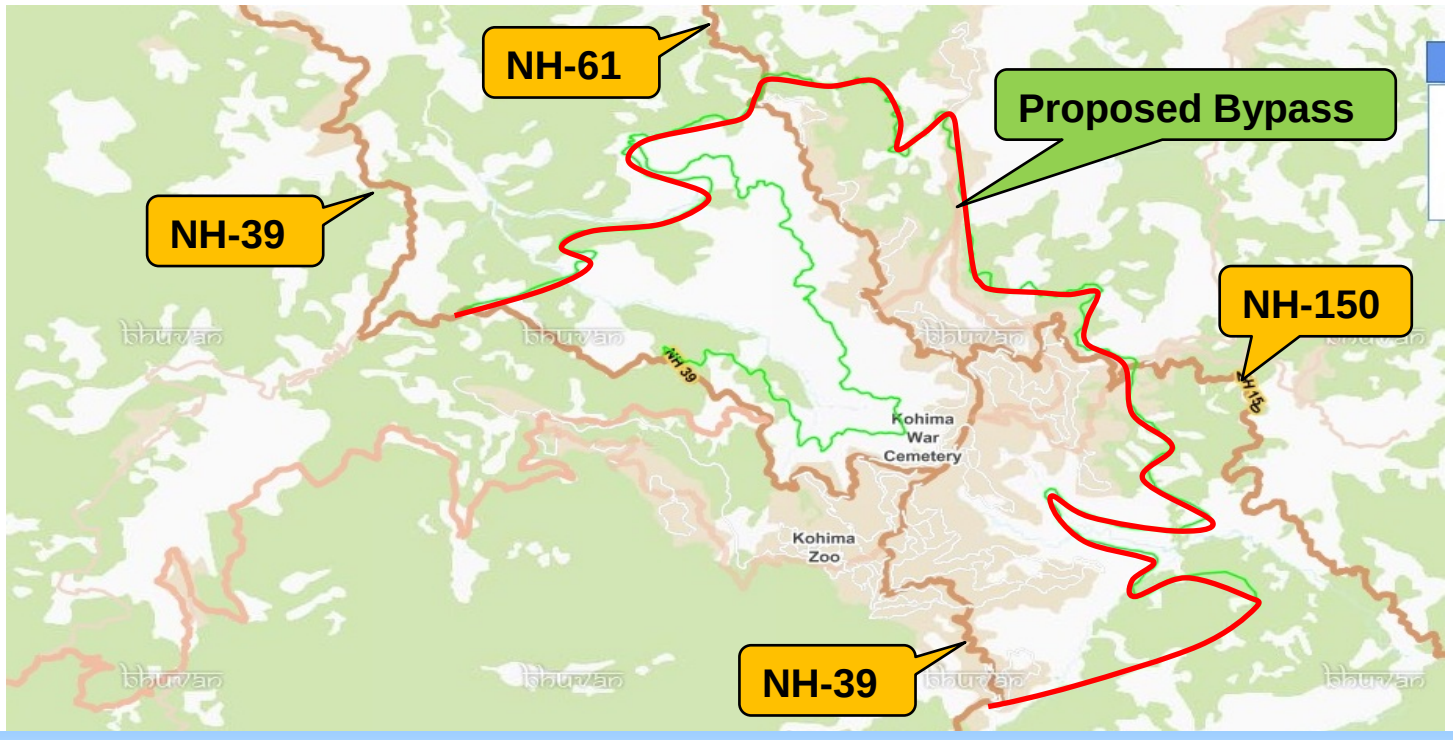
NATIONAL HIGHWAY INFRASTRUCTURE DEVELOPMENT CORPORATION LTD
Government of India
(Ministry of Road Transport and Highways)

Preparation of Detailed Project Report (DPR) and providing pre-construction services in respect of 4 Laning of **Kohima Bypass** connecting NH-39 (New NH-02),NH-150 (New NH-02), NH-61 (New NH-29) and NH-39 (New NH-02) on Engineering, Procurement and Construction (EPC) mode in the state of Nagaland.



FINAL DETAILED PROJECT REPORT

COST ESTIMATES – PACKAGE-I (KM 0+00 TO 14+000)

NOV 2018

In Association with

Highway Engineering Consultancy
JM-89/3C, Behind Panchvati Market,
Saket Nagar, Bhopal,
Madhya Pradesh – 462024
Email:hec_bhopal@rediffmail.com

Agnitio Infrastructure Projects Pvt. Ltd.
RN-73, Sector-62, Noida, Gautam Budh Nagar,
U.P-201309
Phone No.- 0120403352, 01202403353
E-mail: aippldpr@gmail.com,
agnitiodelhi@gmail.com

Cost Estimate-Kohima Bypass (Flexible Pavement) 10.1

Package-I:- Km 0+000 to Km 14+000)

SUMMARY OF COST FOR FLEXIBLE PAVEMENT (Cl.10.1)			
Name of Road: Kohima Bypass			
Existing Length of Road: Nil		**Proposed length: 14+000**	
Bill No.	**Description**	**Item Price (Rupees)**	**Cost in Crores**
1	Site Clearance	1,800,924.14	0.18
2	Earthworks	874,764,400.80	87.48
3	Sub-base and Base Courses	675,289,993.00	67.53
4	Flexible Pavement	618,743,065.50	61.87
5	Structures		-
A	Culverts	256,004,083.57	25.60
B	Bridges	265,245,246.00	26.52
C	Tunnel	1,096,600,000.00	109.66
D	Landslide Protection	143,763,522.71	14.38
6	Road Junctions	38,584,849.67	3.86
7	Bus Bays / Bus Shelters	15,865,683.87	1.59
8	Drainage	18,673,200.00	1.87
9	Protection Works	972,377,082.16	97.24
10	Traffic Signs, Markings & Road Appurtenances	27,530,481.16	2.75
A	**Total Civil Cost of the project**	**5,005,242,532.58**	500.52
	Total Civil Cost of the project in Crores	**500.52**	0.00
	Cost Per Km in Rs (crores) =	**35.752**	0.00
	GST @ 6% of A	**300,314,551.955**	30.03
	Add Contingency 2.8 % on A	**140,146,790.912**	14.01
B	**Total 'B'**	**5,445,703,875.451**	544.57
	Escalation @ 15% of (A) for 3 years' construction period [5% every year; total 15%]	**750,786,379.888**	75.08
	Supervision Charges@ 3 % on (B)	**163,371,116.264**	16.34
	Agency charges @ 3% of (B)	**163,371,116.264**	16.34
	Quality Control @ 0.25% of (B)	**13,614,259.689**	1.36
	Road Safety @ 0.25% of (B)	**13,614,259.689**	1.36
	Total Cost of the project without EIA, Land & Utility Shifting	**6,550,461,007.243**	**655.05**

BILL NO: 1 - SITE CLEARANCE

Item No.	SOR Ref. No.	Description	Unit	Nos.	Length (m)	Breadth (m)	Height (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)
1.01	2.3 (ii) A & B	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 material to be used or auctioned, up to a lead of 1000 meters including removal and disposal of top organic soil not exceeding 150 mm in thickness as per Technical Specifications Clause 201.								
			Ha	1	14000	30		42	42,879.15	1,800,924.14
									TOTAL FOR BILL NO: 1 (CARRIED FORWARD TO SUMMARY)	1,800,924.14

BILL NO: 2 - EARTHWORKS

Item No.	SOR Ref. No.	Description	Unit	Nos	Length (m)	Breadth (m)	Height (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Remarks
2.01	3.3	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres.	cum	1	Refer Earthwork Calculation sheet			1,417,817.12	**195.49**	**277,163,680.11**	**Considering 50% of total Qty**
2.02	3.33	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres.	cum	1	Refer Earthwork Calculation sheet			992,471.98	**276.04**	**273,965,637.64**	**Considering 35% of total Qty**
2.03	3.34	Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 meters	cum	1	Refer Earthwork Calculation sheet			425,345.13	**424.27**	**180,460,967.54**	**Considering 15% of total Qty**
2.06	3.17	**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	1	Refer Earthwork Calculation			367,875.28	**270.67**	**99,573,979.78**	
2.07	**3.19**	**Compacting Original Ground**									
		Case-I Compacting original ground supporting sub-grade									
		Loosening of the ground upto a level of 500 mm below the sub-grade level, watered, graded and compacted in layers to meet requirement of table 300-2 for sub-grade construction.	cum	1	13300	25.00	0.5	166,250.00	**89.15**	**14,821,237.38**	**Total Length - Length of treatment**
2.08		**Case-II: Compacting original ground supporting embankment**									
		Loosening, leveling 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	1	13300	25.00	0.15	49,875.00	**55.85**	**2,785,678.35**	
2.09	3.22	**Turfing with Sods:** Furnishing and laying of the live sods of perennial turf forming grass on embankment slope, verges or other locations shown on the drawing or as directed by the engineer including preparation of ground, fetching of sods and watering.	Sqm	1	5000	10.00		50,000.00	**129.97**	**6,498,305.00**	
2.10	3.23	**Seeding and Mulching** Preparation of seed bed on previously laid top soil, furnishing and placing of seeds, fertilizer, mulching material, applying bituminous emulsion at the rate of 0.23 litres per sqm and laying and **fixing jute netting**, including watering for 3 months all as per clause 308.	Sqm	1	5000	10.00		50,000.00	**389.90**	**19,494,915.00**	
									TOTAL FOR BILL NO: 2 (CARRIED FORWARD TO SUMMARY)	**874,764,400.80**	

Earthwork

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
50	0	0	0	0
100	3323.04	200.898	3323.04	200.898
150	2621.88	675.672	5944.92	876.57
200	6390.33	574.806	12335.25	1451.376
250	7271.13	696.294	19606.38	2147.67
300	4831.8375	1002.342	24438.2175	3150.012
350	4182.0675	477.744	28620.285	3627.756
400	4147.29	14.106	32767.575	3641.862
450	4254.63	184.068	37022.205	3825.93
500	3796.6425	653.898	40818.8475	4479.828
550	3765.1125	1005.744	44583.96	5485.572
600	4796.3175	1052.556	49380.2775	6538.128
650	5697.3525	1116.192	55077.63	7654.32
700	7028.085	1045.65	62105.715	8699.97
750	9176.1525	1306.782	71281.8675	10006.752
800	11449.808	1292.268	82731.675	11299.02
850	11868.51	1162.38	94600.185	12461.4
900	9476.34	729.03	104076.525	13190.43
950	7848.255	135.3	111924.78	13325.73
1000	7334.0475	348.684	119258.8275	13674.414
1050	4831.2075	1061.274	124090.035	14735.688
1100	3511.26	1402.902	127601.295	16138.59
1150	3621.45	1339.782	131222.745	17478.372
1200	3954.9975	964.08	135177.7425	18442.452
1250	3208.2975	434.658	138386.04	18877.11
1300	1530.5325	462.486	139916.5725	19339.596
1350	1021.8825	555.276	140938.455	19894.872
1400	1089.315	675.3	142027.77	20570.172
1450	1068.855	1114.614	143096.625	21684.786
1500	474.5175	2103.24	143571.1425	23788.026
1550	83.4675	3269.052	143654.61	27057.078
1600	597.9075	2704.746	144252.5175	29761.824
1650	2035.26	1438.092	146287.7775	31199.916
1700	3601.11	1323.018	149888.8875	32522.934
1750	4424.0775	1672.902	154312.965	34195.836
1800	3987.8625	1760.742	158300.8275	35956.578
1850	2871.135	1346.43	161171.9625	37303.008
1900	2173.8525	1125.108	163345.815	38428.116
1950	2335.71	954.378	165681.525	39382.494
2000	3009.3225	933.69	168690.8475	40316.184
2050	4874.205	940.674	173565.0525	41256.858
2100	5477.9025	854.058	179042.955	42110.916
2150	3930.3525	1015.974	182973.3075	43126.89
2200	2829.0825	1209.858	185802.39	44336.748
2250	2892.9675	1580.238	188695.3575	45916.986
2300	5045.2125	1301.97	193740.57	47218.956
2350	6137.7225	866.418	199878.2925	48085.374
2400	6940.59	550.776	206818.8825	48636.15
2450	6087.615	97.686	212906.4975	48733.836

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
2500	2956.695	264.414	215863.1925	48998.25
2550	2267.31	627.48	218130.5025	49625.73
2600	1957.23	871.848	220087.7325	50497.578
2650	1311.135	794.784	221398.8675	51292.362
2700	1272.4125	685.578	222671.28	51977.94
2750	1684.4625	1047.624	224355.7425	53025.564
2800	2052.33	1695.24	226408.0725	54720.804
2850	2557.305	2137.668	228965.3775	56858.472
2900	2355.825	2082.324	231321.2025	58940.796
2950	2820.3825	1218.936	234141.585	60159.732
3000	5293.9875	781.728	239435.5725	60941.46
3050	9866.2575	520.122	249301.83	61461.582
3100	12187.62	364.206	261489.45	61825.788
3150	11346.638	672.504	272836.0875	62498.292
3200	10269.195	980.514	283105.2825	63478.806
3250	8950.8825	1401.804	292056.165	64880.61
3300	11245.778	1102.122	303301.9425	65982.732
3350	16913.91	457.182	320215.8525	66439.914
3400	21026.903	379.896	341242.755	66819.81
3450	23074.868	441.636	364317.6225	67261.446
3500	23822.858	384.528	388140.48	67645.974
3550	22886.88	218.274	411027.36	67864.248
3600	19382.108	230.748	430409.4675	68094.996
3650	15114.338	245.46	445523.805	68340.456
3700	12948.383	282.318	458472.1875	68622.774
3750	13181.34	361.758	471653.5275	68984.532
3800	13891.043	388.284	485544.57	69372.816
3850	13072.388	246.6	498616.9575	69619.416
3900	7990.605	382.902	506607.5625	70002.318
3950	2150.805	1252.56	508758.3675	71254.878
4000	348.195	4802.94	509106.5625	76057.818
4050	246.66	8138.106	509353.2225	84195.924
4100	339.54	7446.726	509692.7625	91642.65
4150	820.17	3735.522	510512.9325	95378.172
4200	3283.6875	765.798	513796.62	96143.97
4250	8010.96	305.856	521807.58	96449.826
4300	10713.135	216.414	532520.715	96666.24
4350	10218.975	572.202	542739.69	97238.442
4400	11570.445	982.026	554310.135	98220.468
4450	15484.988	1017.042	569795.1225	99237.51
4500	17503.635	1054.266	587298.7575	100291.776
4550	18007.643	1208.256	605306.4	101500.032
4600	19407.075	1168.89	624713.475	102668.922
4650	19022.438	1010.418	643735.9125	103679.34
4700	14269.125	1196.976	658005.0375	104876.316
4750	8693.8125	1586.538	666698.85	106462.854
4800	6931.29	1656.102	673630.14	108118.956
4850	8096.6925	1514.04	681726.8325	109632.996
4900	8479.7325	1581.564	690206.565	111214.56
4950	6480.3525	1784.016	696686.9175	112998.576
5000	3526.4175	1783.53	700213.335	114782.106
5050	1481.37	1432.104	701694.705	116214.21

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
5100	2502.06	684.438	704196.765	116898.648
5150	6027.75	189.702	710224.515	117088.35
5200	8039.6625	64.326	718264.1775	117152.676
5250	7430.055	684.078	725694.2325	117836.754
5300	6584.4	2490.744	732278.6325	120327.498
5350	16019.865	2314.284	748298.4975	122641.782
5400	30321.818	688.998	778620.315	123330.78
5450	32491.485	177.42	811111.8	123508.2
5500	22289.775	528.93	833401.575	124037.13
5550	9922.515	1382.13	843324.09	125419.26
5600	2626.935	3258.504	845951.025	128677.764
5650	0	6956.238	845951.025	135634.002
5700	43.485	6059.304	845994.51	141693.306
5750	2933.0325	1835.7	848927.5425	143529.006
5800	9537.4575	297.792	858465	143826.798
5850	7715.805	1044.522	866180.805	144871.32
5900	1200.6525	2439.12	867381.4575	147310.44
5950	5617.365	1476.618	872998.8225	148787.058
6000	15355.83	143.154	888354.6525	148930.212
6050	22162.755	156.78	910517.4075	149086.992
6100	25947.098	437.82	936464.505	149524.812
6150	29152.448	354.81	965616.9525	149879.622
6200	34872.548	143.826	1000489.5	150023.448
6250	29991.323	46.74	1030480.823	150070.188
6300	24868.148	113.304	1055348.97	150183.492
6350	26863.215	594.384	1082212.185	150777.876
6400	27238.935	945.474	1109451.12	151723.35
6450	23758.98	1280.82	1133210.1	153004.17
6500	12635.505	2058.534	1145845.605	155062.704
6550	5071.0725	2364.39	1150916.678	157427.094
6600	2390.025	2325.132	1153306.703	159752.226
6650	5186.13	2348.532	1158492.833	162100.758
6700	12073.845	1764.066	1170566.678	163864.824
6750	20358.615	1038.48	1190925.293	164903.304
6800	23454.285	827.61	1214379.578	165730.914
6850	16994.97	472.278	1231374.548	166203.192
6900	6777.4275	409.428	1238151.975	166612.62
6950	1087.6725	1879.116	1239239.648	168491.736
7000	467.9175	2982.288	1239707.565	171474.024
7050	1426.035	2254.896	1241133.6	173728.92
7100	7398.1125	1122.432	1248531.713	174851.352
7150	20178.038	434.286	1268709.75	175285.638
7200	35958.908	49.296	1304668.658	175334.934
7250	36162.015	0	1340830.673	175334.934
7300	20052.465	0	1360883.138	175334.934
7350	7651.0125	224.298	1368534.15	175559.232
7400	3679.62	987.738	1372213.77	176546.97
7450	3456.3975	2360.55	1375670.168	178907.52
7500	2758.1325	2928.06	1378428.3	181835.58
7550	2179.5225	2784.828	1380607.823	184620.408
7600	2973.78	2846.22	1383581.603	187466.628
7650	7312.7175	2667.096	1390894.32	190133.724

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
7700	11166.533	2808.684	1402060.853	192942.408
7750	10051.5	1698.264	1412112.353	194640.672
7800	5706.6375	864.198	1417818.99	195504.87
7850	2092.875	4555.344	1419911.865	200060.214
7900	1403.1825	6993.87	1421315.048	207054.084
7950	1592.3475	4368.576	1422907.395	211422.66
8000	3816.75	2016.678	1426724.145	213439.338
8050	11031.885	1350.222	1437756.03	214789.56
8100	22764.128	1064.988	1460520.158	215854.548
8150	18817.995	1839.552	1479338.153	217694.1
8200	7002.6225	2152.206	1486340.775	219846.306
8250	5553.6525	1345.26	1491894.428	221191.566
8300	7620.7725	1366.896	1499515.2	222558.462
8350	6959.565	1086.12	1506474.765	223644.582
8400	2017.5	1672.464	1508492.265	225317.046
8450	257.3325	3305.658	1508749.598	228622.704
8500	1600.2825	5539.53	1510349.88	234162.234
8550	4237.065	6816.636	1514586.945	240978.87
8600	8315.2875	5055.426	1522902.233	246034.296
8650	17210.273	1769.04	1540112.505	247803.336
8700	25989.51	57.546	1566102.015	247860.882
8750	21421.695	138.606	1587523.71	247999.488
8800	10277.363	1746.186	1597801.073	249745.674
8850	3469.995	3134.658	1601271.068	252880.332
8900	881.58	6497.82	1602152.648	259378.152
8950	6544.14	7054.83	1608696.788	266432.982
9000	13900.763	2348.628	1622597.55	268781.61
9050	12268.575	672.096	1634866.125	269453.706
9100	6239.7975	1085.874	1641105.923	270539.58
9150	1937.5875	2053.524	1643043.51	272593.104
9200	387.015	2979.258	1643430.525	275572.362
9250	953.6925	2503.206	1644384.218	278075.568
9300	1084.5225	1959.576	1645468.74	280035.144
9350	4970.4075	1188.936	1650439.148	281224.08
9400	6514.155	687.522	1656953.303	281911.602
9450	4626.4575	688.938	1661579.76	282600.54
9500	3659.535	1031.352	1665239.295	283631.892
9550	1478.5875	2469.984	1666717.883	286101.876
9600	1354.0875	2651.376	1668071.97	288753.252
9650	3800.6775	1785.282	1671872.648	290538.534
9700	12656.438	1750.416	1684529.085	292288.95
9750	27823.193	1281.756	1712352.278	293570.706
9800	28939.538	6094.152	1741291.815	299664.858
9850	23589.705	7176.51	1764881.52	306841.368
9900	21755.73	2283.75	1786637.25	309125.118
9950	9925.335	3584.022	1796562.585	312709.14
10000	9233.64	2368.032	1805796.225	315077.172
10050	13355.265	127.812	1819151.49	315204.984
10100	9268.2225	206.976	1828419.713	315411.96
10150	7062.5475	403.764	1835482.26	315815.724
10200	4111.7925	2605.998	1839594.053	318421.722
10250	1269.72	3509.592	1840863.773	321931.314

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
10300	4954.6725	1274.712	1845818.445	323206.026
10350	15197.73	135.444	1861016.175	323341.47
10400	20796.03	77.694	1881812.205	323419.164
10450	14927.4	155.034	1896739.605	323574.198
10500	5960.4975	142.77	1902700.103	323716.968
10550	1632.8325	2011.584	1904332.935	325728.552
10600	2142.315	2586.228	1906475.25	328314.78
10650	5905.395	1296.276	1912380.645	329611.056
10700	7398.4875	1646.16	1919779.133	331257.216
10750	13230.743	1496.796	1933009.875	332754.012
10800	22877.955	363.744	1955887.83	333117.756
10850	27277.545	10.176	1983165.375	333127.932
10900	24090.818	114.234	2007256.193	333242.166
10950	17547.263	263.496	2024803.455	333505.662
11000	14599.035	168.942	2039402.49	333674.604
11050	14857.38	79.572	2054259.87	333754.176
11100	18156.375	167.76	2072416.245	333921.936
11150	20860.62	181.302	2093276.865	334103.238
11200	22930.643	86.544	2116207.508	334189.782
11250	23358.293	0	2139565.8	334189.782
11300	22289.145	0	2161854.945	334189.782
11350	20996.258	0	2182851.203	334189.782
11400	19586.385	0	2202437.588	334189.782
11450	14090.828	621.888	2216528.415	334811.67
11500	7555.9575	785.22	2224084.373	335596.89
11550	6264.945	515.436	2230349.318	336112.326
11600	9882.7575	620.484	2240232.075	336732.81
11650	10425.683	352.866	2250657.758	337085.676
11700	6086.3925	154.392	2256744.15	337240.068
11750	2775.78	732.036	2259519.93	337972.104
11800	8960.535	1174.266	2268480.465	339146.37
11850	11492.235	1150.806	2279972.7	340297.176
11900	5025.69	2520.534	2284998.39	342817.71
11950	2276.88	4585.008	2287275.27	347402.718
12000	10168.05	4324.242	2297443.32	351726.96
12050	19979.573	2718.87	2317422.893	354445.83
12100	25178.198	1380.906	2342601.09	355826.736
12150	27302.91	13.062	2369904	355839.798
12200	30201.765	11.268	2400105.765	355851.066
12250	32966.543	13.356	2433072.308	355864.422
12300	26311.905	76.506	2459384.213	355940.928
12350	16288.68	153.546	2475672.893	356094.474
12400	6099.4125	526.716	2481772.305	356621.19
12450	1915.74	587.706	2483688.045	357208.896
12500	1894.8	252.234	2485582.845	357461.13
12550	2284.5525	119.004	2487867.398	357580.134
12600	2149.605	154.572	2490017.003	357734.706
12650	2106.81	514.542	2492123.813	358249.248
12700	2760.2025	1756.524	2494884.015	360005.772
12750	13978.013	1534.188	2508862.028	361539.96
12800	43861.823	146.814	2552723.85	361686.774
12850	67650.84	0	2620374.69	361686.774

Station	Cut Volume (Cu.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)
12900	69619.08	1.722	2689993.77	361688.496
12950	57778.193	49.782	2747771.963	361738.278
13000	38405.37	284.04	2786177.333	362022.318
13050	24332.28	692.394	2810509.613	362714.712
13100		552.936	2810509.613	363267.648
13150		2.496	2810509.613	363270.144
13200		2.778	2810509.613	363272.922
13250		7.758	2810509.613	363280.68
13300		5.058	2810509.613	363285.738
13350		0	2810509.613	363285.738
13400		0	2810509.613	363285.738
13450		0	2810509.613	363285.738
13500		0	2810509.613	363285.738
13550		57.534	2810509.613	363343.272
13600		234.264	2810509.613	363577.536
13650		302.358	2810509.613	363879.894
13700		528.48	2810509.613	364408.374
13750		821.328	2810509.613	365229.702
13800		626.094	2810509.613	365855.796
13850	8384.1075	767.214	2818893.72	366623.01
13900	7984.995	902.562	2826878.715	367525.572
13950	8755.515	349.71	2835634.23	367875.282

Total Cut Volume	2835634.23
Total Filling required	367875.28
Reused Quantity	367875.28
Balance quantity for disposal	2467758.95

BILL NO: 3 - SUB-BASE AND BASE COURSES FOR FLEXIBLE PAVEMENT

Item No.	SOR Ref	Description	Unit	Nos.	Length (m)	Breadth (m)	Height (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Remarks
3.01		**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 clause 401)									
a)	4.2 (i)	Drainage layer of 100mm thick (Grading of Table - 400 -2 Grading I)	cum	1	14000.00	21.9	0.100	30,660.00	**4,574.00**	**140,238,840.00**	
b)	4.2 (ii)	Second layer of 100mm thick (Grading of Table - 400 -2 Grading II)	cum	1	13300.00	20.9	0.100	27,797.00	**4,574.00**	**127,143,478.00**	
3.02	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 sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.)									
		a) For widening Portion (250mm thick) in two layers	cum	1	13300.00	21.5	0.250	71,487.50	**5,706.00**	**407,907,675.00**	
									TOTAL FOR BILL NO: 3B (CARRIED FORWARD TO SUMMARY)	**675,289,993.00**	

BILL NO: 4 - BITUMINOUS WORKS FOR FLEXIBLE PAVEMENT

Item No.	SOR Ref No.	Description	Unit	Nos.	Length (m)	Breadth (m)	Height (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Remarks
4.01		Providing and applying bituminous Prime Coat over granular surface with bitumen emulsion complete as per Technical Specifications Clause 502									
	5.1	**a) @ 6.0 kg per 10 sqm**	sqm	1	13,300.00	21		279,300.00	**40.00**	**11,172,000.00**	
4.02		Providing and applying bituminous Tack coat over prepared surface with bituminous emulsion all complete as per Technical Specification Clause 503									
	5.20	**a) @ 2.5 kg per 10 sqm over granular surface treated with**	sqm	1	13,300.00	21		279,300.00	**15.00**	**4,189,500.00**	
		b) @ 2.0 kg per 10 sqm over bituminous surface	cum	1	13,300.00	21		279,300.00	**15.00**	**4,189,500.00**	
4.03	5.6 (i)	Providing and laying Dense Bituminous Macadam (DBM) course complete as per Technical Specifications Clauses 507 and as directed by the Engineer	cum	1	13,300.00	21	0.095	26,533.50	**15,793.00**	**419,043,565.50**	
4.04	5.8 (i)	Providing and laying Bituminous Concrete wearing course using Modified Bitumen as per drawing and Technical Specifications Clauses 509 & 521.	cum	1	13,300.00	21	0.040	11,172.00	**16,125.00**	**180,148,500.00**	
TOTAL FOR BILL NO: 4 (CARRIED FORWARD TO SUMMARY)										**618,743,065.50**	

DETAILS OF QUANTITIES

Box Culverts **2X2 (12.00M. Width)**

No. of Box Culvert 85

SOR Ref.	SI. No.	Description	Unit	No.	Qty.	Total Quantity	Rate	Amount
	1	Earthwork in excavation of foundation for structures including pipe culverts in all types of soil complete as per drawings and Technical Specification Clause 304, 309 and 2903.	cum.					
3.13 i B		Box Cell		1	28.54			
		Wing wall at Abutment end		4	117.60			
		Wing wall at Return wall end		4	21.59			
		Flexible apron U/S		1	30.82			
		Flexible apron D/S		1	61.64			
		Floor apron U/S		1	9.11			
		Floor apron D/S		1	15.19			
		Curtain wall U/S		1	41.10			
		Curtain wall D/S		1	63.36			
					388.94	**33059.91**	**220.82**	**7300290.251**
	2	Cement concrete in foundation/M-15 levelling course on pipe culvert and under approach slab etc.including centering and shuttering all complete as drawing and Technical Specifications Sections 2100 and 2200.	cum.					
12.8 A		Box Cell		1	5.35			
		Wing wall at Abutment end		4	10.69			
		Wing wall at Return wall end		4	1.96			
		Floor apron U/S		1	3.04			
		Floor apron D/S		1	5.06			
		Curtain wall U/S		1	3.08			
		Curtain wall D/S		1	3.80			
					32.99	**2803.88**	**10438.32**	**29267769.63**
	3	Providing and laying filter medium, behind abutments, retaining wall and return wall complete as per drawing and Technical Specifications Clause 2504.	cum.					
13.10		Wing wall		4	18.93			
					18.93	**1609.26**	**5498.00**	**8847711.299**
	4	Back filling behind abutments, wing walls/ retaining and return walls or any other area with selected granular material of approved quality complete as per drawing and Technical Specification clause 300.	cum.					
13.9A		Wing wall		4	10.70			
					10.70	**909.36**	**1611.62**	**1465547.853**
	5	M-20 grade Plain cement concrete in foundation and substructure including centering and shuterring but excluding reinforcement, complete as per drawing and Technical Specifications Sections 1500, 1700, 2100, 2200 and 2300	cum.					
12.8 C ii		M-20 grade Concrete						
		Wing Wall Foundation at Abutment end		4	39.87			
		Wing Wall Foundation at end		4	6.52			
		Wing Wall Substructure at Abutment end		4	42.41			
		Wing Wall Substructure at end		4	3.78			
					92.58	**7869.47**	**9857.00**	**77569332.23**
	6	M-25 grade Reinforced cement concrete in Box Structure including centering and shuttering but excluding reinforcement, complete as per drawing and Technical Specifications Sections 1500 ,1700 and 2300.	cum.					
12.8 D ii		M-25 grade Concrete						
		Bottom Slab		1	10.92			
		Shear Key		2	3.20			
		Top Slab		1	9.36			
		Vertical outer wall		2	14.94			
		Vertical inner wall		0	0.00			
		Haunch		4	0.54			
		Bracket		0	0.00			
		Parapet wall		2	0.39			
					39.35	**3345.13**	**9980.00**	**33384422.35**

12.40	7	HYSD bar reinforcement for culverts, underpass, retaining walls etc. complete as per drawings and Technical Specifiations Section 1600.	MT					
		For Box			2.75			
		Wing Wall Skin Reinforcement			0.37			
		2X4X1/2(1.739+0.61)X6.72	63.108					
		4X0.5X0.3X2	1.2					
		4X0.35X0.4X2	1.12					
		Return Wall Skin Reinforcement						
		2X4X0.61X1.4	6.832					
		4X0.5X0.3X2	1.2					
		4X0.35X0.4X2	1.12					
					3.13	**265.86**	**84675.00**	**22511346.17**
13.8	8	Providing weep holes in abutments, wing walls, retaining walls, return walls etc. complete as per drawing and Technical Specifications Clause 2706.	Nr.					
		Wing wall		32	32			
					32	**2720.00**	**662.72**	**1802597.584**
8.8	9	Painting of culvert no. and span arrangement as per Technical Specifications Clause 803	Nr.					
		For Box		2	2			
					2	**170.00**	**147.62**	**25095.4**
15.4	10	Stone Pitching 300 mm thick on slopes as per drawings and Technical Specifications Section 2500.	cum.					
		Abutment Corner		4	15.14			
					15.14	**1286.57**	**2287.50**	**2943033.149**
15.5	11	Filter material underneath stone pitching on slopes complete as per drawing and Technical Specifications Section 2500.	cum.					
		Abutment Corner		4	7.57			
					7.57	**643.29**	**2017.88**	**1298073.821**
15.11	12	Providing and laying Flexible apron complete as per drawing and Technical Specifications.	cum.					
		Flxible apron u/s		1	30.82			
		Flxible apron d/s		1	61.64			
					92.47	**7859.55**	**3601.00**	**28302246.37**
15.1A	13	Providing and laying Stone apron complete as per drawing and Technical Specifications Clause 2500.	cum.					
		Floor apron U/S		1	6.07			
		Floor apron D/S		1	10.12			
					16.20	**1376.85**	**1936.00**	**2665588.705**
	14	Providing and fixing of Guard post complete as per drawing and Technical Specification or as directed by Engineer.	Nr.					
		For Span		2	2.00			
					2.00	**170.00**		
12.8 C ii	15	Providing cement concrete M-20 grade in cut off wall complete as per drawing and Technical Specifications Sections 1500 & 1700 and Clause 2507.	cum.					
		Wall u/s		1	20.103			
		Wall d/s		1	25.993			
					46.096	**3918.13**	**9857.00**	**38621028.76**
							TOTAL	**256004083.6**

Cost Summary of Kohima Bridges

Sl.no.	Chainage	Type	Span Arrangement	Total Cost
1	4+020	Truss	1 x 80m	265245246
2	14+850	Truss	1 x 80m	0
3	23+620	Truss	1 x 80m	0
4	32+400	PSC	13x30m	0
5	35+600	RCC Girder	1 x 24m	0
			Total Cost	**265,245,246.00**

REPORT

Name of Work: -	Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in state of Nagaland
State:-	Nagaland
Span Arrangement:-	1x81.5M
Carriage width:-	9.5 M
Total Length of Bridge:-	81.5 M
Estimated cost of Bridge & Approach:-	**265245246**

PROJECT TITLE:-	Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in state of Nagaland
CLIENT:-	National Highways and Infrastructure Development Corporation Ltd.
STATE	Nagaland
LENGTH OF BRIDGE	81.5 M
WIDTH OF BRIDGE	12.5 M
TYPE OF ABUTMENT	WALL TYPE
TYPE OF FOUNDATION	OPEN
TYPE OF SUPERSTRUCTURE	Truss
NO. OF SPAN	1
LENGTH OF SPAN	81.5 M

	UNIT	
RTL	M	1080.000
AGL	M	1076.746
NBL	M	1076.346
HFL	M	1105.914
LWL	M	1104.914
OFL	M	1105.414
FL	M	1072.346
RTL-NBL	M	3.654
RTL-FL	M	7.654

MEMBER	FRL	GL	FDNL
A1	1080	1076.346	1072.346
P1			
P2			
A2	1080	1077.146	1073.146

GENERAL ABSTRACT OF COST

S.I. No.	Description of work		ESTIMATED COST
1.0	ESTIMATE OF THE BRIDGE	**Rs.**	182807909
2.0	ESTIMATE OF THE RETAINING WALL	**Rs.**	81067958
		Total	263875867
3.0	Add for Contigency upto 1 crore (1%)	**Rs.**	100000
4.0	Add for Contigency above 1 crore (0.5%)	**Rs.**	1269379
	Grand Total	**Rs.**	**265245246**

SUPERSTRUCTURE

No. of Span		1			
Number of Girder in each span		4			
C/C of Expansion Joint	=	81.5	m		
		No.	Width	Total Width	unit
Width of Crash barrier	=	2	0.50	1	m
Width of Carriage way	=	1	9.5	9.5	m
Width of Footpath	=	1	1.50	1.5	m
Width of Railing		1	0.50	0.5	m
Total Width	=			**12.5**	m

SUBSTRUCTURE

No. of Abutment	=	2	
Thickness of Abutment Shaft	=	1.00	m
Length of Shaft	=	12.50	m
Length of Abutment Cap	=	12.50	m
Width of Abutment Cap	=	1.57	m
Height of Abutment Cap (Rectangular Portion)	=	0.5	m
Height of Abutment Cap (Trapezoidal Portion)	=	0.5	m
Average Height of Abutment Shaft	=	2.25	m
No. of Piers	=	0	
Thickness of Pier Shaft	=	1.00	m
Length of Shaft	=	5.00	m
Length of Pier Cap (At Top)	=	11.20	m
Length of Pier Cap (At Bottom)	=	6.00	m
Width of Pier Cap	=	2.00	m
Height of Pier Cap (Rectangular Portion)	=	0.5	m
Height of Pier Cap (Trapezoidal Portion)	=	0.75	m
Average Height of Pier Shaft	=		m

FOUNDATION

For Abutment A1		
Length	12.50	m
Breadth	11.0	m
Height of Rectangular Portion	1	m
Height of Trapezoidal Portion	1.5	m
Toe Length	5	m
Heel Length	5	m
Thickness of Return Wall	0.5	m
Thickness of Filter Media	0.6	m
Height of Filter Media(behind abutment)	4.64	m
Height of Return Wall	5.89	m
For Abutment A2		
Length	12.50	m
Breadth	11.0	m
Height of Rectangular Portion	1	m
Height of Trapezoidal Portion	1.5	m
Toe Length	5	m
Heel Length	5	m
Height of Filter Media(behind abutment)	3.84	m
Height of Return Wall	5.09	m

For Pier P1	
Length	0.00 m
Breadth	1.0 m
Height of Rectangular Portion	0 m
Height of Trapezoidal Portion	0 m
Toe Length	0 m
Heel Length	0 m

Bearing and Bearing Pedestal

		L	B	H	
On Abutment	=	0.80	0.80	0.250	
On Pier	=	0.80	0.80	0.250	
No. of Bearing on Abutment	=	4	no.		
No. of Bearing on Pier	=	8	no.		
			Total=	**8**	**no.**

Seismic Arrestor

		L	B	H
Size	=	0.8	0.8	0.80
No. of Trans. Seis. Arrestor on each Pier	=	0	no.	
No. of Trans. Seis. Arrestor on each Abutment	=	2	no.	
		Total=	**4**	**no.**

Dirt wall

Thickness of dirt wall	=	0.30 m
Height of dirt wall (Dirt wall)	=	1.44 m
Bracket (thickness)	=	0.20 m
Bracket (length l1)	=	0.18 m
Bracket (length l2)	=	0.12 m
Length of Dirt wall	=	12.5 m
Length of Bracket	=	12.5 m

Approach Slab

Width of Approach Slab	=	3.5 m
Length of Approach Slab	=	12.5 m
Thickness of Approach Slab	=	0.3 m
PCC below Approach Slab	=	0.15 m

No. of Span	1	2	3	4
Length of Span	81.5			
Name of Abutment/Pier	A1			A2
FRL	1080	0	0	1080
FL	1072.35	0	0	1073.15
Height of Superstructure (m)	1.085			1.085
Height of bearing +pedestal	0.35			0.35
Height of Abutment/Pier cap(m)	1.0			1.0
Height of Foundation (m)	2.5			2.5
Height of Shaft (m)	2.654			1.854
No. of Bearing	4			4

BILL OF QUANTITY (BRIDGE)

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
1	2.3	201	**SITE CLEARANCE**									
			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 material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.									
				hect.	1	92.5	16.5			0.15		
				hect.					**Total**	**0.15**	**48834.00**	**7453.29**
2	12.1(IB)	304	**EXCAVATION WORK**									
			Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work.									
			UPTO 3M									
			For Abutment A1 (Weathered rock)	cum.	1	12.7	11.2	2.00		284.48	**79.3**	**22559.264**
			For Abutment A1 (Hard rock)	cum.	1	12.7	11.2	1.00		142.24	**79.3**	**11279.632**
			For Abutment A2 (Weathered rock)	cum.	1	12.7	11.2	2.00		284.48	**79.3**	**22559.264**
			For Abutment A2 (Hard rock)	cum.	1	12.7	11.2	1.00		142.24	**79.3**	**11279.632**
			For Pier P1 (Weathered rock)	cum.	0	0.2	1.2	2.00		0.00	**79.3**	**0.000**
			For Pier P1 (Hard rock)		0	0.2	5.6	0.60		0.00	**79.3**	**0.000**
				cum.								
			3M TO 6M									
			For Abutment A1 (Hard rock)	cum.	1	12.7	11.2	1.10		156.46	**79.3**	**12407.5952**
			For Abutment A2 (Hard rock)	cum.	1	12.7	11.2	1.10		156.46	**79.3**	**12407.60**
			For Pier P1	cum.	0	0.2	1.2					
			For Pier P2	cum.		0.2	5.6					
				cum.								**0.00**
			6M TO 9M									
			For Abutment A1	cum.	0	12.7	11.2	0.00		0.00		
			For Abutment A2	cum.	0	12.7	11.2	0.00		0.00		
			For Pier P1	cum.	0	0.2	1.2	0.00		0.00		
			For Pier P2	cum.	0	0.2	5.6	0.00		0.00		
				cum.					**0**	**0.00**	**0**	**0.00**
3	12.8	1500, 1700 & 2100	**PCC GRADE M15 LEVELLING COURSE IN FOUNDATION**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
			For Abutment A1	cum.	1	12.7	11.2	0.10		14.22		
			For Abutment A2	cum.	1	12.7	11.2	0.10		14.22		
			For Pier P1	cum.	0	0.2	1.2	0.10		0.00		
			For Pier P2	cum.		0.2	5.6	0.10		0.00		
				cum.					**Total**	**28.45**	**11678.00**	**332215.74**
4	13.9	710.1.4.of IRC:78 & 2200	**BACKFILLING**									
			Back filling behind abutment, wing wall and return wall complete as per drawing and Technical Specification									
			Behind Abutment A1	cum.	1	10.3	4.40	5.89		266.89		
			Behind Abutment A2	cum.	1	10.3	4.40	5.09		230.63		
				cum.					**Total**	**497.52**	**3091.00**	**1537843.47**
5	14.10	2700	**PCC LEVELLING COURSE M15**									
			PCC M15 Grade leveling course below approach slab complete as per drawing and Technical specification									
			Below Approach Slab	cum.	2	12.50	3.50	0.15		13.13		
				cum.					**Total**	**13.13**	**9611.00**	**126144.38**
6	13.10	710.1.4.of IRC:78 and 2200	**FILTER MEDIA**									
			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 towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification.									
			Behind Abutment A1	cum.	1	11.5	0.6	4.64		32.01		
			Behind Return wall	cum.	2	4.4	0.6	5.89		31.09		
			Behind Abutment A2	cum.	1	11.5	0.6	3.84		26.49		
			Behind Return wall	cum.	2	4.4	0.6	5.09		26.87		
				cum.					**Total**	**116.46**	**3787**	**441041.75**
7	12.8	1500, 1700 & 2100	**RCC GRADE M35 FOR FOUNDATION**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
			Abutment A1									
			Rectangular Portion	cum.	1	12.50	11	1.00		137.50		
			Trapezoidal Portion	cum.	1	12.50			9.00	112.50		
			Abutment A2									
			Rectangular Portion	cum.	1	12.50	11	1.00		137.50		
			Trapezoidal Portion	cum.	1	12.50			9.00	112.50		
			Pier P1									
			Rectangular Portion	cum.	0	0.00	1	0.00		0.00		
			Trapezoidal Portion	cum.	0	0.00			0.00	0.00		
			Pier P2									
			Rectangular Portion	cum.	0	0.00	5.4	0.50		0.00		
			Trapezoidal Portion	cum.	0	0.00			2.24	0.00		
				cum.					**Total**	**500.00**	**12329.00**	**6164500.00**

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
8	12.40	1600	**STEEL FOR FOUNDATION**									
			Supplying, Fitting and Placing un-coated HYSD bar Reinforcement in Foundation complete as per Drawing and Technical Specifications.									
				MT						25.22		
				MT					**Total**	**25.22**	**84675.00**	**2135865.75**
9	13.5	1500,1700 & 2200	**RCC GRADE M35 FOR SUB-STRUCTURE**									
			Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications									
			For Abutment Shaft									
			Abutment Shaft A1 **(upto 5m)**	cum.	1	12.5	1.0	2.65		33.18	**13982.00**	**463852.85**
			Abutment Shaft A1 **(above 5m)**	cum.	1	12.5	1.0	0.00		0.00	**14287.00**	**0.00**
			Abutment Shaft A2 **(upto 5m)**	cum.	1	12.5	1.0	1.85		23.18	**13982.00**	**324032.85**
			Abutment Shaft A2 **(above 5m)**	cum.	1	12.5	1.0	0.00		0.00	**14287.00**	**0.00**
			For Abutment cap, A1 & A2									
			Rectangular Portion	cum.	2	12.5	1.57	0.50		19.63	**13982.00**	**274396.75**
			Trapezoidal Portion	cum.	2	12.5			0.64	16.06	**13982.00**	**224585.875**
			For Dirt Wall									
			Rectangular Portion	cum.	2	12.5	0.30	1.44		10.76	**13982.00**	**150481.275**
			Bracket Portion	cum.	2	12.5			0.048	1.20	**13982.00**	**16778.4**
			For Pedestal	cum.	8	0.8	0.8	0.25		1.28	**13982.00**	**17896.96**
			For Seismic Arrester	cum.	4	0.8	0.8	0.8		2.05	**13982.00**	**28635.136**
				cum.								
10	13.5	1500,1700 & 2200	**RCC GRADE M35 FOR RETURN WALL**									
			Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications									
			Return Wall (A1) **(upto 5m)**	cum.	2	5.0	0.5	5		25.00	**13982.00**	**349550**
			Return Wall (A1) **(above 5m)**	cum.	2	5.0	0.5	0.89		4.44	**14287.00**	**63505.715**
			Return Wall (A2) **(upto 5m)**	cum.	2	5.0	0.5	5		25.00	**13982.00**	**349550**
			Return Wall (A2) **(above 5m)**	cum.	2	5.0	0.5	0.09		0.45	**14287.00**	**6357.715**
11	13.6	1600 & 2200	**STEEL FOR SUB-STRUCTURE**									
			Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and Technical Specifications									
				MT						23.48		
				MT								
				MT					**Total**	**23.48**	**84990.00**	**1995565.2**
12	14.1	1500, 1600 & 1700	**RCC GRADE M35 FOR SUPER-STRUCTURE**									
			Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification									
			Deck Slab	cum.	1	82	12.50	0.23		229.22		
			Longitudinal Girder									
			End Section	cum.	0	1			0.54	0.00		
			Mid Section	cum.	0	20.2			0.40	0.00		
			Tapered Section	cum.	0	0.9			0.47	0.00		
			Cross Girder									
			End Cross Girder	cum.	0	7.2	0.4	0.46		0.00		
				cum.					**Total**	**229.22**	**15330.00**	**3513923.44**
13	14.2	1600	**STEEL FOR SUPER-STRUCTURE**									
			Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications									
			Steel for Truss	MT						749.91	**87000.00**	**65242275.26**
				MT						44.26		
				MT					**Total**	**44.26**	**87230.00**	**3860761.44**
14	14.11	1500, 1600, 1700 & 2704	**RCC GRADE M30 FOR APPROACH SLAB**									
			Reinforced cement concrete Grade M30 in approach slab including reinforcement and formwork complete as per drawing and Technical specification									
				cum.	2	12.50	3.50	0.30		26.25		
				cum.					**Total**	**26.25**	**16386.00**	**430132.50**
15	14.2	1600	**STEEL FOR APPROACH SLAB**									
			Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications									
				MT						0.00		
				MT					**Total**	**0.00**	**87230.00**	**0.00**

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
			WEARING COAT(65mm thick)									
16	**14.4**	**2702**	Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab excluding prime coat with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 9.5 mm nominal size at the rate of 0.005cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces not less than 100 deg. C, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 515.									
				cum.	1	89	9.50			840.75		
				cum.					**Total**	**840.75**	**402.00**	**337981.50**
			CEMENT CONCRETE CRASH BARRIER									
17	**8.22**	**809**	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 bars 25 mm dia, 450 mm long at expansion joints filled with pre-moulded asphalt filler board, keyed to the structure on which it is built and installed as per design given in the enclosure to MOST circular No. RW/NH - 33022/1/94-DO III dated 24 June 1994 as per dimensions in the approved drawing and at locations directed by the Engineer, all as specified									
			For Crash Barrier	cum.	2	89			1.083	192		
				cum.					**Total**	**192**	**5876.00**	**1126376.316**
			CEMENT CONCRETE KERB									
18	**8.1**	**408**	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									
				Rm	2	89				177		
				Rm					**Total**	**177**	**585.00**	**103545.00**
			FOOTPATH									
19	**4.16**	**409**	Construction of footpath/separator by providing 25 mm thick cement concrete grade M15, over laid with pre-cast concrete tiles in cement mortar 1:3 including provision of all drainage arrangements but excluding kerb channel.									
				sqm.	2	89	1.50			265.5		
				sqm.					**Total**	**266**	**2500.00**	**663750.00**
			POT PTFE Bearing									
20	**13.14**	**2000, 2200**	Supplying, fitting and fixing in position true to line and level POT-PTFE bearing consisting of a metal piston supported by a disc or unreinforced elastomer confined within a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel mating surface, complete assembly to be of cast steel/fabricated structural steel, metal and elastomer elements to be as per IRC: 83 part-I & II respectively and other parts conforming to BS: 5400, section 9.1 & 9.2 and clause 2006 of MoRTH Specifications complete as per drawing and approved Technical Specifications.									
				MT	4					300		
				MT					**Total**	**1200.0**	**535.00**	**642000**
			EXPANSION JOINTS									
21	**14.22**	**2607**	Providing and laying of a strip seal expansion joint catering to maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer/supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation.									
				Rm	2	12.5				25		
				Rm					**Total**	**25.00**	**122.00**	**3050.00**
22	**14.9**	**2705**	**DRAINAGE SPOUTS**									
			Drainage Spouts complete as per drawing and Technical specification									
				nos.	34					34		
				nos.					**Total**	**34**	**4078.00**	**138652.00**
			NAME PLATE									
23	**8.4**	**801**	Providing and fixing retro-reflectorised cautionary,mandatory and informatory sign as per IRC-67 made of encapsulated lens type reflecting sheeting vide clause 801.3, fixed over alluminium sheeting, 1.5 m thick supported on a mild steel angle iron post 75mm x 75mm x 6mm firmly fixed to the ground by mean of properly designed foundation wiyh M15 grade cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing including painting of vertical post as per specification									
				nos.	2					2		
				nos.					**Total**	**2**	**7756.00**	**15512.00**
			WEEPHOLES									
24	**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 Specifications									
			In Abutment	nos.	153					153		
			In Return Wall	nos.	144					144		
				nos.					**Total**	**297.00**	**617**	**183249**
			CONFIRMATORY BORING									
25			Confirmatory boring at every pier and abutment location-Confirmatory Boring through Core drilling of BX (41mm to 59mm) size by rotary core drilling machine upto 10.0 m depth in all kinds of hard rock including finishing , maintenance of core (minimum 80% core recovery in hard rock is essential and sludge for foundation exploration complete as per spn. and direction of E/I									
				RM	2	10				**20.00**	**2000.00**	**40000**
											TOTAL	**91403954.54**

Detail Estimate for the construction of 7.0 M High Retaining Wall in the Approach Road

Sl. No.	Clause	Morth Specification	Description	Units	Nos	Length(m)	Width(m)	Depth(m)	Area(m^2)	Quantity	Rate	Amount
1	12.1(IB)	304	**EARTHWORK EXCAVATION**									
			Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work.									
				Cum	4	10	7	2.1		588	**48834.00**	**28714392.00**
												28714392.00
2	12.8	1500, 1700 & 2100	**PCC GRADE M15 LEVELLING COURSE IN FOUNDATION**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
				Cum	4	10	7	0.1		28	**11678.00**	**326984.00**
												326984.00
3	13.10	710.1.4.of IRC:78 and 2200	**FILTER MEDIA**									
			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 towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification.									
				Cum	4	10	0.6	9		216	**3787.00**	**817992.00**
												817992.00
4	13.5	1500,1700 & 2200	**RCC GRADE M35 FOR SUB-STRUCTURE**									
			Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications									
			Stem	Cum	4	10			5.07	202.8	**13982.00**	**2835549.60**
												2835550.0
5	12.8	1500, 1700 & 2100	**RCC GRADE M35 FOR FOUNDATION**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
			Footing	Cum	4	10			5.84	233.6	**12329.00**	**2880054.40**
												2880055.0
6	13.6	1600 & 2200	**STEEL FOR SUB-STRUCTURE**									
			Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and Technical Specifications									
			Steel @150kg/cum	MT					202.8	30.42	**84990.00**	**2585395.80**
												2585396.00
7	12.40	1600	**STEEL FOR FOUNDATION**									
			Supplying, Fitting and Placing un-coated HYSD bar Reinforcement in Foundation complete as per Drawing and Technical									
			Steel @120kg/cum	MT					233.6	28.032	**84675.00**	**2373609.60**
												2373610.00
											Total	**40533979.00**

Truss Bridge

No. of carriageway **2**

Sr. No.	Dsg.	Pl Description	Area(mm^2)	Length(mm)	Nos.	Wt kg/m	Wt Kg
1	R1	Top Chord	73250	5000	8	575.01	23000.50
2	R2	Top Chord	91500	5000	8	718.28	28731.00
3	R3	Top Chord	104400	5000	8	819.54	32781.60
4	R4	Bottom Chord	96100	5000	16	754.39	60350.80
5	R5	Bottom Chord	96100	5000	8	754.39	30175.40
6	R6	Bottom Chord	96100	5000	8	754.39	30175.40
7	R7	Diagonal	37520	7072	20	294.53	41658.61
8	R8	Diagonal	23120	7072	16	181.49	20536.18
9	R9	Diagonal	23120	7072	16	181.49	20536.18
10	R10	Vertical	37520	10000	8	294.53	23562.56
11	R11	Vertical	23120	10000	8	181.49	14519.36
12	R12	Vertical	23120	10000	8	181.49	14519.36
13	R13	Vertical	23120		6	181.49	0.00
14	R14	End Racker	81750	14142.13	4	641.74	36302.14
15	R15	Int.Top Lateral	7612	12800	5	59.75	3824.27
16	R16	Top Lateral	7612	12800	6	59.75	4589.12
17	R17	Top Bracing	7612	8122	24	59.75	11647.77
18	R18	Bottom Bracing	13356	8122	32	104.84	27249.53
19	R19	Horz.member	9036	10000	2	70.93	1418.65
20	R20	End Girder	63552	12800	2	498.88	12771.41
21	R21	Int Girder	63552	12800	15	498.88	95785.57
22	R22	Stringer	16568	81500	4	130.06	42399.17
23	R23	Knee Bracing	27524	6000	14	216.06	18149.33
						Total Weight=	**594683.91**

Lacing

For Lacing Inc it by 10% **59468.39**

Gusset Plates

For Gusset plates Inc it by 15% **89202.59**

Shear Connector

Sr.No.	-	Description	Area	Length	Nos.	Wt kg/m	Wt Kg
1	-	ISMC 150	2088	200	**2000**	**16.3908**	**6556.32**
						Total Weight=	**6556.32**

2000

	Bolts	Nuts	Washers
1 Truss (2Lane)	2000	2000	4000
2 Truss (4Lane)	4000	4000	8000

Total Weight (for 1 carriageway) except Bolts= **749.91** kgs

Total Weight (for 2 carriageway) except Bolts= **1499.82** kgs

STEEL QUANTITY

PROJECT TITLE:- Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in state of Nagaland

CLIENT:- National Highways and Infrastructure Development Corporation Ltd.

STATE Nagaland

DESCRIPTION	UNIT	NOS	WEIGHT	TOTAL WT.
FOUNDATION BELOW ABUTMENT	MT	2	12.61	25.22
ABUT. SHAFT	MT	2	6.06	12.12
ABUT. CAP	MT	2	2.02	4.04
DIRT WALL	MT	2	0.71	1.42
BRACKET	MT	2	0.25	0.50
FOUNDATION BELOW PIER	MT	0	0.00	0.00
PIER SHAFT	MT	0	0.00	
PIER CAP	MT	0	0.00	0.00
PEDESTAL	MT	8	0.08	0.64
SEISMIC ARRESTER	MT	4		0.00
DECK SLAB	MT	1	44.26	44.26
CROSS GIRDER	MT	2	0.00	0.00
INTER CROSS GIRDER	MT	2	0.00	0.00
LONG GIRDER	MT	4	0.00	0.00
APPROACH SLAB	MT	2	0.00	0.00
RETURN WALL	MT	4	1.19	4.76
			TOTAL	**92.96**

DESCRIPTION	UNITS	STEEL	TOTAL STEEL
FOUNDATION	MT	25.22	25.22
SUB-STRUCTURE	MT	18.72	18.72
SUPER STRUCTURE	MT	44.26	44.26
RETURN WALL	MT	4.76	4.76
	TOTAL	**92.96**	**92.96**

ABUTMENT BBS

PROJECT TITLE:- Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in state of Nagaland

STATE Nagaland

BAR MARK	LENGTH	SPACING LENGTH	BAR DIA.	SPACING	M1	M2	M3	LENGTH OF EACH BAR	NO. OF BAR	TOTAL LENGTH	WT. PER METER	TOTAL WT.	
			(mm)	(mm) c/c.	(m)	(m)	(m)	(m)		(m)	(kg/m)	(kg)	
1	5.77		25		5.77	0.3	0.3	6.37	120	763.98	3.853	2943.89	**ABUT. SHAFT**
2	5.77		20		5.77	0.3	0.3	6.37	120	763.98	2.466	1884.09	
3	12.35	3.92	12	150	12.35	0.3	0.3	12.95	54	699.30	0.888	620.85	
4	0.85		10	150	0.85	0.1	0.1	1.05	810	850.50	0.617	524.37	
5	5.77		12		5.77	0.3	0.3	6.37	16	101.86	0.888	90.44	**6063.63**
6	6.50	12.3	25	120	6.50	0.5		7.00	208	1456.00	3.853	5610.49	**FOUNDATION**
7	11.00	12.3	12	120	11.00	0.5	0.5	12.00	104	1248.00	0.888	1107.99	
8	12.30	11	12	150	12.30	0.5	0.5	13.30	74	984.20	0.888	873.79	
9	6.72	12.3	25	130	6.72	0.5		7.22	96	693.13	3.853	2670.90	
10	11.34	12.3	12	120	11.34	0.5	0.5	12.34	104	1283.39	0.888	1139.41	
11	12.30	5.22	12	150	12.30	0.5	0.5	13.30	72	957.60	0.888	850.17	
11a	46.60		12		46.60	2	2	50.60	8	404.80	0.888	359.39	**12612.14**
12	12.35		20		12.35	0.3	0.3	12.95	15	194.25	2.466	479.05	**ABUT. CAP**
12a	3.87	12.35	12	45	3.87	0.12	0.12	4.11	275	1129.76	0.888	1003.02	
12b	3.84	12.35	10	1000	3.84	0.1	0.1	4.04	26	105.04	0.617	64.76	
13	12.35		20		12.35	0.3	0.3	12.95	12	155.40	2.466	383.24	
13a	12.35		12		12.35			12.35	8	98.80	0.888	87.72	**2017.78**
14	2.04	12.35	12	110	2.04	0.15	0.5	2.69	113	303.41	0.888	269.37	**DIRT WALL**
15	3.04	12.35	12	110	3.04	0.15	0.12	3.31	113	374.39	0.888	332.39	
16	12.35	1.285	10	200	12.35	0.15	0.15	12.65	7	88.55	0.617	54.59	
16a	12.35	1.285	10	200	12.35	0.15	0.15	12.65	7	88.55	0.617	54.59	**710.95**
17	12.35		12		12.35	0.15	0.15	12.65	3	37.95	0.888	33.69	**BRACKET**
18	1.30	12.35	10	450	1.30	0.1	0.1	1.50	54	81.00	0.617	49.94	
19	1.41	12.35	12	100	1.41	0.12		1.53	125	191.25	0.888	169.79	**253.43**
											TOTAL		**21657.93**
											TOTAL(1-30)		**22850.34**

RETURN WALL, APPROACH SLAB BBS

PROJECT TITLE:- Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in

CLIENT:- National Highways and Infrastructure Development Corporation Ltd.

STATE Nagaland

SI No.	BAR MARK	LENGTH	SPACING LENGTH	BAR DIA	SPACING	M1	M2	M3	LENGTH OF EACH BAR	NUMBER OF BARS	TOTAL LENGTH	UNIT WEIGHT	WEIGHT	
				(mm)	mm(c/c)	(m)	(m)	(m)				Per(kg)	(kg)	
1	20	5.85	4.7	12	80	5.85	0.30	0.30	6.45	60	387.0	0.89	344	**RETURN WALL**
2	21	5.85	4.7	12	150	5.85	0.30	0.30	6.45	32	206.4	0.89	183	
3	22	7.3	5.85	12	120	7.30	0.30	0.30	7.90	50	395.0	0.89	351	
4	23	7.3	5.85	12	150	7.30	0.30	0.30	7.90	40	316.0	0.89	281	
5	24	5		12		5.00	0.15	0.15	5.30	5	26.5	0.89	24	
6	25	5.85		10		5.85			5.85	3	17.6	0.62	11	
7	26			12	150	0.00			0.00	1	0.0	0.89	0	1192
														4770

RCC GIRDER AND DECK SLAB

PROJECT TITLE:-	Consultancy services fo carrying out Feasibility study,Preperation of DPR and Providing preconstruction services in respect of 4 Laning of Kohima Bypass connecting NH-39(new NH-02),NH-150(New NH-02),NH-61(New NH-29) and NH-39(New NH-02)on Engineering, Procurement and Construction (EPC) mode in state of Nagaland
CLIENT:-	National Highways and Infrastructure Development Corporation Ltd.
STATE	Nagaland

DECK SLAB

Eff. Length-	81.5
Width-	12.5
C/C distance btw girders	3
Dist.of outer Girder from tip of cantilever	1.75
C.Co-	0.04

SL. NO	BAR MARK	LENGTH	SPACING LENGTH	BAR DIA.	SPACING	M1	M2	M3	LENGTH OF BAR	NO. OF BAR	TOTAL LENGTH	WT. PER METER	TOTAL WT.	
				(mm)	(mm) c/c.	(m)	(m)	(m)	(m)		(m)	(kg/m)	(kg)	
1	1	12.42	81.42	16	150	12.42	0.15	0.15	12.72	544	6919.68	1.58	10921.58	Main top
2	2	81.42	12.42	12	125	81.42	0.15	0.15	81.72	100	8172.00	0.89	7255.22	Dist top
3	3	81.42	12.42	12	125	81.42	0.15	0.15	81.72	200	16344.00	0.89	14510.43	Dist bottom
4	4	12.42	81.42	16	200	12.42	0.15	0.15	12.72	408	5189.76	1.58	8191.19	Mainbot
5	5	81.42	-	16	150	81.42	0.15	0.15	81.72	4	326.88	1.58	515.93	Railing bot
6	6	1.10	81.46	16	125	1.10	0.15	0.14	1.39	1306	1815.34	1.58	2865.22	Haunch Bar
													44259.56	

KOHIMA TUNNEL BOQ SUMMARY AND COST					
Sl. No.	**DESCRIPTION**	**Qty**	**Unit**	**Rate in INR**	**Cost in Lakh**
Both the Tunnel 1100 m Long with Portals					
1	a) Underground Excavation	111506	m^3	4000	4460
	b) Over Break	5540	m^3	800	44
2	Concreting				0
	i. M-15 for Backfill (Behind Steel Ribs)	168	m^3	5000	8
	ii. M-35 for Lining fo Portals	2608	m^3	9000	235
	iii. Drain Concrete (M25)	2280	m^3	8000	182
3	Primary SFRS	9498	m^3	12000	1140
4	Secondary M35 Concrete Lining	6854	m^3	9000	617
5	Steel Fibre (L=35mm ,d-0.62 mm ,Dramix R55/35 -BN	491	MT	70000	343
6	Lagging (M20)	416	m^3	12000	50
7	Reinforcement Steel	261	MT	75000	196
8	Structural Steel	137	MT	125000	171
9	Rock Bolting (25mm Dia),Fully grouted	50140	m	1500	752
10	Length of Resin Capsule	3581	m	800	29
11	Length of Cemet Capsule	3581	m	800	29
12	Tie Rods	7	MT	80000	6
13	Lattice Girder	546	MT	100000	546
14	Spread Water Proofing Memebrane	29222	Sqm	600	175
15	Instrumentation and Monitoring				0
a	Load Cells	18	Nos	25000	5
b	3 Point Multi Point Bore Hole Extensometer	18	Nos	5000	1
c	3D Survey Reflectometer	84	Nos	5000	4
d	Switch Box	12	Nos	25000	3
e	Pressure Cells	6	Nos	20000	1
f	Tape Extensometer	6	Nos	5000	0.3
16	Dewatering @ 1.5% of cost of works except L.S. Items				135
17	Lighting and Accessories 2 %				180

KOHIMA TUNNEL BOQ SUMMARY AND COST					
Sl. No.	**DESCRIPTION**	**Qty**	**Unit**	**Rate in INR**	**Cost in Lakh**
18	Contingencies and Work Charged Establishment @ 3% of cost of works except L.S. Items				270
19	Embedment Steel	5.0	MT	100000.0	5.0
20	Earthing Wire steel	128.8	MT	128.8	0.2
21	GSB for Pavement	5080	Cum	2000	101.6
22	DLC (Dry Lean Concrete)	2420	Cum	5000	121.0
23	PQC pavement Quality Concrete	3630	Cum	6000	217.8
24	Fore poling of 38 mm Dia or 89 mm Dia Pipe roofing at Portal (initial 15 m)	1584	m	2500	39.6
25	Spot bolting of 6 m length 25 mm Dia rock Bolt	6000	m	1200	72.0
26	Contact Grouting for lining	338	m	2000	6.8
27	Consolidation grouting	1350	m	2000	27.0
28	**Portal Works**				
a	Excavation for All Portals	59800	Cum	300	179.4
b	25 mm Dia Fully Grouted Rock Bolts	9926	m	1200	119.1
c	Drainage Hole 50 mm Dia	6514	m	1200	78.2
d	Perforated PVC Pipe for drain	6514	m	1200	78.2
e	Portal Concrete M35 Grade	1093	Cum	8000	87.5
f	Reinforcement Steel for Portal	328	MT	1200	3.9
g	Volume of 100 mm thick Shotcrete (Grade M25)	1489	Cum	10000	148.9
h	Wire mesh (100 mm x100mmx5 mm)	11669	Sqm	800	93.4
29	**Instrumentation and Monitoring**				0.0
a	Multipoint Borehole Extensometer	42	Nos	5000	2.1
b	3D survey Reflector	54	Nos	5000	2.7
Total Cost for Tunnel Construction					**10966**
Total Cost for Tunnel Construction along with portals					**109.7 Crores**

KOHIMA _TUNNEL BOQ BACKUP

TUNNEL BOQ (1.1 kM Long)
(Modified Horse Shoe Shaped)

Total Length of Tunnel =	**=**	**1,100**	**m**

Assumptions
As per Geological Section

Percentage of Class II	=	**20.00**	**%**
Percentage of Class III	=	**30.00**	**%**
Percentage of Class IV	=	**35.00**	**%**
Percentage of Class V	=	**15.00**	**%**

For Class II

Features	Value	Unit	REMARK
Length	**220**	**m**	
Finished Area of Tunnel (1-1)	**100.8**	**Sqm**	From Auto Cad
Excavated Area of Tunnel (4-4)	**121.22992**	**Sqm**	From Auto Cad
Area After Primary Shotcrete (2-2)	**113.97232**	**Sqm**	From Auto Cad
Area of Tunnel at start of secondary Lining (3-3)	**111.132**	**Sqm**	From Auto Cad
Curve Length at Cnterline of Lattice Girder	**20**	**m**	From Auto Cad
Length of Vertical Leg at Cenreline	**11**	**m**	From Auto Cad
Total Perimeter after Primary SFRS	**31**	**m**	From Auto Cad
Spacing of Rock Bolt	**2.5**	**m c/c**	
Length of Rock Bolt	**6**	**m**	

Excavation	=	**26,671**	m^3	
Overbreak	=	**1,334**	m^3	
Total Excavation	=	**28,004**	m^3	
Volume of Primary SFRS	=	**2,221.5**	m^3	
Volume of Secondary Lining	=	**2,273**	m^3	
Area of Spread Water proofing Memebrane	=	6843	Sqm	
Total length of Rock Bolt	=	4,380	m	

For Class III

Features	Value	Unit	REMARK
Length	**330**	**m**	
Finished Area of Tunnel (1-1)	**100.8**	**Sqm**	From Auto Cad
Excavated Area of Tunnel (4-4)	**121.22992**	**Sqm**	From Auto Cad
Area after Primary Shotcrete (2-2)	**113.97232**	**Sqm**	From Auto Cad
Area of Tunnel at start of secondarySFRS (3-3)	**111.132**	**Sqm**	From Auto Cad
Total Perimeter after Primary SFRS	**31**	**m**	From Auto Cad
Spacing of Rock Bolt	**2**	**m c/c**	
Length of Rock Bolt	**6**	**m**	
Weight of Lattcie Girder per m	**NA**	**Kg/m**	
Spacing of Lattice Girder	**NA**	**m c/c**	

Excavation	=	**40,006**	m^3	
Overbreak	=	**2,000**	m^3	
Total Excavation	=	**42,006**	m^3	
Volume of Primary SFRS (4-4 minus 2-2)	=	**2,395.0**	m^3	

KOHIMA _TUNNEL BOQ BACKUP

TUNNEL BOQ (1.1 kM Long)

Volume of Secondary lining	=	**2,156**	m^3	
Area of Spread Water proofing Memebrane	=	**10265**	Sqm	
Total length of 25 mm Dia Fully Grouted Rock Bolt	=	**15,398**	m	

For Class IV

Features	Value	Unit	REMARK
Length	**385**	**m**	
Finished Area of Tunnel (1-1)	**100.8**	**Sqm**	From Auto Cad
Excavated Area of Tunnel (4-4)	**128.71152**	**Sqm**	From Auto Cad
Area After Primary Shotcrete (2-2)	**113.97232**	**Sqm**	From Auto Cad
Area of Tunnel at start of secondarySFRS (3-3)	**112.903**	**Sqm**	From Auto Cad
Curve Length at Cnterline of Lattice Girder	**22**	**m**	From Auto Cad
Length of Vertical Leg at Cenreline	**12**	**m**	From Auto Cad
Total Perimeter after Primary SFRS	**34**	**m**	From Auto Cad
Spacing of Rock Bolt	**1.5**	**m c/c**	
Length of Rock Bolt	**5**	**m**	
Weight of Lattcie Girder per m	**17**	**Kg/m**	
Spacing of Lattice Girder	**1**	**m c/c**	

Excavation	=	**49,554**	m^3	
Overbreak	=	**2,478**	m^3	
Total Excavation	=	**52,032**	m^3	
Volume of Primary SFRS (4-4 minus 2-2)	=	**5,674.6**	m^3	
Volume of Secondary SFS ()	=	**4,660**	m^3	
Area of Spread Water proofing Memebrane	=	**13090**	Sqm	
Total length of 25 mm Dia Fully Grouted Rock Bolt	=	**29,089**	m	
Weight of lattice Girder	=	**223.11**	MT	

For Class V

Features	Value	Unit	REMARK
Length	**165**	**m**	Both Portal End
Finished Area of Tunnel (1-1)	**100.8**	**Sqm**	From Auto Cad
Excavated Area of Tunnel (4-4)	**128.71152**	**Sqm**	From Auto Cad
Area after Primary Shotcrete (2-2)	**113.97232**	**Sqm**	From Auto Cad
Area of Tunnel at start of secondarySFRS (3-3)	**112.903**	**Sqm**	From Auto Cad
Area of Tunnel after Primary SFRS	**151.5608**	**Sqm**	From Auto Cad

KOHIMA _TUNNEL BOQ BACKUP

TUNNEL BOQ (1.1 kM Long)

Curve Length at Cnterline of Steel Rib	**17.46**	**m**	From Auto Cad	
Length of Vertical Leg of Steel Rib	**16.18**	**m**	From Auto Cad	
Total Perimeter after Primary SFRS	**34**	**m**	From Auto Cad	
Spacing of Rock Bolt	**1.5**	**m c/c**		
Length of Rock Bolt	**5**	**m**		
Weight of Steel Girder per m	**25**	**Kg/m**		
Spacing of Steel Rib	**0.5**	**m c/c**		

Excavation	=	**21,237**	m^3	
Overbreak	=	**1,062**	m^3	
Total Excavation	=	**22,299**	m^3	
Volume of Primary SFRS	=	**1,402.5**	m^3	
Volume of RCC Lining	=	**2,608.3**	m^3	Including OverBreak fill
Area of Spread Water proofing Memebrane	=	**5,610**	Sqm	
Total length of Rock Bolt	=	**12,467**	m	
Lattice Girder	=	**278**	MT	
Volume of Precast Lagging	=	**416.3**	Cum	

Concrete Backfill

Area of Backfill concrete	=	5.60	Sqm	Autocad
Length of Class D	=	30.00	m	
Total Volume of Backfill Concrete	=	168.00	Cum	

Tie Rods

Diameter	=	20	mm
Length per Rod	=	0.70	m
Weight	=	2.47	Kg / m
Numbers per section	=	34	Nos.
No. of Ribs	=	121	Nos.
No. of rods	=	4,037	Nos.
Total Length of Rods	=	2,826	m
Total Weight of Rods	**=**	**6.97**	**MT**

Pipe Roofing /Fore Poling

Length of forepoles pf 38 mm Dia	**=**	**8.00**	**m**
Perimeter for Forepolng	**=**	**9.42**	**m**
Spacing of Fore Poling	**=**	**0.30**	**m**
No of fore Poles per drive	**=**	**33.00**	**Nos**
No of anticipated drive for portal reache	**=**	**6.00**	**Nos**
Total Length of Forepoling	**=**	**1,584**	**m**

BOQ Trolly Refuge

Area of Niche e at Plan	**=**	17.50	Cum
Average Height	**=**	4.50	m
Total Excavation for One section	**=**	78.75	Cum
No of Niche Marked	**=**	9.00	Nos
Total Excavation for Niche	**=**	**708.75**	Cum
Addition Primary SFRS for one section	**=**	2.86	Cum
Total primary SFRS for Niche	**=**	**25.74**	Cum
Addition Secondary SFRS for one section	**=**	4.29	Cum
Total Secondary SFRS for Niche	**=**	**38.61**	Cum
Additional surfacearea	**=**	**349.65**	Sqm
Additional 25 mm Dia fully Grouted bolt	**=**	**349.65**	**m**
Additional water proofing membrane		**257.40**	Sqm

Spot Bolting and Grouting

Considering one 6 m long rock bolt per m	**=**	**6,000**	**m**

KOHIMA _TUNNEL BOQ BACKUP

TUNNEL BOQ (1.1 kM Long)

Considering contact grouting for 30 m length 15 Nos ,1.5 m deep	=	**338**	**m**			
Considering consolidation groutinggrouting for 30 m length 15 Nos ,6 m deep	=	**1,350**	**m**			

PORTAL QUANTTITY CALCULATION

Excavation

Length of Excavation Considered (Except Deep Cut) =			20	m		
Area of Cross Section Excavated	=	1610		Sqm		Autocad
Area of Cross Section Excavated	=	1380		Sqm		Autocad
Area of 2 Nos of side Faces	=	3113		Sqm		Autocad
Area of 2 Nos of side Faces	=	1342		Sqm		
Area of Front Face	=	1610		Sqm		Autocad
Area of Front Face	=	1380		Sqm		
	=					
Total Excavation for Both the Portals	=		59,800	Cum		
Spacing of 25 mm Dia Rock Bolt	=	3		mc/c		
Length of Rock Bolt	=	6		m		
Total Length of Rock	=	4963		m		
Volume of 100 mm thick M25 Shotcrete	=	744		cum		
Wire mesh (100 mmx100 mmx5mm)	=	5834		sqm		
Total length for Drainage Hole	=		3,257	m		@
Total length for Drainage Hole	=		3,257	m		
Concrete Portal						
Width of Portal	=	17		m		
Height of Portal	=	14		m		
Volume of Base Slab	=	96		Cum		
Volume of Top Slab	=	240		Cum	MT	
Side Walls		210.72		Cum		
Total Concrete for portal	=	546.72		Cum		
Reinforcement at 150 kG/Cum	=	82.008		MT		

Area

Summary of Quantities

1	**Underground excavation**					
	Class A & B					
	a	Excavation	=	***40,715***	m^3	
	b	overbreak	=	***2,000***	m^3	
	Class C & D					
	a	Excavation	=	***70,791***	m^3	
	b	overbreak	=	***3,540***	m^3	
2	**Concreting**					
		M-15 for backfill	=	***168.00***	m^3	
		M-35 for lining	=	***2,608***	m^3	
		M-20 for concrete plugs	=	***416.3***	m^3	
3	**Primary SFRS (M35)**		=	***9,498***	Cum	
4	**Secondary SFRS (M35)**		=	***6,854***	Cum	
a	**Steel Fibre @ 30kg/cum Tensile strength 1270 Mpa**	**L =35 mm D=0.62 mm**	**DRAMIX R55/35-BN**	***491***	MT	
5	**Rockbolt 25mm dia**		=	***57,303***	m	
6	**Drilling of 45 mm Hole for Bolt**		=	***57303***	m	
a	**Length of bolt in crown portion**		=	***19101***	m	
b	**Length of resin capsule**		=	***3581***	m	
c	**Length of Cement Capsule**		=	***3581***	m	
7	**Reinforcement Steel**		=	***260.83***	MT lumpsum	
7	**Structural Steel (with 20% Extra for Plates and Bolt)**		=	***334.05***	MT	
8	**Lagging (M20)**		=	***416***	m^3	
9	**Tie Rods**		=	***6.97***	MT	
10	**Spread water Proofing Membrane**		=	***29,222.44***	Sqm	
11	**Weight of Lattice Girder (20% extra for paltes and Nu**		=	**267.73**	MT	
12	**Length of Foreploing of 38mm dia or 89 mm Dia pipe roofing**		=	**1,584.00**	m	

Cost Estimate of Kohima Landslide (Km 1+550)						
Sl.No.	**Particular of Items**	**Unit**	**Quanitites**	**Rate (in INR)**	**Amount (in INR)**	**Scope**
1	**Earthwork** Excavation in hilly area in ordinary rock not requiring blasting by mechanical means	Cum	587	223.00	130886	Civil Contractor
2	**Reinforced Earth Composite System:**Supply of prefabricated galvanized steel mesh facing units (dia. of bars to be used is 8mm and 12mm with galvanization of 610 grams per sqm) including supply of high adherence geosynthetic staps 50mm wide with trapezoidal groove like rib (lateral teeth) on both edge of the strap,supply of mechanical connection to connect the geosynthetic stap with the steel mesh fascia and also with the soil nails, supply of back steel mesh, supply of connectors,non-woven geotextiles etc. including the design, preparation of construction drawings and detail construction methodology of Reinforced Earth Composite System. The slope angle of the structure is maximum 70 degree with horizontal.	Sqm	1174	13672	16049104	Specialized System Supplier
3	PCC M-20 for levelling pad (150mm wide x 100mm thick)	Cum	2	5500	8663	Civil Contractor
4	Labour cost for Installation of Reinforced Earth Composite System	Sqm of face area	1174	350	410853	Civil Contractor
5	Providing and Laying of selected backfill soil as per MoRT&H's specification in between slope surface and the facing element to a full height compacted to a firm condition complete as per drawings and Technical Specification.	Cum of filling	6704	2296	15392842	Civil Contractor
6	Providing 600 mm drainage gallery as Chimney drain wrapped with non-woven geotextile with 19.5mm passing and 9.1mm retaining aggregates behind reinforced earth zone with proper compaction for entrapping of seepage or subsurface water from the existing slope area .	Cum	6704	1000	6704320	Civil Contractor
7	150-200 crushed boulder packing of 400mm wide at the face of Reinforced Earth Composite System structure	Cum	4470	4182	18691644	Civil Contractor
8	**Soil Nail for Reinforced Earth Composite System:** Supply of fully threaded hot-dip galvanized solid geotechnical bars as soil nails (galvanization minimum 500 grams per sqm) of 28 mm diameter, having yield strength > 670N/mm^2 and tensile strength > 800N/mm^2, spherical nut, Nail head, coupler including supply of necessary arrangement for connecting the nail with polymeric strap.	Rmt of Soil Nail	8231	3430	28231275	Specialized System Supplier
9	Drilling, grouting and fixing of Soil Nail and Reinforced Earth Composite System structure connection arrangement as per the construction method and guidance of System Supplier.	Rmt of Soil Nail	8231	1000	8230692	Civil Contractor

Sl.No.	Particular of Items	Unit	Quanitites	Rate (in INR)	Amount (in INR)	Scope
10	Drilling of 100mm diameter semi-perforated PVC pipe inside the hill slope wrapped with non woven geotextile complete as per drawing and as directed by the engineer.	Rmt of pipe	2671	200	534200	Civil Contractor
11	Providing and laying 100 mm diameter Semi-Perforated PVC pipe in lateral direction wrapped with non woven geotextile complete as per drawing and as directed by the engineer.	Rmt of pipe	2671	200	534200	Civil Contractor
12	**Ground Anchors** Supply of permanent ground anchors for strenthening and stabilizing the hill slopes including its accessories only as per the tender drawing and specification.	Rmt of Anchor	2120	19026	40335120	Specialized System Supplier
13	Drilling, grouting and fixing of Permanent Ground Anchors.	Rmt of Anchor	2120	2000	4240000	Civil Contractor
14	Supply of OPC-43 Grade cement including handling charges etc.	Bags	10351	350	3622742	Civil Contractor
15	Supply of Admixture to make smooth non shrink grout for anchoring activities including handling charges etc	Kgs	2588	250	646981	Civil Contractor
TOTAL in INR:					**143,763,523**	

Bill No. 7 Junctions

Item No.	SOR Ref. No.	Description	Unit	No.	Area	Depth	Qty	Unit Rate	Amount	Remarks
Major Junction										
Bill No 1: Site Clearance										
6.01	2.3 (i) A	Clearing and grubbing road land by mechanical means in area of light jungle 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 material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Ha	1.0	1800.0		0.2	**42,879.15**	**7,718.25**	
6.02	3-32	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres.	Cum	1.0	540.00	0.20	108.0	**195.49**	**21,112.51**	**Consederin g 30% of total area**
6.03	3-33	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres.	Cum	1.00	540.00	1.00	540.0	**276.04**	**149,063.60**	**Consederin g 30% of total area**
6.04	3-34	Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 meters	Cum	1.0	720.00	1.00	720.0	**424.27**	**305,474.04**	**Consederin g 40% of total area**
6.08	4.2 (ii)	**Granular Sub-Base with Coarse Graded Material (Table:- 400- 2)**								
		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 clause 401)	Cum	4.0	1800.0	0.200	1440.0	**4,574.00**	**6,586,560.00**	
6.09	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 sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.)	Cum	4.0	1800.0	0.250	1800.0	**5,706.00**	**10,270,800.00**	
6.10	5.6 (i)	Providing and laying Dense Bituminous Macadam (DBM) course complete as per Technical Specifications Clauses 507 and as directed by the Engineer	Cum	4.0	1800.0	0.095	684.0	**15,793.00**	**10,802,412.00**	
6.11	5.8 (i)	Providing and laying Bituminous Concrete wearing course using Modified Bitumen as per drawing and Technical Specifications Clauses 509 & 521.	Cum	4.0	1800.0	0.040	288.0	**16,125.00**	**4,644,000.00**	

Item No.	SOR Ref. No.	Description	Unit	No.	Area	Depth	Qty	Unit Rate	Amount	Remarks
Minor Junction										
Bill No 1: Site Clearance										
6.01	2.3 (i) A	Clearing and grubbing road land by mechanical means in area of light jungle 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 material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Ha	1.0	660.0		0.1	**42,879.15**	**2,830.02**	
6.02	3-32	Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres.	Cum	1.0	198.00	0.20	39.6	**195.49**	**7,741.25**	**Consederin g 30% of total area**
6.03	3-33	Excavation in hilly area in ordinary rock not requiring blasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres.	Cum	1.00	198.00	1.00	198.0	**276.04**	**54,656.65**	**Consederin g 30% of total area**
6.04	3-34	Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 meters	Cum	1.0	264.00	1.00	264.0	**424.27**	**112,007.15**	**Consederin g 40% of total area**
6.08	4.2 (ii)	**Granular Sub-Base with Coarse Graded Material (Table:- 400- 2)**								
		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 clause 401)	Cum	2.0	660.0	0.150	198.0	**4,574.00**	**905,652.00**	
6.09	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 sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.)	Cum	2.0	660.0	0.250	330.0	**5,706.00**	**1,882,980.00**	
6.10	5.6 (i)	Providing and laying Dense Bituminous Macadam (DBM) course complete as per Technical Specifications Clauses 507 and as directed by the Engineer	Cum	2.0	660.0	0.095	125.4	**15,793.00**	**1,980,442.20**	
6.11	5.8 (i)	Providing and laying Bituminous Concrete wearing course using Modified Bitumen as per drawing and Technical Specifications Clauses 509 & 521.	Cum	2.0	660.0	0.040	52.8	**16,125.00**	**851,400.00**	
		TOTAL FOR BILL NO: 7 (CARRIED FORWARD TO SUMMARY)							**38,584,849.67**	

Bill 7 :- Bus Bays / Bus Shelter

Sl. No.	SOR Ref No	Item Description	Unit	Plan Area /Length	Nos. of Bus Bays	Effective Area/ Length	Depth (m)	Quantity	Unit Rate (per sqm/cum)	Amount
A)		**Bus Bay for One Buses:**								
i)		Approx. Area of Existing Pavement (sqm)		-		-				
ii)		Approx. Area of Pavement Improvement (sqm)		500.0	**6.0**	3,000.0				
iii)		Approx. Area of Islands & Medians (sqm)		-		-				
		Approx. Length along the edges of Islands & Medians (m)		-		-				
Quantities:										
1	5.8(i)	BC	Cum			3,000.0	0.040	120.0	16,125.0	**1,935,000.00**
2	5.6(i)	DBM	Cum			3,000.0	0.095	285.0	15,793.0	**4,501,005.00**
3	4.1	WMM	Cum			3,000.0	0.250	750.0	5,706.0	**4,279,500.00**
4	4.2 (ii)	GSB	Cum			3,000.0	0.200	600.0	4,574.0	**2,744,400.00**
5	4.14	Isand/Median Filling	Cum			35.0	0.610	21.4	270.7	**5,778.87**
5	4.16	Bus Shelter	Each			16.0		16.0	150,000.0	**2,400,000.0**
									TOTAL FOR BILL NO: 8 (CARRIED FORWARD TO SUMMARY)	**15,865,683.9**

Note:

Pavement Strength is considered to be equal to that of Service Road.

Tack coat shall be applied in 2 layers, in the case of Bus Bay.

1 layer shall be applied @ 2.0 kg/10 sqm on normal bituminous courses

1 layer shall be applied @ 2.5 kg/10 sqm (quantity can be taken as equal to that of Prime coat) on hungry Surface, etc.

* - Quantity for the Tack Coat applied @ 2.0 kg/10 sqm on normal bituminous courses

BILL NO: 8 - DRAINAGE

Item No.	SOR Ref No	Description	Unit	No.	Length (m)	Breadth (m)	Depth (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Remarks
8.01	3-29	Drain at Edge of Pavement (Construction of an underground drain 1 m x 1 m (inside dimensions) lined with RCC-20 cm thick and covered with RCC slab10 cm in thickness on urban roads)	m	2.00	-			-	**6,209.37**	-	Length of TCS-III
8.02	8.2 (B)	Cast in Situ Cement Concrete M 20 Kerb with Channel (Construction of cement concrete kerb with channel with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M10 grade foundation 150 mm thick, kerb channel 300 mm wide, 50 mm thick in PCC M20 grade, sloped towards the kerb, kerb stone with channel laid with kerb laying machine, foundation concrete laid manually, all complete as per clause 408)	m	1.00	13,300.00			13,300.00	**1,404.00**	**18,673,200.00**	
TOTAL FOR BILL NO: 9 (CARRIED FORWARD TO SUMMARY)										**18,673,200.00**	

BILL NO: 9 - PROTECTION WORKS

Item No.	SOR Ref No	Description	Unit	No.	Length (m)	Breadth (m)	Depth (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)	Remarks
9.01	8.23 (A)	**Metal Beam Crash Barrier:** Type - A, "W" : Metal Beam Crash Barrier (Providing and erecting a "W" metal beam crash barrier comprising of 3 mm thick corrugated sheet metal beam rail, 70 cm above road/ground level, fixed on ISMC series channel vertical post, 150 x 75 x 5 mm spaced 2 m centre to centre, 1.8 m high, 1.1 m below ground/road level, all steel parts and fitments to be galvanised by hot dip process, all fittings to conform to IS:1367 and IS:1364, metal beam rail to be fixed on the vertical post with a spacer of channel section 150 x 75 x 5 mm, 330 mm long complete as per clause 810)	Rm	1.00	1,330.00			1,330.00	**3,878.58**	**5,158,504.88**	Length = total length - Length of bridges/structures
								TOTAL FOR BILL NO: 9 (CARRIED FORWARD TO SUMMARY)		**5,158,504.88**	

Detailed Estimate for the construction of 3.00m High Guard wall

Sl.	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	QTY	RATE	AMOUNT
1	3.2	301	Excavation for roadway in soil using manual means including loading in truck for carrying of cut earth to embankment site with all lifts and lead upto1000 metres. 1500 x 1.7 x 1.6	Cum	1	4080	**490.00**	**1999200.00**
2	12.8	**1500,1700 & 2100**	Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications. 1500 x 1.7 x 0.2	Cum	1	510	**0.00**	**0.00**
3	12.7	1400	Stone Masonry Work in Cement Mortar 1:3 in Foundation complete as per Drawing and Technical Specifications. $\frac{1500}{2}$ x $\frac{(1.5+1.250)}{2}$ x 1.4	Cum	1	2887.5	**10534.00**	**30416925.00**
4	13.4	1400 & 2200	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications $\frac{1500}{2}$ x $\frac{(1.05+.40)}{2}$ x 2	Cum	1	2175	**9215.78**	**20044318.00**
5	12.8	**1500,1700 & 2100**	Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications. 1500 x 0.4 x 0.075	Cum	1	45	**0.00**	**0.00**
6	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 Specifications	Nos	2	0	**127.26**	**0.00**
7			Provinding cement flush pointing with clean coarse sand of F.M. 1.5 including screening curing with all leads and lifts of water including taxes and royalties all complete job as per specification and direction of E/I. 1500 x 2	Sqm	1	3000	**43.94**	**131820.00**
			Total (Rs.)					**52592263.00**

BILL OF QUANTITY (RETAINING WALL)

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
1	12.1(IB)	304	**Earthwork Excavation**									
			Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work.									
				cum.	1	650	4.3	2.1		5869.50		
									Total=	**5869.50**	**76.00**	**446101.46**
2	13.9	710.1.4.of IRC:78 & 2200	**BACKFILLING**									
			Back filling behind abutment, wing wall and return wall complete as per drawing and Technical Specification									
				cum.	1	650	1.80	5.00		5850.00		
									Total=	**5850.00**	**11925.50**	**69764175.00**
3	12.8	1500, 1700 & 2100	**PCC GRADE M15**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications									
				cum.	1	650	4.3	0.10		279.50		
									Total=	**279.50**	**0.00**	**0.00**
4	13.10	710.1.4.of IRC:78 and 2200	**FILTER MEDIA**									
			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 towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification.									
				cum.	1	650.0	0.6	4.40		1716.00		
									Total=	**1716.00**	**17654.49**	**30295101.41**
5	12.8	1500, 1700 & 2100	**RCC GRADE M35 For Foundation**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
				cum.	1	650.0			2.13	1384.50		

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
									Total=	**1384.50**	**770.40**	**1066618.80**
6	**13.5**	**1500,1700 & 2200**	**RCC GRADE M35 For Shaft**									
			Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications									
				cum.	1	650			2.42	1573.00		
									Total=	**1573.00**	**662.04**	**1041394.11**
7	**12.40**	**1600**	**HYSD Fe 500**									
			For Foundation									
			Supplying, Fitting and Placing un-coated HYSD bar Reinforcement in Foundation complete as per Drawing and Technical Specifications.									
			Steel @ 140kg/cum	MT						**193.83**	**0.00**	**0.00**
8	**13.6**	**1600 & 2200**	**For Shaft**									
			Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and Technical Specifications									
			Steel @ 140kg/cum	MT						**220.22**	**17308.92**	**3811770.42**
											TOTAL	**106425161.20**

BILL OF QUANTITY (RETAINING WALL)

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
1	12.1(IB)	304	**Earthwork Excavation**									
			Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaining earth locally for road work.									
				cum.	1	1950	8.0	2.1		32760.00		
									Total=	**32760.00**	**76.00**	**2489868.63**
2	13.9	710.1.4.of IRC:78 & 2200	**BACKFILLING**									
			Back filling behind abutment, wing wall and return wall complete as per drawing and Technical Specification									
				cum.	1	1950	3.30	8.00		51480.00		
									Total=	**51480.00**	**11925.50**	**613924740.00**
3	12.8	1500, 1700 & 2100	**PCC GRADE M15**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications									
				cum.	1	1950	8.0	0.10		1560.00		
									Total=	**1560.00**	**0.00**	**0.00**
4	13.10	710.1.4.of IRC:78 and 2200	**FILTER MEDIA**									
			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 towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification.									
				cum.	1	1950.0	0.6	7.40		8658.00		
									Total=	**8658.00**	**17654.49**	**152852557.10**
5	12.8	1500, 1700 & 2100	**RCC GRADE M35 For Foundation**									
			Plain/Reinforced Cement Concrete in Open Foundation complete as per Drawing and Technical Specifications.									
				cum.	1	1950.0			3.69	7195.50		

S.I. NO	CLAUSE	MORTH SPECIFICATION	ITEM	UNIT	NOS	LENGTH	WIDTH	HEIGHT	AREA	QUANTITY	RATE	AMOUNT
									Total=	**7195.50**	**770.40**	**5543413.20**
6	**13.5**	**1500,1700 & 2200**	**RCC GRADE M35 For Shaft**									
			Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications									
				cum.	1	1950			5.55	10822.50		
									Total=	**10822.50**	**662.04**	**7164963.61**
7	**12.40**	**1600**	**HYSD Fe 500**									
			For Foundation									
			Supplying, Fitting and Placing un-coated HYSD bar Reinforcement in Foundation complete as per Drawing and Technical Specifications.									
			Steel @ 140kg/cum	MT						**1007.37**	**0.00**	**0.00**
8	**13.6**	**1600 & 2200**	**For Shaft**									
			Supplying, fitting and placing HYSD bar reinforcement in sub-structure complete as per drawing and Technical Specifications									
			Steel @ 140kg/cum	MT						**1515.15**	**17308.92**	**26225610.53**
											TOTAL	**808201153.08**

BILL NO: 10 - TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

Item No.	SOR Ref No.	Description	Unit	No.	Length (m)	Breadth (m)	Depth (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)
10.01	8.16	Providing and fixing RCC boundary pillars including cost of reinforcement and two coats of painting with ready mix oil bound paint complete as per drawing and Technical Specifications Clause 806.	Nr.	70.00				70.00	**1,542.41**	**107,968.53**
10.02	8.14 (i), (ii), (iii)	Providing and fixing PCC/RCC hectometer, kilometer and 5th kilometer stones including cost of reinforcement complete as per Technical Specifications Clause 804.								
		a) 200-metre stone	Nr.	70.00				70.00	**1,045.10**	**73,156.95**
		b) Kilometre stone	Nr.	14.00				14.00	**4,090.17**	**57,262.42**
		c) 5th km. stone	Nr.	3.00				3.00	**6,625.05**	**19,875.15**
10.03	8.11 (i)	Providing and laying Pavement marking with hot applied thermoplastic material complete as per drawing and Technical Specifications Clause 803.								
		a) Lane/ Centre line/ Edge marking/ Transverse marking and any other marking.	Sqm	3.00	13,300.00	0.15		5,985.00	**300.75**	**1,799,976.78**
	8.11 (i)	b) Directional Arrows, Lettering etc. as per drawing No.61 of MORTH Type Designs for Intersections on National Highways.	Sqm	2.00	13,300.00	0.10		2,660.00	**300.75**	**799,989.68**
10.04	8.8	Providing and laying kerb painting with ordinary paints grade-I (IS:164) complete as per drawing and Technical Specifications Clause 803	Sqm	2.00	13,300.00	0.30		7,980.00	**216.97**	**1,731,406.24**
10.05	8.5, 8.4 (v)	Supplying and fixing sign boards complete as per Technical Specifications Clause 801 and as directed by Engineer, including the cost of posts, fitting and fixing. Sheeting will be retro reflecting type of high intensively grade and messages/borders will be screen printed								
A		Informatory signs								
		a) Advance Direction / Destination / Reassurance signs	Sqm	50.00		0.90		45.00	**11,210.38**	**504,467.18**
		b) Route marker signs (450mm x 600mm)	Nr.	50.00				50.00	**11,210.38**	**560,519.09**
B	8.4 (i)	Cautionary signs, size triangular 900mm side	Nr.	50.00				50.00	**5,804.44**	**290,221.82**
10.06	8.7 A & B	Supplying and fixing overhead signs complete as per drawing and Technical Specifications Section 800 including cost of posts, truss, erection, fitting and foundations. Sheeting will be retro reflective type of high intensity grade and message/borders will be screen-printed as per drawings.								
		a) Truss and Vertical Support (Portal type)	MT.	5.00				5.00	**109,433.60**	**547,168.02**
		b) Aluminium alloy plate for over head sign	MT.	10.00				10.00	**4,923.67**	**49,236.74**

BILL NO: 10 - TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

Item No.	SOR Ref No.	Description	Unit	No.	Length (m)	Breadth (m)	Depth (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)
10.07	8.15	Providing and fixing road delineators complete as per drawing and Technical Specifications Clause 805 as directed by Engineer.								
		a) Road Indicators	Nr.	50.00				50.00	**1,163.25**	**58,162.52**
		b) Hazard Markers	Nr.	50.00				50.00	**1,163.25**	**58,162.52**
		c) Object Markers	Nr.	50.00				50.00	**1,163.25**	**58,162.52**
10.08	8.4	Retro- reflectorised Traffic signs (Providing and fixing of retro-reflectorised cautionary, mandatory and 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 75 mm x 75 mm x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 cm x 45 cm x 60 cm, 60 cm below ground level as per approved drawing)								
	(i)	90 cm equilateral triangle	each	10.00				10.00	**5804.44**	**58,044.36**
	(v)	60 cm x 45 cm rectangular	each	10.00				10.00	**5177.16**	**51,771.62**
10.09	8.5	Direction and Place Identification signs upto 0.9 sqm size board. (Providing and erecting direction and place identification retro-reflectorised sign asper IRC:67 made of encapsulated lens type reflective sheeting vide clause 801.3, fixed over aluminium sheeting, 2 mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm, 60 cm below ground level as per approved drawing)	Sqm	10.00				10.00	**11,210.38**	**112,103.82**
10.10	8.8	Painting Two Coats on New Concrete Surfaces (Painting two coats after filling the surface with synthetic enamel paint in all shades on new plastered concrete surfaces)	Sqm	1.00	850.00	12.00		10,200.00	**216.97**	**2,213,075.64**
10.12	8.35	Road Markers/Road Stud with Lense Reflector (Providing and fixing of road stud 100x 100 mm, die cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphaltic surface by drilling hole 30 mm upto a depth of 60 mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS 873 part 4:1973)	each	2.00	500.00			333.33	**1,984.00**	**661,333.33**

BILL NO: 10 - TRAFFIC SIGNS, MARKINGS & OTHER ROAD APPURTENANCES

Item No.	SOR Ref No.	Description	Unit	No.	Length (m)	Breadth (m)	Depth (m)	Quantity	Unit Rate (Rs.)	Amount (Rs.)
10.13	8.27	**Street Lighting**								
		Providing and erecting street light mounted on a steel circular hollow pole of standard specifications for street lighting, 9 m high spaced 40 m apart, 1.8 m overhang on both sides if fixed in the median and on one side if fixed on the footpath, fitted with sodium vapour lamp and fixed firmly in concrete foundation.								
	(i)	For Fixing in Median (At every 100 m excluding structures)	each	133.00				133.00	**59,529.84**	**7,917,469.29**
	(ii)	For fixing in Footpath (At every 100 m excluding structures)	each	133.00				133.00	**59,382.69**	**7,897,898.12**
10.14	8.28	**Lighting on Bridges**								
		Providing and fixing lighting on bridges, mounted on steel hollow circular poles of standard specifications, 5 m high fixed on parapets with cement concrete, 20 m apart and fitted with sodium vapour lamp	each	4				4.00	**31,762.21**	**127,048.84**
10.15	8.29	**Cable Duct Across the Road**								
		Providing and laying of a reinforced cement concrete pipe duct, 300 mm dia, across the road (new construction), extending from drain to drain in cuts and toe of slope to toe of slope in fills, constructing head walls at both ends, providing a minimum fill of granular material over top and sides of RCC pipe as per IRC:98-1997, bedded on a 0.3 m thick layer of granular material free of rock pieces, outer to outer distance of pipe at least half dia of pipe subject to minimum 450 mm in case of double and triple row ducts, joints to be made leak proof, invert level of duct to be above higher than ground level to prevent entry of water and dirt, all as per IRC: 98 - 1997 and approved drawings.								
	(i)	Single row for one utility service	metre	-				-	**11,033.16**	**-**
10.16	8.40	**High Mast Pole Lighting at Interchanges and Flyovers**	each	-				-	**1,000,000.00**	**-**
10.17	11.9	Planting of Trees and their Maintenance for one Year (Planting of trees by the road side (Avenue trees) in 0.60 m dia holes, 1 m deep dug in the ground, mixing the soil with decayed farm yard/sludge mannure, planting the saplings, backfilling the trench, watering, fixing the tree guard and maintaining the plants for one year)	each	800.00				800.00	**2,220.00**	**1,776,000.00**
				TOTAL FOR BILL NO: 10 (CARRIED FORWARD TO SUMMARY)						**27,530,481.16**