

# Detailed Cost Estimate

## General

The cost estimate presented in this Section is based on the detailed proposals given in Section 5 in Vol-I. It is envisaged that the project would involve site clearance, construction of new formation in cutting, slope protection works, cross-drainage structures, pavement and road furniture etc. The detailed cost estimate presented in this report has been worked out using quantities of different items of works derived from the detailed design, drawing and unit rates.

## Estimation of Quantities

In arriving at the quantities, the following items of civil works have been computed for the total length of the road :

- \* Earthwork
- \* Slope Protection Works
- \* Culverts
- \* Pavement
- \* Road appurtenances

Detailed estimate of quantities and costs are presented in “Volume – III: Cost Estimate” of the report. Methodology followed for various items are based on Technical Specifications of Ministry of Road Transport and Highways (MoRTH) for material laying, its quality, measurements, etc. and it has been illustrated in brief in the subsequent paragraphs.

### a) Earthwork :

Earthwork quantities in cutting and small quantities of filling are calculated by highway design software Mx-Road for the entire length of the project road. The formation cutting consists of earth cutting to get a formation width of double lane standard. Through cutting has also been proposed in some locations especially in curves where the existing alignment has been followed to ease the curves while going round spurs. Embankment s has also been proposed at some stretches.

The classification of soil in cutting has been made in three categories :

- # Soil : includes ordinary soil, hard, soil mixed with boulder
- # Ordinary Rock not requiring blasting
- # Hard Rock requiring blasting.

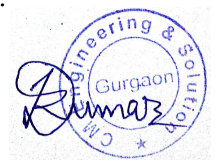
Locations along the road alignment passing along the above given three were noted down during field surveys and total quantities of earthwork in cutting has been worked out accordingly.

### b) Slope Protection Works :

Quantities for retaining walls, breast walls, parapet walls, toe walls, etc. have been worked out based on the design proposals. Gabion walls have also been proposed at specified locations and quantities have been worked out.

### c) Culverts :

Quantities of culverts and bridges have been worked out for all the stretches of the road based on the structure proposed at each location of cross-stream or river. The proposal also includes quantity for construction of chutes to protect the adjoining areas from further erosion.



#### **d) Pavement :**

The provision for pavement includes different layers of sub-base, base, and surfacing course as appropriate throughout the whole stretch of the road.

# Granular Sub-base (GSB): 250mm thick sub-base layer of crushed stone aggregate has been proposed. The sub-base course has been extended up to full width of the formation.

# Extra quantities for widening at curves, major and minor junction locations are calculated separately and final quantities are worked out.

#Wet Mix Macadam Base (WMM): 250mm thick base layer of Wet Mix Macadam is proposed for 10.0m width.

#Dense Bituminous Macadam of 60 mm thick and 40mm thick of Bituminous Concrete as surfacing course has been proposed.

#### **e) Road Appurtenances**

Road appurtenances include provision for road signs and markings, etc.

#### **Unit Rates**

The unit rates for arriving at cost of different components of works are based on SIKKIM PWD Schedule of Rates 2012 (for National Highways). For those items of works which are not available in the SOR, separate Analysis of Rates have been carried out and incorporated in this DPR.

- Bitumen (60-70 grade) (Ex-Singtam) ( Basic rate = Rs 23976/ MT + 2% CST, Rs 479.5+4% SKVAT, Rs 959.0 + 1% Env Cess (Cost +VAT) Rs. 249.4 +transportation from Barauni to Singtam (462Km xRs.11) Rs.5082.0= Rs 30745.9)
- Emulsion (Ex-Singtam) ( Basic rate = Rs 19636.0/ MT + 2% CST, Rs 392.7+4% SKVAT, Rs 785.40 + 1% Env Cess (Cost +VAT) Rs. 204.2 +transportation from Haldia to Singtam (740Km xRs.11) Rs.8140.0= Rs 29158.3)
- Cement (43 grade) (Ex-Singtam) ( Basic rate = Rs 4200.00/ MT + 2% CST, Rs 84.0+14.5% SKVAT, Rs 609.0 + 12.5 Rs. ED 525.00 + 1% Env Cess (Cost +VAT) Rs. 48.1 +transportation from Murshidbad to Singtam (467Km xRs.5.6) Rs.2615.2= Rs 8081.3)
- Cold twisted bars (HYSD Fe 500 Bars)( Basic rate = Rs 32000.00/ MT + 2% CST, Rs 640.0+4% SKVAT, Rs 1280.0 + 1% Env Cess (Cost +VAT) Rs. 332.8 +transportion from Siliguri to Singtam (90Km xRs.5.6) Rs.504.0= Rs 34756.8)
- Sand & Aggregate from Teesta River.

#### **Construction Cost Items**

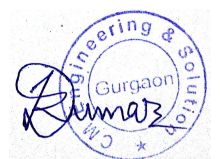
For construction of project road, the cost items include various elements, which added together, will give the total cost. The elements of the cost considered for the project are under the following major heads :

- \* Site Clearance
- \* Earthwork
- \* Pavement Works



- \* Slope Protection Works
- \* Culverts
- \* Miscellaneous Works
- \* Facilities for Engineers
- \* Provision for land Acquisition & Forest clearance.
- \* Provisional Sum

Based on the unit rate of various items as per rates adopted as mentioned earlier and quantities calculated, a detailed cost estimate has been prepared under the above mentioned major heads.



**DETAILED PROJECT REPORT FOR WIDENING TO 2-LANE OF NH 510  
(SINGTAM-TARKU-RABONGLA-LEGSHIP-GYALSHING)  
IN THE STATE OF SIKKIM**

Name of Road :NH-510 within Sikkim (KM 00+00 TO KM- 16+000)

Length of road : 16.00 Km

**ABSTRACT OF COST ESTIMATE**

Sr.No.	Items of work	Total quantity	Unit	Amount (Rs)
	<b>CONSTRUCTION COST</b>			
1	Formation Cutting	16.00	Km	
a.	Jungle Clearance etc			635,386.60
b.	Formation Works	1205807.70	Cum	256,470,123.68
2	Protection Works	18045.00	Rm	426,007,955.50
3	Cross Drainage Works	70.00	Nos	103,912,829.46
4	Pavement Works	16.00	Km	335,809,085.08
5	Km Stones & Road Signs	149.00	Nos	6,210,254.50
6	Road Safety Measures	3000.00	Rm	10,908,000.00
7	Diversion of Existing Road During Construction & Development of Link Road and Junction		LS	13,760,990.00
8	Bridge Work		LS	281,810,000.00
9	General Items		LS	14,479,590.01
<b>A</b>	<b>TOTAL OF (1to 9)</b>			<b>Rs. 1,450,004,214.83</b>
B	Escalation for 4 years @ 5%		Rs.	290,000,842.97
<b>C</b>	<b>Civil Cost</b>			<b>Rs. 1,740,005,057.80</b>
D	Contingency (2.8% of C)		Rs.	48,720,141.62
<b>E</b>	<b>TOTAL (C+D)</b>			<b>Rs. 1,788,725,199.42</b>
F	Construction Supervision Charge (3 % of E)		Rs.	53,661,755.98
G	Quality Control Charge (0.25% of E)		Rs.	4,471,813.00
H	Road Safety Audit Charge (0.25% of E)		Rs.	4,471,813.00
I	Maintenance for 4Years (0.5%+1.5%x3=5% of C)		Rs.	87,000,252.89
J	Escalation (15% of C)		Rs.	261,000,758.67
K	Agency (NHIDCL) Charge (3 % of E)		Rs.	53,661,755.98
L	Cost of compensation for Land Acquisition (Approx)		Rs.	1,250,000,000.00
M	Cost of Utility Shifting		Rs.	21,200,000.00
N	Cost of Forest Clearance (Approx)		Rs.	23,000,000.00
	<b>TOTAL PROJECT COST</b>			<b>Rs. 3,547,193,348.94</b>
	<b>Say</b>			<b>Rs. 3,547,000,000.00</b>
	<b>Project Cost per Km</b>			<b>Rs. 140,812,084.31</b>
	<b>Civil cost per km</b>			<b>Rs. 111,795,324.96</b>

**DETAILED PROJECT REPORT FOR WIDENING TO 2-LANE OF NH 510  
(SINGTAM-TARKU-RABONGLA-LEGSHIP-GYALSHING)  
IN THE STATE OF SIKKIM**

**ABSTRACT OF COST ESTIMATE FOR CIVIL WORK**

Name of Road :NH-510 within Sikkim (KM 00+00 TO KM- 16+000)

Length of road : 16.00 Km

Sr.No.	Items of work	Total quantity	Unit	Amount
<b>A.</b>	<b>FORMATION CUTTING :</b>	<b>TOTAL 'A'</b>	=	<b>257,105,510</b>
a	Clearing, setting, etc.	16.00	Km	635,386.60
b	Earthwork			
	Ordinary soil	445611.51	m <sup>3</sup>	64,970,161.18
	Soft rock	529473.81	m <sup>3</sup>	105,259,391.44
	Hard rock	230722.38	m <sup>3</sup>	58,326,618.56
c	Spreading & Compaction of surplus material	543388.55	m <sup>3</sup>	9,780,993.90
d	Preparation of Sub-Grade	30284.75	m <sup>3</sup>	8,116,313.00
e	Embankment Works	36860.45	m <sup>3</sup>	7,666,973.60
f	Compacting of OGL supporting subgrade	34554.00	m <sup>3</sup>	2,349,672.00
<b>B.</b>	<b>PROTECTION WORKS :</b>	<b>TOTAL 'B'</b>	=	<b>426,007,955.50</b>
1	Retaining Wall 3.00m high	870.00	Rm	17,292,120.00
2	Retaining Wall 4.00m high	440.00	Rm	13,049,080.00
3	Retaining Wall 5.00m high	240.00	Rm	9,912,480.00
4	Retaining Wall 6.00m high	155.00	Rm	8,492,760.00
5	Breast Wall 2.00m high	2235.00	Rm	21,033,585.00
6	Breast Wall 3.00m high	1380.00	Rm	22,616,820.00
7	Gabion Wall 2.00 m high	920.00	Rm	6,455,088.00
8	Gabion Wall 3.00 m high	755.00	Rm	10,609,713.00
9	Toe Wall 2.00 m high	850.00	Rm	7,069,373.50
10	Toe Wall 3.00 m high	490.00	Rm	7,126,756.00
11	Reinforced Earth Retaining Wall (H=7m)	930.00	sqm	33,472,560.00
12	Reinforced Earth Retaining Wall (H=8m)	720.00	sqm	31,893,840.00
13	Reinforced Earth Retaining Wall (H=9m)	600.00	sqm	28,519,200.00
14	Reinforced Earth Retaining Wall (H=10m)	960.00	sqm	51,751,680.00
15	Cut Slope Wall	6500.00	Rm	52,546,000.00
20	Seeding and Mulching (Soil Cut Slope)	30000.00	sqm	4,697,400.00
21	Vegetation Mat (Steep Slope)	1400.00	sqm	1,005,900.00
22	Crib Work (F300)	900.00	sqm	3,134,700.00
23	Crib Work (F500)	1600.00	sqm	9,491,200.00
27	Groundwater Drainage Work	4500.00	metre	53,302,500.00
28	Anchor Work	1600.00	Rm	31,593,600.00
29	Rock-bolt Work	800.00	Rm	941,600.00
<b>C.</b>	<b>DRAINAGE WORKS :</b>	<b>TOTAL 'C'</b>	=	<b>103,912,829.46</b>
a	Concrete lined side drain	18772.00	Rm	24,184,155.32
b	<b>HP CULVERT</b>			
	<i>Type- I</i>	14.00	No	7,248,304.00
	<i>Type- II</i>	13.00	No	8,243,404.00
c	<b>BOX CULVERT</b>			
	<i>Type- I (1.5m X 1.5m)</i>	28.00	No	29,960,826.84
	<i>Type- II (2m X 2m)</i>	11.00	No	18,924,386.14
	<i>Type- III (3m X 3m)</i>	3.00	No	7,939,459.50
	<i>Type- IV (6m X 4m)</i>	1.00	No	



Sr.No.	Items of work	Total quantity	Unit	Amount
d	<b>CHUTE</b>			
	Type- I (1.85m Width)	260.00	No	1,541,571.20
	Type- II (2.1m Width)	80.00	No	604,880.80
	Type- III (2.6m Width)	100.00	No	852,107.00
	<b>Total of drainage works</b>	<b>70.00</b>	<b>No</b>	
<b>D.</b>	<b>PAVEMENT WORKS</b>	<b>TOTAL 'D'</b>	<b>=</b>	<b>335,809,085.08</b>
a	Granular Sub-base	52096.30	m <sup>3</sup>	86,531,954.30
b	Wet Mix Macadam	43385.79	m <sup>3</sup>	73,842,614.58
c	Prime Coat	173543.20	m <sup>3</sup>	3,991,493.60
d	Tack Coat	347086.34	m <sup>3</sup>	4,512,122.42
e	Dense Grade Bituminous Macadam	10412.59	m <sup>3</sup>	79,604,250.55
f	Bituminous Concrete	6941.73	m <sup>3</sup>	59,081,064.03
g	Carriage of materials			28,245,585.60
<b>E.</b>	<b>KM STONE &amp; ROAD SIGN</b>	<b>TOTAL 'E'</b>	<b>=</b>	<b>6,210,254.50</b>
a	Traffic Sign	149.00	Nos	816,794.00
b	Pavement marking	4,000.00	sqm	4,240,000.00
c	Direction and Place Identification signs upto 0.9 sqm size board.	7.50	sqm	102,217.50
d	Boundary stone, km stone, 5th km stone, & hectometre stones	231.00	Nos	130,659.00
e	Traffic blinker LED Delineator, stud, reflective payment marker, tree reflector	14.00	Nos	39,634.00
f	Road furniture	1050	Nos	880,950.00
<b>F.</b>	<b>ROAD SAFETY MEASURES</b>	<b>TOTAL 'F'</b>	<b>=</b>	<b>10,908,000.00</b>
	Steel Crash Barrier	3000.00	Rm	10,908,000.00
	<b>Total of Road Safety</b>			
<b>G.</b>	<b>DIVERSION OF EXISTING ROAD DURING CONSTRUCTION &amp; DEVELOPMENT OF LINK ROAD</b>			<b>13,760,990.00</b>
a	Development Minor junction		L.S.	8,256,594.00
b	Diversion of existing road during construction		L.S.	5,504,396.00
<b>H.</b>	<b>GENERAL ITEMS</b>			<b>14,479,590.01</b>
a	Dismantling of Structures		L.S.	1,550,572.01
b	Dismantling of Flexible Pavements		L.S.	3,832,920.00
c	Land Slide Clearance		L.S.	3,858,592.00
d	Turfing with Sods		L.S.	1,225,000.00
e	Bus Bay and Road Amenity		L.S.	2,574,218.00
f	Roadside Amenities		L.S.	1,118,740.00
g	View Point		L.S.	319,548.00
<b>I.</b>	<b>BRIDGE WORK</b>	<b>TOTAL 'I'</b>	<b>L.S.</b>	<b>281,810,000.00</b>
a	Ch 70 Span Arrganement 1X20+1X65+2X20		L.S.	161,800,000.00
b	Ch 1590 Span Arrganement 1X25+1X48+1X25		L.S.	44,080,000.00
c	Ch 2860 Span Arrganement 1X40		L.S.	17,790,000.00
d	Ch 2975 Span Arrganement 1X48+1X20		L.S.	33,720,000.00
e	Ch 6090 Span Arrganement 1X48		L.S.	24,420,000.00
		<b>Total =</b>	<b>Rs.</b>	<b>1,450,004,214.6</b>

Say = Rs. 1,450,000,000.0  
(Rupees one hundred forty five crore ) only