

**DETAILED PROJECT REPORT FOR DEVELOPMENT OF NANDED CITY ROADS UNDER JNNURM**

Calculated by : M.M.Phatak

Checked by : P.P. Kundargi

Date : September 2006

**R.O.B. AT HINGOLI**

Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
1.01	Clearing & Grubbing the Project Area		764.750	24.000		m <sup>2</sup> Say , i.e. Ha	18354.00 19000.00 2.00
1.02	Barricade on both sides of Bridge during construction at a distance of 2.5 m	2	764.75 / 2.5 + 1			Nos. Say ,	614 620
1.03	Signage Boards						(Already covered in Road Works)
1.04	<u>Dismantling existing Structures</u>  Existing P.C.C. Median Kerb for a length equal to Viaduct portion which covers existing road alignment		500.000	1.200	0.500	m <sup>3</sup>	300.00
1.05	<u>Soil Investigations -</u>						
A	Boring in all strata except Rock	22	20.000			Say ,	440.00 500.00
B	Drilling in Hard Rock	22	5.000			Say ,	110.00 125.00



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2.01	<u>Excavation -</u>						
2.01.- i	<u>In Soil -</u>						
A	Abutment Pile Caps	2 x 2	9.650	5.600	2.150	m <sup>3</sup> Say ,	464.74 465.00
B	Pier Pile Caps -						
1	P10 & P11 (Railway Span)	2 x 2	7.800	7.800	2.450	m <sup>3</sup> Say ,	596.23 600.00
2	P14 & P15 (42.5m Span)	2 x 2	7.800	7.800	2.450	m <sup>3</sup> Say ,	596.23 600.00
3	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 7	6.600	5.600	2.150	m <sup>3</sup> Say ,	1112.50 1115.00
4	P3, P4, P6, P7, P9. P13, P17, P18 & P20 (free Piers)	2 x 9	6.600	6.600	2.150	m <sup>3</sup> Say ,	1685.77 1690.00
						Total = Say ,	4470.00 4500.00

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2.01.- ii	<u>In Rock -</u>  Nominal Quantity (5% of Quantity for Soil)	0.05 * 4500 =				m <sup>3</sup> Say ,	223.50 300.00
2.02	<u>Trial Pit -</u>	6	24.000	3.000	3.000	m <sup>3</sup> Say ,	1296.00 1300.00
2.03	<u>M15 Levelling course (150 thk.) below Pile Cap</u>						
2.03.1	Abutment Pile Caps	2 x 2	9.650	5.600	0.150	m <sup>3</sup>	32.42
2.03.2	Pier Pile Caps -						
1	P10 & P11 (Railway Span)	2 x 2	7.800	7.800	0.150	m <sup>3</sup>	36.50
2	P14 & P15 (42.5m Span)	2 x 2	7.800	7.800	0.150	m <sup>3</sup>	36.50
3	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 7	6.600	5.600	0.150	m <sup>3</sup>	77.62

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity	
2.04	<b><u>Drilling / Boring &amp; Concrete in R.C.C. Piles (for 14.0m Length above founding level)</u></b>	4	2 x 9	5.600	5.600	0.150	m <sup>3</sup>	84.67
							Say ,	85.00
							Total =	268.05
							Say ,	268.00
2.04.1	1000 mm Dia. Piles - (Considering 3 x Dia. Of Piles = 3.0m Additional length of Embedment below founding level)							
A	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 8 x 7	14.000			Rm	1568.00	
						Say ,	1568.00	
B	P3, P4, P6, P7, P9. P13, P17, P18 & P20 (free Piers)	2 x 6 x 9	14.000			Rm	1512.00	
						Say ,	1512.00	

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
C	Abutments - A1 and A2	2 x 8 x 2	14.000			Rm	448.00
						Say ,	448.00
						Subtotal =	3528.00
						Say ,	3600.00
2.04.2	1200 mm Dia. Piles (Considering 3 X Dia. Of Piles = 3.6m Additional length of Embedment below founding level)						
A	P10 & P11 (Railway Span)	2 x 8 x 2	14.000			Rm	448.00
						Say ,	450.00
B	P14 & P15 (42.5m Span)	2 x 8 x 2	14.000			Rm	448.00
						Say ,	450.00
						Subtotal =	900.00
						Say ,	900.00
2.06	<u>600 Thick Filter Media behind Abutments</u>	2 x 2	8.600	0.600	6.187	m <sup>3</sup>	127.70
						Say ,	130.00



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
<b>2.08</b>	<b><u>M30 Grade concrete in R.C.C. Abutment Walls, Dirt Walls and Pier shafts</u></b>						
2.08.1	Abutment Walls	2 x 2	8.600	1.500	3.250	m <sup>3</sup> Say ,	167.70 <b>170.00</b>
2.08.2	Piers - Straight Portion	2 x 20	Plan Area = 2.517 m <sup>2</sup>		4.500	m <sup>3</sup> Say ,	453.06 <b>454.00</b>
2.08.3	Flare Portion Common for all Piers at Top of variable Area of 2.0m Height	2 x 20	Avg. Plan Area of 2.517 m <sup>2</sup> At Base & 7.142 m <sup>2</sup> At Top =		2.000	m <sup>3</sup> Say ,	386.36 <b>387.00</b>
						Subtotal =	<b>1011.00</b>
						Say ,	<b>1015.00</b>
2.08.4	Dirt Walls	2 x 2	8.600	2.381	0.300	m <sup>3</sup> Say ,	24.57 <b>25.00</b>
						Total =	<b>1040.00</b>

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
<b>2.09</b>	<b><u>M30 Grade concrete in R.C.C. Abutment Caps, Pier Caps &amp; Pedestals</u></b>						
<b>2.09.1</b>	Abutment Caps	2 x 2	8.600	1.500	0.200	m <sup>3</sup> Say ,	10.32 <b>11.00</b>
<b>2.09.2</b>	Pier Caps						
<b>A</b>	For Piers except Piers of	2 x 18	C.S. Area = 6.6 m <sup>2</sup>		2.6	m <sup>3</sup> Say ,	617.76 <b>618.00</b>
<b>B</b>	Piers of Portal Frame	2 x 2	8.600	1.000	1.200	m <sup>3</sup> Say ,	41.28 <b>42.00</b>
						Subtotal =	<b>660.00</b>
<b>2.09.3</b>	Pedestals on Abutment Cap	2 x 2 x 3	0.500	0.500	0.300	m <sup>3</sup> Say ,	0.90 <b>1.00</b>
<b>2.09.4</b>	Pedestals on Pier Cap -						
1	On Pier P1 of Span A1-P1, for	2 x 3 x 19	0.500	0.500	0.300	m <sup>3</sup> Say ,	8.55 9.00
2	For Span P14-P15	2 x 2	0.500	0.500	0.300	m <sup>3</sup> Say ,	0.30 1.00



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
2.10	<sup>3</sup> For Span P1-P2, P2-P3 and Span P3-P4  <u>HYSD Reinforcement in Diff. Structural Members mentioned under -</u>  Rerring Concrete Quantities,	2 x 5 x 3	0.500	0.500	0.300	m <sup>3</sup>	2.25
						Say ,	3.00
						Subtotal =	14.00
						Total =	685.00
2.10.1	R.C.C. Piles						
A	1000 mm Dia. Piles		0.785 m2	3600.000	100		282743
B	1200 mm Dia. Piles		1.131 m2	900.000	100		101788
						Subtotal =	384531
						Say ,	385000
			<u>Concrete Quantity</u>		<u>kg/m<sup>3</sup></u>	<u>HYSD Qty. in 'kg'</u>	



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
2.10.2	R.C.C. Pile Caps			2680.000	125		335000
						Say ,	<b>335000</b>
2.10.3	R.C.C. Abutment Walls, Straight and Flared Portion of R.C.C. Piers			1015.000	100		101500
						Say ,	<b>102000</b>
2.10.4	R.C.C. Abutment Caps			11.000	80		880
						Say ,	<b>1000</b>
2.10.5	R.C.C. Pier Caps			660.000	125		82500
						Say ,	<b>83000</b>
2.10.6	R.C.C. Pedestals on Abutment Cap and Pier Cap			14.000	80		1120
						Say ,	<b>1200</b>
2.10.7	R.C.C. Dirt Wall			25.000	80		2000
						Say ,	<b>2000</b>
						Total =	<b>909200</b>
						Say ,	<b>913000</b>

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
<b>2.11</b>	<b><u>Coal Tar Epoxy Paint for Structures below Ground Level or in contact with the Earth</u></b>						
2.11.1	Abutments	2 x 2	8.600		6.187	m <sup>2</sup> Say ,	212.83 <b>220.00</b>
2.11.2	Piers	2 x 20	Perimeter = 5.712 m		0.500	m <sup>2</sup> Say ,	114.24 <b>120.00</b>
2.11.3	Abutment Pile Caps - Top	2 x 2	9.350	5.300		m <sup>2</sup> Say ,	198.22 <b>200.00</b>
2.11.4	Pier Pile Caps - Top						
1	P10 & P11 (Railway Span)	2 x 2	7.800	7.800		m <sup>2</sup> Say ,	243.36 <b>250.00</b>
2	P14 & P15 (42.5m Span)	2 x 2	7.800	7.800		m <sup>2</sup> Say ,	243.36 <b>250.00</b>
3	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 7	5.600	5.600		m <sup>2</sup> Say ,	125.44 <b>130.00</b>
4	P3, P4, P6, P7, P9, P13, P17, P18 & P20 (free Piers)	2 x 9	5.600	5.600		m <sup>2</sup> Say ,	125.44 <b>130.00</b>
2.11.5	Abutment Pile Caps - Sides	2 x 2	Perimeter = 28.9 m		0.500	m <sup>2</sup>	57.80



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
2.11.6	Pier Pile Caps - Sides					Say ,	60.00
1	P10 & P11 (Railway Span)	2 x 2	Perimeter = 30.0 m		0.500	m <sup>2</sup> Say ,	60.00 60.00
2	P14 & P15 (42.5m Span)	2 x 2	Perimeter = 30.0 m		0.500	m <sup>2</sup> Say ,	60.00 60.00
3	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 7	Perimeter = 23.2 m		0.500	m <sup>2</sup> Say ,	162.40 170.00
4	P3, P4, P6, P7, P9. P13, P17, P18 & P20 (free Piers)	2 x 7	Perimeter = 21.2 m		0.500	m <sup>2</sup> Say ,	148.40 150.00
						Total = Say ,	1800.00 1800.00

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
2.18	<b><u>M30 Grade concrete in R.C.C. Pile Cap</u></b>						
2.18 - i	Abutment Pile Caps	2 x 2	9.350	5.300	1.500	m <sup>3</sup>	297.33
2.18 - ii	Pier Pile Caps -						
1	P10 & P11 (Railway Span)	2 x 2	7.800	7.800	1.800	m <sup>3</sup>	438.05
2	P14 & P15 (42.5m Span)	2 x 2	7.800	7.800	1.800	m <sup>3</sup>	438.05
3	P1, P2, P5, P8, P12, P16 and P19 (fixed Piers)	2 x 7	5.600	5.600	1.500	m <sup>3</sup>	658.56
4	P3, P4, P6, P7, P9. P13, P17, P18 & P20 (free Piers)	2 x 9	5.600	5.600	1.500	m <sup>3</sup>	846.72
						total of above =	<b>2678.71</b>
						Say ,	<b>2680.00</b>



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
2.22	<b><u>6 mm thick M.S. Liner</u></b>  For 1200 mm Dia. Piles for Pier P10 & P11 supporting 31.25m Railway Span upto founding level	2 x 8 x 2	10.100	Perimeter = ( 3.142 * 1.216 m	0.006	MT Say ,	58.16 <b>60.00</b>
3.01	<b><u>H.T. Steel in PSC Girders</u></b>						
3.01.1	PSC I - Girders + Diaphragms	Conc. Quantity = 2802 m3			45	=	126090
3.02.2	PSC Box Girders + Diaphragms	Conc. Quantity = 462 m3			45	=	20790
						Total = Say ,	<b>146880</b> <b>147000</b>



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
3.02	<u>M40 Grade concrete in P.S.C. I - Girders &amp; Diaph.</u>  To account for Web thickening, future prestressing blocks, etc.C.S. Area of Girder is increased by 20% for Quantity Calculations.						
3.02.1	For 23.50 m Span						
A	PSC I Girders	2 x 3 x 6	23.400	0.801 m <sup>2</sup>	x 1.20	m <sup>3</sup>	809.71
B	End Diaphragms	2 x 2 x 6	8.297	m <sup>2</sup>	0.500	m <sup>3</sup>	99.56
C	Intermediate Diaphragms	2 x 1 x 6	9.500	m <sup>2</sup>	0.300	m <sup>3</sup>	34.20
						Subtotal =	943.48



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
<b>3.02.2</b>	For 24.50 m Span						
A	PSC I Girders	2 x 3 x 10	24.400	0.801 m <sup>2</sup>	x 1.20	m <sup>3</sup>	1407.20
B	End Diaphragms	2 x 2 x 10	8.297 m <sup>2</sup>		0.500	m <sup>3</sup>	165.94
C	Intermediate Diaphragms	2 x 1 x 10	9.500 m <sup>2</sup>		0.300	m <sup>3</sup>	57.00
						Subtotal =	<b>1630.14</b>
<b>3.02.3</b>	For 31.25 m Span						
A	PSC I Girders	2 x 3 x 1	31.150	0.875 m <sup>2</sup>	x 1.20	m <sup>3</sup>	196.25
B	End Diaphragms	2 x 2 x 1	9.508 m <sup>2</sup>		0.500	m <sup>3</sup>	19.02
C	Intermediate Diaphragms	2 x 2 x 1	10.974 m <sup>2</sup>		0.300	m <sup>3</sup>	13.17
						Subtotal =	<b>228.43</b>
						Total =	<b>2802.05</b>
						Say ,	<b>2802.00</b>
<b>3.03</b>	<b><u>Bearings</u> -</b>						
A	POT PTFE Bearings -						
	a) Vertical Capacity - 180 t	126				Nos.	<b>126</b>
	b) Vertical Capacity - 200 t	6				Nos.	<b>6</b>
	c) Vertical Capacity - 250 t	4				Nos.	<b>4</b>

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
<b>B</b>	<b>POT Bearings -</b>						
	a) Vertical Capacity - 180 t	66				Nos.	<b>66</b>
	b) Vertical Capacity - 200 t	6				Nos.	<b>6</b>
	c) Vertical Capacity - 250 t	4				Nos.	<b>4</b>
<b>3.04</b>	<b><u>M40 Grade concrete in R.C.C. Deck Slab over PSC I -Girders &amp; in 15.0m Span Superstructure for Span P1-P2, P2-P3 &amp; P3-P4</u></b>						
<b>3.04.1</b>	For 23.50 m Span	2 x 6	23.500	8.600	0.250	m <sup>3</sup> Say ,	1818.90 <b>1819.00</b>
<b>3.04.2</b>	For 24.50 m Span	2 x 10	24.500	8.600	0.250	m <sup>3</sup> Say ,	1053.50 <b>1054.00</b>
<b>3.04.3</b>	For 31.25 m Span	2 x 1	31.250	8.600	0.250	m <sup>3</sup> Say ,	134.38 <b>135.00</b>
						Subtotal =	<b>3008.00</b>
						Say ,	<b>3010.00</b>
<b>3.04.4</b>	Superstructure for 15.0m Typical Span P1-P2, P2-P3 & P3-P4	2 x 3	15.000	8.600	1.200	m <sup>3</sup> Say ,	928.800 <b>930.00</b>
						Total =	<b>3940.00</b>



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3.05	<u>M40 Grade concrete in PSC Box Girder for 42.50 m.Span P14-P15</u>  To account for Web thickening, future prestressing blocks, etc.C.S. Area of Girder is increased by 20% for Quantity Calculations.					Say ,	3940.00
3.05.1	PSC Box Girder	2 x 1	42.500	4.800 m <sup>2</sup>	x 1.20	m <sup>3</sup> Say ,	408.00 408.00
3.05.2	End Diaphragms	2 x 2 x 1	12.635 m <sup>2</sup>		0.600	m <sup>3</sup> Say ,	30.32 31.00
3.05.3	Intermediate Diaphragms	2 x 3 x 1	12.635 m <sup>2</sup>		0.300	m <sup>3</sup> Say ,	22.74 23.00
						Total =	462.00



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
3.06	<u>HYSD Reinforcement in Diff. Structural Members mentioned under -</u>  Rerring Concrete Quantities,						
			<u>Concrete Quantity</u>		<u>kg/m<sup>3</sup></u>	<u>HYSD Qty. in 'kg'</u>	
3.06.1	PSC I - Girders + Diaphragms			2802.000	100	Say ,	280200 280200
3.06.2	PSC Box Girder & Diaphragms			462.000	150	Say ,	69300 69300
3.06.3	R.C.C. Deck Slab Superstructure			930.000	150	Say ,	139500 139500
3.06.4	R.C.C. Deck Slab on PSC I Girders			3010.000	120	Say ,	361200 362000
						Total = Say ,	<b>851000</b> <b>851000</b>



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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
4.01	<u>RCC Anticrash barrier</u> For both sides of deck	2	504.75 + 120 + 140 = 764.75			Rm Say ,	1529.50 <b>1530.00</b>
4.02	100 mm HDPE pipe inside Crash Barrier					Rm Say ,	1529.50 <b>1530.00</b>
4.03	R.C.C. Median Kerbs	2	0.300	0.600	504.750	m <sup>3</sup> Say ,	181.71 <b>185.00</b>
4.04	HYSD Reinforcment						
B	R.C.C.Median Kerbs			185.000	50	kg/m <sup>3</sup> Say ,	9250 9500

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Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
4.06	<b><u>Drainage Spouts</u></b> - For 3.0m c/c spacing,	2	504.75 / 3.0	+1		Nos.	339
4.07	<b><u>Longitudinal Runner Pipes</u></b> - Along Viaduct Length	2	505			Rm	1010
4.08	<b><u>Downtake Pipes</u></b> - From Deck to Pier Cap Top	339	$2.0 + 0.500 = 2.75$ m			Rm Say ,	930.88 940.00
4.11	<b><u>Expansion Joint (Strip Seal)</u></b> For Movement above 50 mm	10	17.200			Rm	172.00
4.12	<b>Primer coat using bituminous emulsion ....</b>	2	504.750	7.50		m <sup>2</sup> Say ,	7571.250 7580.00
4.13	<b>Tack Coat</b>	2	504.750	7.50		m <sup>2</sup> Say ,	7571.25 7580.00

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Checked by : P.P. Kundargi  
Date : September 2006

**R.O.B. AT HINGOLI**

Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
4.14	Mastic Asphalt (12mm thick)	2	504.750	7.50		m <sup>2</sup> Say ,	7571.250 <b>7580.00</b>
4.15	D.B.M. (50mm thick)	2	764.750	7.50	0.05	m <sup>3</sup> Say ,	573.56 <b>580.00</b>
4.16	B.C. (25mm thick)	2	764.750	7.50	0.025	m <sup>3</sup> Say ,	286.78 <b>290.00</b>
4.20	<b><u>100 Dia Weep Holes -</u></b>  For 2.0m c/c spacing,	2 x 24				Nos.	<b>48</b>
4.21	M.S. Railing on Crash Barrier					Rm Say ,	1529.50 <b>1530.00</b>
4.22	20 mm thick filler material between 2 Decks		504.750			Rm Say ,	504.750 <b>505.00</b>
4.26	Elastomeric Bearings Vertical Capacity - 200 t	40	40.000	25.000	7.5	cm <sup>3</sup>	<b>300000</b>



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### R.O.B. AT HINGOLI

Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
5.01	Excavation for Bedding for R.E. Walls						
	On Hingoli side	2	120.000	0.900	0.600	m <sup>3</sup>	129.60
						Say ,	130.00
	On Banda Ghat side	2	120.000	0.600	0.300	m <sup>3</sup>	43.20
						Say ,	45.00
					Total =	175.00	
					Say ,	180.00	
5.02	R.C.C. Bedding Concrete in footing of R.E. Wall						
	On Hingoli side	2	120.000	0.600	1.800	m <sup>3</sup>	259.20
	On Banda Ghat side	2	140.000	0.600	1.800	m <sup>3</sup>	302.40
						Total =	561.60
						Say ,	565.00

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**R.O.B. AT HINGOLI**

Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
5.03	<b><u>Reinforced Earth Wall</u></b> <b>(Facia Panel Area)</b>						
	Including Reinf., C.S. Area. Considering Average Ht. of 0.50m to 5.00m above Ground Level = 2.75 + 1.5 = 4.25 m						
	On Hingoli side	2	120.000	4.250		m <sup>2</sup>	1020.00
						Say ,	1020.00
	On Banda Ghat side	2	140.000	4.250		m <sup>2</sup>	1190.00
					Say ,	1190.00	
					Total =	2210.00	
					Say ,	2210.00	
5.04	<b><u>R.C.C. Concrete in friction</u></b> <b><u>Slab</u></b>						
	On Hingoli side	2	120.000	2.500	0.300	m <sup>2</sup>	180.00
						Say ,	180.00
	On Banda Ghat side	2	140.000	2.500	0.300	m <sup>2</sup>	210.00
						Say ,	210.00
					Total =	390.00	
					Say ,	400.00	



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**R.O.B. AT HINGOLI**

Item No.	Description	No.	Length	Breadth	Depth	Unit	Quantity
5.05	<u>HYSD Reinforcement in friction Slab</u>						
	On Hingoli side			180.000	100	kg/m <sup>3</sup>	18000
						Say ,	18000
	On Banda Ghat side			210.000	100	kg/m <sup>3</sup>	21000
						Say ,	21000
					Total =	<b>39000</b>	
					Say, =	<b>40000</b>	