74.55	223.65
4. G.I. Pipe 65 mm NB heavy duty	m	6.75	1029.00	6945.75
5. Welding (base plate with vertical plate) : 1x2x14.00 = 28.00 cm Quantity for 6 sets = 28x6 = 168 cm	cm	168.00	1.00	168.00
6. Labour for cutting and erection charges				
i) Black smith	each	0.18	300.00	54.00
ii) Bandhani	each	0.09	208.00	18.72
iii) Beldar	each	0.66	150.00	99.00
7. Galvanishing : 1.5 sqm	sqm	1.50	180.00	270.00
		TOTAL =		**12921.50**
			Overheads @ 10 %	1292.15
				14213.65
			Contractor's profit 10%	1421.37
			Cost for 6.75m	15635.02
			Cost for 1 m	2316.30

ANALYSIS OF RATE FOR PAVER BLOCKS

(A) Name of item: 4 Lane Capital Connectivity to itanagar in Arunachal Pradesh under SARDP NE Work (Phase A). 4 Laning from Km 17.300 (Dolabari Road Junction on NH-37A) to KM 36.110 (Jamugurihat Road Junction; KM-182.00 OF NH-52) in Sonitpur District in the state of Assam.

DESCRIPTION OF ITEM	Unit	Quantity per sqm.	Rate (in Rs.)/ sqm of face area	Amount (in Rs.)
1. Cost of 60mm thick interiocking paver block M-35 concrete (0.06 cum/ sqm) (concrete rate @ 6348/- per cum as per item No. 12.8B	sqm	5.00	497.94	2489.70
2. Coarse sand below paver blocks = 5x0.025= 0.125 cum @ Rs. 864/cum as per item 12.3 of SOR	cum	0.125	864.00	108.00
3. Add 15% for cost of other miscellaneous items including carriage.				301.86
			TOTAL =	**2899.56**
			Cost for 5.00 sqm	2899.56
			Cost for 1.00 sqm	579.91
			Overheads included in the above rates	
			Contractors	

ANALYSIS OF RATE FOR KERB STONE

(A) Name of item: 4 Lane Capital Connectivity to itanagar in Arunachal Pradesh under SARDP NE Work (Phase A). 4 Laning from Km 17.300 (Dolabari Road Junction on NH-37A) to KM 36.110 (Jamugurihat Road Junction; KM 182.00 OF NH-52) in Sonitpur District in the state of Assam.

Item No.	DESCRIPTION OF ITEM	Unit	Quantity per sqm.	Rate (in Rs.)/ sqm of face area	Amount (in Rs.)
1	Cement Concrete M-35 @ Rs. 6348/ cum as per item 12.8 B of SOR (including centering/ shuttering)	cum	1.00	6348.00	6348.00
2	Carriage of kerb stone including handling charges @ 10%				634.80
3	Levelling pad of lean concrete @ 0.145/ cum of concrete @ Rs. 3193 per cum as per item No. 12.4 of SOR (Quantity 5.5 kg. per sqm of face @ Rs. 50/- per kg)	cum	0.145	3193.00	462.99
4	Add 15% for cost of other miscellaneous items including				301.86
5	Add for cutting road/ other incidental works	L.S	1.000	250.00	250.00
				TOTAL =	**7998**
	Overheads included in the above rates				
	Contractors profit included in the above rates				

Sl.No **DETAILS OF QUANTITY CALCULATION FOR THE JIA-BHARALI BRIDGE.**

RCC Superstructure.

1	**Superstructure**			
	Area of Mid Portion:-		16.15	m2
	length:-		41.15	m
	Area of Support Portion:-		22.87	m2
	length:-		3.40	m
	Area of Varying Portion:-		19.51	m2
	length:-		1.80	m
	Cantilever Portion		16.13	m3
	Diaphragm		40.24	m3
	Deviator Block		12.60	m3
	Anchorage Block		15.12	m3
	Volume		861.53	m3
	No of Deck		25.00	No
	Total Concrete Quantity in Deck		21538.31	m3
		Say	22000.00	m3
2	**High Tensile Steel Strands.**			
	No of Cable		32.00	No
	Length of Cable		48.50	m
	Total Unit		25.00	No
	Total Length		38800.00	m
	Unit Wt.		20.95	kg/m
	Weight:-	Total	812.86	t
		say	850.00	t
3	**65 thk wearing coat.**			
	Width		22.00	m
	Length		1207.00	m
	Area	Total	26554.00	m2
		say	27000.00	m2
4	**Drainage spout.**			
	No of drainage spout in each segment:-		16.00	Nos
	No of unit		25.00	nos
		Total	400.00	nos

5	**Spherical Bearing**							
a)	Sliding bearing							
	Capacity 5500 kN						25.00	nos
b)	Fixed bearing							
	Capacity 5500 kN						25.00	nos
c)	Guided bearing							
	Capacity 5500 kN						100.00	nos
6	**Strip seal Expansion joint.**						655.20	m
						say	700.00	m
7	**Reinforced cement concrete railing.**						2414.00	m
						say	2500.00	m
8	**Reinforced cement concrete crashbarrier.**							
	Single faced	2	0.35	1207.00			844.90	m3
	double faced in the median	2	0.40	1207.00			965.60	m3
						Total	1810.50	m3
						say	1850.00	m3
9	**PCC Below Approach slab.**							
	Width						25.20	m
	Length						3.70	m
	thk of pcc						0.15	m
	Volume					Total	27.97	m3
						say	30.00	m3
10	**RCC Approach slab**							
	Width						25.20	m
	length=						3.50	m
	thk of pcc						0.30	m
	Volume:-					Total	52.92	m3
						say	60.00	m3
11	**HYSD Steel**							
	Super Structure	@200kg/m3					4400.00	t
	Crash Barrier	@150kg/m3					271.58	t
	Approach Slab	@80kg/m3					4.23	t
						Total	4675.81	t
						say	5000.00	t
12	**PVC Pipe below footpath.**						1200.00	m
							4.00	rows
						Total	4800.00	m

BILL OF QUANTITY (FOUNDATIONS & SUBSTRUCTURE)

Project: Construction of Jia Bharali Bridge in Assam

Note: In the following calculations all dimensions are in meter

Item No.	Description of Item	Unit	Nos.	Length/ Area	Width	Depth/ Thick.	Quantity
1.0	**WELL FOUNDATIONS:**						
1.1	**Earth work in excavation** of foundation of structures as per the **Drawings** and **Ministry of Shipping, Road Transport & Highways (MoRT&H) Specifications for Road and Bridge Works.**	**Cum**					**11967.420**
1.1.1	Abutment Foundations	Cum	2	254.262	1.000	5.000	2542.620
1.1.2	Pier Foundations	Cum	24	78.540	1.000	5.000	9424.800
1.2	Providing and Laying **cutting edge** of mild steel in the well foundations complete as per **Drawings** and **MoRT&H Specifications for Road and Bridge Works.**	**MT**					**126.244**
1.2.1	Abutment Foundations @ 150kg/m	MT	2	5.726	1	1	11.452
1.2.2	Pier Foundations @ 150kg/m	MT	24	4.783	1	1	114.792
1.3	Providing and laying **M25** Grade PCC using 43/53 grade Ordinary Portland Cement, 20mm & down stone aggregate and approved quality sand in the top/intermediate and bottom plug of the well foundations as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Cum**					**13443.775**
1.3.1	**Top/Intermediate Plug**						
i.	Abutment Foundations	Cum	2	36.317	1	1	72.634
ii.	Pier Foundations	Cum	24	24.630	1	1	591.120
1.3.2	**Bottom Plug**						
i.	Abutment Foundations	Cum	2	113.097	1	6.500	1470.261
ii.	Pier Foundations	Cum	24	78.540	1	6.000	11309.760
1.4	Providing and placing selected **sand fill** in the well foundations as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works.**	**Cum**					**20026.595**
1.4.1	Abutment Foundations	Cum	2	36.317	1	27.500	1997.435
1.4.2	Pier Foundations	Cum	24	24.630	1	30.500	18029.160

Item No.	Description of Item	Unit	Nos.	Length/ Area	Width	Depth/ Thick.	Quantity
1.5	Providing and placing **M35** grade cement concrete (RCC) in well curb using 43/53 grade Ordinary Portland Cement, 20mm & down stone aggregate and approved quality sand as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Cum**					**3481.022**
1.5.1	Abutment Foundations	Cum	2	5.500	1	38.170	419.870
1.5.2	Pier Foundations	Cum	24	4.000	1	31.887	3061.152
1.6	Providing and placing **M25** grade cement concrete (RCC) in well steining using 43/53 grade Ordinary Portland Cement, 20mm & down stone aggregate and approved quality sand as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Cum**					**45132.477**
1.6.1	Abutment Foundations	Cum	2	76.781	1	28.500	4376.517
1.6.2	Pier Foundations	Cum	24	53.910	1	31.500	40755.960
1.7	Providing and placing **M35** grade cement concrete (RCC) in well cap using 43/53 grade Ordinary Portland Cement, 20mm & down stone aggregate and approved quality sand as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Cum**					**5983.710**
1.7.1	Abutment Foundations	Cum	2	254.262	1.000	2.500	1271.310
1.7.2	Pier Foundations	Cum	24	78.540	1.000	2.500	4712.400
1.8	Sinking of 12m external diameter abutment wells through all type of strata complete as per **Drawings** and **MoRT&H Specifications for Road and Bridge Works.**	**Meter**					
1.8.1	Depth upto 10m from top of well cap	Meter	2	1	1	10	**20.000**
1.8.2	Depth beyond 10m upto 20m	Meter	2	1	1	10	**20.000**
1.8.3	Depth beyond 20m upto 30m	Meter	2	1	1	10	**20.000**
1.8.4	Depth beyond 30m upto 35m	Meter	2	1	1	5	**10.000**
1.9	Sinking of 10m external diameter pier wells through all type of strata complete as per **Drawings** and **MoRT&H Specifications for Road and Bridge Works.**	**Meter**					
1.9.1	Depth upto 10m from top of well cap	Meter	24	1	1	10	**240.000**
1.9.2	Depth beyond 10m upto 20m	Meter	24	1	1	10	**240.000**
1.9.3	Depth beyond 20m upto 30m	Meter	24	1	1	10	**240.000**
1.9.4	Depth beyond 30m upto 37.5m	Meter	24	1	1	7.5	**180.000**
2.0	**SUB-STRUCTURE:**						
2.1	Providing and placing **M35** grade cement concrete (RCC) for the construction of abutments, abutment caps, return walls, dirt walls, wing walls, piers, pier caps, bearing pedestals etc. using 43/53 grade Ordinary Portland Cement, 20mm & down stone aggregate and approved quality sand as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works.**	**Cum**					**7794.432**
2.1.1	Abutment front walls	Cum	2	14.000	25.200	1.500	1058.400
2.1.2	Abutment return walls	Cum	4	14.000	7.500	1.500	630.000
2.1.1	Piers	Cum	24	18.602	9.000	1.000	4018.032
2.1.2	Pier caps	Cum	24	14.500	4.000	1.500	2088.000

Item No.	Description of Item	Unit	Nos.	Length/ Area	Width	Depth/ Thick.	Quantity
2.2	Providing weep holes in abutment walls, return walls, wing walls etc. with 100mm dia AC pipe, extending through the full width of the structure with slope of 1V:20H towards draining face as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Meter**					**1650.000**
2.2.1	Abutment front walls	Meter	700	1.500	1.000	1.000	1050.000
2.2.2	Abutment return walls	Meter	400	1.500	1.000	1.000	600.000
2.3	Providing and laying of Filter Media with granular materials/stone, crushed aggregates satisfying the requirements of **MoRT&H Specifications for Road and Bridge Works.**	**Cum**					**672.000**
2.3.1	Abutment location	Cum	2	40.000	14.000	0.600	672.000
2.4	Providing and laying well compacted selected granular backfilling material behind abutment as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**Cum**					**5250.000**
2.4.1	Abutment location	Cum	2	25.000	14.000	7.500	5250.000
3.0	**REINFORCEMENT:**						
	Providing and placing in position **TMT (Fe 500 Grade)** reinforcement bars in foundations and substructure as per the **Drawings** and **MoRT&H Specifications for Road and Bridge Works**.	**MT**					**6189.481**
3.1	Item 1.5, well curb @ 100 kg/cum	MT					348.102
3.2	Item 1.6, well steining @ 75 kg/cum	MT					3384.936
3.3	Item 1.7, well cap @ 150 kg/cum	MT					897.557
3.4	Item 2.1, Substructure @ 200 kg/cum	MT					1558.886