

## CHAPTER 7: PROJECT COSTING AND ESTIMATION

### 7.1 GENERAL

Project cost is worked out based on estimated quantities from the detailed engineering design including road works, drainage works, pavement, culverts, road furniture, road safety appurtenances etc.

### 7.2 CONSTRUCTION ITEMS

The following factors have been considered to arrive at the unit rates for various construction items;

The unit rate has been worked out based on PWP & ISTD Schedule of Rates, Bangalore Circle, for the year 2012-2013. Based on PWP & ISTD, lead costs have been added to the basic rates. Adopted rate for estimate given in the rate analysis table.

**Table 7.1 Adopted Unit Rates for Some of The Major Items (Excluding Area Weight Factor)**

Sl. No.	Items	Unit	Rate
1	Clearing and grubbing	Hectare	32313.00
2	Construction of sub grade and earthen shoulder	Cum	162.00
3	Construction of sub base	Cum	818.00
4	Laying of Wet Mix Macadam	Cum	981.00
5	Construction of dry lean cement concrete Sub- base	Cum	2667.00
6	Construction of un-reinforced- Pavement Quality Concrete	Cum	5589.00
7	Construction of unreinforced plain cement concrete white topping	Cum	4102.00
8	Dense Bituminous Macadam	Cum	8159.00
9	Bituminous Concrete (BC)	Cum	9451.01
10	Direction Identification Signs	Sqm	5991.00
11	900mm Equilateral triangle Warning / Cautionary signs	Each	3165.00

Sl. No.	Items	Unit	Rate
12	600mm circular Mandatory/ Regulatory signs	Each	2716.00
13	600x800 mm size Information / Single Chevron signs	Each	4821.00
14	300x900 mm Object hazard Marker signs	Each	3235.00
15	Providing and laying in position Plain Cement Concrete of nominal mix M15	Cum	4083.00
16	Providing and laying in position Reinforced Cement Concrete of nominal mix M20	Cum	5222.00
17	Providing, supplying and fabricating of steel reinforcement of all sizes, conforming to IS:1785;432	MT	63128.00
18	Milling the existing bituminous surface for a thickness range of 25 to 150mm	Sqm	82.00
19	Cement Concrete Kerb with Channel in M-20 grade PCC	m	460.00
20	Cement Concrete Kerb with in M-20 grade PCC	m	241.00
21	Precast Paving tiles white / color having Rustic appearance (shot Blasted) for footpaths / walk ways	Sqm	1131.80
22	Tubular Steel Railing on Medium Weight Steel Channel (ISMC Series)	m	1412.00
23	Providing and fixing bollard is manufactured of cement concrete of M-30 grade	No	1516.00
24	Precast Tree Surround as per approved drawing manufactured with M-30 grade of concrete	4 No / Tree	3250.00
25	Providing and laying reinforced cement concrete pipe NP2 for chute drain	m	396.00
26	Supplying HDPE pipes confirming to IS 4984:1995	m	806.00
27	MS Grating of size 250 mm by 500 mm at gully trap along kerb channel	No	500.00

Sl. No.	Items	Unit	Rate
28	Curved RCC Chair Bench without Back Rest	No	3500.00
29	Providing and fixing steel litter bin	No	3000.00

### 7.3 PROJECT COSTING

#### Quantification

The quantification of various items of work is based upon the proposals recommended in the previous chapters. The quantities have been worked out separately for different items of work. The construction cost has been sub - divided into Site clearance, Earth works, Sub base and base course, Bituminous course, Structural Elements like Foundation, Sub Structure, Superstructure, Drainage, Traffic signs, Marking and Other Road Appurtenances. The cost estimate for grade separator and service road is provided in this chapter.

The approach adopted for assessment of quantities of major items of construction items is described below:

#### Site Clearance

The quantity has been worked out for clearing and grubbing, dismantling of existing structures, RCC hume pipe, dismantling of existing pavement and dismantling of side drains. Clearing and grubbing has been worked out based on the Proposed Typical cross sections.

#### Earthwork, Sub base & base courses and Bituminous courses

The quantification of pavement is based on the typical cross sections showing the thickness and width of various pavement layers.

The quantity calculation for GSB, WMM, Prime coat, Tack coat and bituminous layers has been worked out based on detailed LB&D dimension as per drawings.

#### Traffic Signs, Markings and other Appurtenances

##### Road Signs:

Traffic signs are important features of traffic control devices and transmit visually vital information to drivers and ensure increased safety and efficiency in free flow of traffic. All these signs shall be of informative nature. All signs shall be retro-reflectorised type.

Road Markings would be done with thermoplastic paints with reflective bands. It will consist of lane line and edge line. The width of center line in tangents and curves will be 100mm while that of edge line will be 150mm. The centre line will be broken line 1.5m long with 3m

gap but the edge line will be continuous in tangents and curves more than 1000m radius while it will be an uninterrupted line in lesser radii curves.

### Utility Relocation Cost

The implementation of proposed Project requires relocation of certain utilities like telephone poles, electric poles, water supply lines and other utilities along the Project Road. Hence provision has been made for this in the total project cost.

### 7.4 TOTAL PROJECT COST

The total project cost includes construction cost, 3% for Utility relocation cost and 2% for engineering design and supervision cost. The summary for the project are given in Table 7.2 to Table 7.5 for Total Project Cost and GroupWise Cost Summary.

The detailed rate analysis and quantity estimation is given in Volume-3: Cost Estimate.

**Table 7.2 Summary of Cost - 100 Feet Road Indira Nagar**

Sl. no.	Items	Amount, Rs.	Amount, Rs. Crores
1	Improvements to Carriageway	36,656,700	3.67
2	Improvements to Sidewalk and Kerb and Cycle Track	20,419,965	2.04
3	Construction of Roadside Drain, Chamber	39,969,456	4.00
4	Street Lighting	1,532,538	0.15
5	Construction of Bus Bays	1,876,037	0.19
6	Traffic Signs, Markings and Other Road Appurtenances	2,664,092	0.27
	<b>Total Construction Cost, Rs.</b>	<b>103,118,789</b>	<b>10.31</b>
	Utility Shifting and Miscellaneous @ 3% of Construction Cost	3,093,564	0.31
	Cost of Waste Plastic for Bitumen	448,285	0.04
	Design and Supervision (PMC) @ 2% of Construction Cost	2,062,376	0.21
	<b>Total Project Cost, Rs.</b>	<b>108,723,013</b>	<b>10.87</b>

**Table 7.3 Summary of Cost - Kensington Road**

Sl. no.	Items	Amount, Rs.	Amount, Rs. Crores
1	Improvements to Carriageway	31,645,550	3.16
2	Improvements to Sidewalk and Kerb	25,026,816	2.50
3	Construction of Roadside Drain, Chamber	18,899,153	1.89
4	Street Lighting	825,771	0.08
5	Traffic Signs, Markings and Other Road Appurtenances	906,220	0.09
6	Miscellaneous Items (Culvert, Restoration of Manholes ect.,)	-	0.00
	<b>Total Construction Cost, Rs.</b>	<b>77,303,510</b>	<b>7.73</b>
	Utility Shifting and Miscellaneous @ 3% of Construction Cost	2,319,105	0.23
	Design and Supervision (PMC) @ 2% of Construction Cost	1,546,070	0.15
	<b>Total Project Cost, Rs.</b>	<b>81,168,685</b>	<b>8.12</b>

Table 7.4 Summary of Cost - Annaswamy Road

Sl. no.	Items	Amount, Rs.	Amount, Rs. Crores
1	Improvements to Carriageway	33,700,019	3.37
2	Improvements to Sidewalk and Kerb	15,930,218	1.59
3	Construction of Roadside Drain, Chamber	18,082,070	1.81
4	Street Lighting	617,394	0.06
5	Traffic Signs, Markings and Other Road Appurtenances	1,927,766	0.19
6	Miscellaneous Items (Culvert, Restoration of Manholes ect.,)	1,695,447	0.17
	<b>Total Construction Cost, Rs.</b>	<b>71,952,915</b>	<b>7.20</b>
	Utility Shifting and Miscellaneous @ 3% of Construction Cost	2,158,587	0.22

Sl. no.	Items	Amount, Rs.	Amount, Rs. Crores
	Cost of Waste Plastic for Bitumen	11,726	0.00
	Design and Supervision (PMC) @ 2% of Construction Cost	1,439,058	0.14
	<b>Total Project Cost, Rs.</b>	<b>75,562,286</b>	<b>7.56</b>

**Table 7.5 Summary of Cost - Group G (Nrupathunga Road)**

Sl. no.	Items	Amount, Rs.	Amount, Rs. Crores
1	Improvements to Carriageway	29,276,742	2.93
2	Improvements to Sidewalk and Kerb	17,091,290	1.71
3	Construction of Roadside Drain, Chamber	17,825,373	1.78
4	Street Lighting	665,559	0.07
5	Construction of Bus Bays	3,075,975	0.31
6	Traffic Signs, Markings and Other Road Appurtenances	1,125,856	0.11
	<b>Total Construction Cost, Rs.</b>	<b>69,060,796</b>	<b>6.91</b>
	Utility Shifting and Miscellaneous @ 3% of Construction Cost	2,071,824	0.21
	Cost of Waste Plastic for Bitumen	276,849	0.03
	Design and Supervision (PMC) @ 2% of Construction Cost	1,381,216	0.14
	<b>Total Project Cost, Rs.</b>	<b>72,790,685</b>	<b>7.28</b>