

**LIFE CYCLE COST ANALYSIS****A ) Life Cycle Costing of Flexible Pavement****I) Initial Cost**

Pavement Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,181,880	1000	40	7	4221/Cu m
DBM	3,452,540	1000	140	7	3523Cu m
WMM	820,750	1000	250	7	469/Cu m
GSBI	593,600	1000	200	7	424/Cu m
GSBII	506,800	1000	200	7	362/Cu m
Prime Coat	112,000	1000	1 Coat	7	16/Sq m
Tack Coat	126,000	1000	2 Coats	7	9/Sq m
<b>Initial Cost</b>	<b>6,793,570</b>				

**Investment Cost**

Construction Year	Cost (Rs.)
1st	3,396,785
2nd	3,396,785
<b>Total</b>	<b>6,793,570</b>

Discounted Cost (Rs.)		
#@12%	#@11%	#@10%
3,396,785	3,396,785	3,396,785
3,032,844	3,060,167	3,087,986
<b>6,429,629</b>	<b>6,456,952</b>	<b>6,484,771</b>

**II) Overlay Cost**

Overlay shall be provided at every 10 th year

Overlay Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,181,880	1000	40	7	4221/Cu m
BM	975,100	1000	50	7	2786/Cu m
Profile Correction Course (BM)	975,100	1000	50	7	2786/Cu m
<b>Initial Cost</b>	<b>3,132,080</b>				

Overlay	Initial Cost (Rs)	Inflated Cost@5.5%	Discounted Cost(Rs)		
			#@12%	#@11%	#@10%
10th Year	3,132,080	5,954,733.94	1,528,432	1,702,106	1,897,362
<b>Total</b>	<b>3,132,080</b>	<b>5,954,734</b>	<b>1,528,432</b>	<b>1,702,106</b>	<b>1,897,362</b>

**III) Maintenance Cost**

Periodic Maintenance in every 5 years by roviding BC of 40 mm

Pavement Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,181,880	1000	40	7	4221/Cu m

Year	Cost	Inflated Cost@5.5%	Discounted Cost(Rs)		
			#@12%	#@11%	#@10%
5th	1,181,880	1,719,256.21	777,704	828,094	882,250
10th	1,181,880	2,246,999.10	576,749	642,284	715,963
15th	1,181,880	2,936,737.96	427,719	498,167	581,018
<b>Total</b>	<b>2,363,760</b>	<b>6,902,993</b>	<b>1,782,172</b>	<b>1,968,545</b>	<b>2,179,231</b>



Cost	35560						
Year	Cost	Inflated Cost @5.5%	#@12%	Discounted Cost			#@10%
				#@11%			
5th	35,560	51,728.39	23,399	24,915			26,545
10th	35,560	67,606.94	17,353	19,325			21,542
15th	35,560	115,482.42	16,819	19,590			22,848
<b>Total</b>	<b>106,680</b>	<b>234,818</b>	<b>57,572</b>	<b>63,830</b>			<b>70,934</b>

**Concrete Spalling**

0.5% of Joint length for a width of .50m in every 10 years

10th year spalling concrete =9.465 Sqm

Year	Cost	Inflated Cost @5.5%	#@12%	#@11%	#@10%
10th	33,600	33,600	8,624	9,604	10,706
<b>Total</b>	<b>33,600</b>	<b>33,600</b>	<b>8,624</b>	<b>9,604</b>	<b>10,706</b>

**Surface Texture**

Year	Cost	Inflated Cost	#@12%	Discounted Cost			#@10%
				#@11%			
12th	640,000	640,000	130,957	148,477			168,532
<b>Total</b>	<b>640,000</b>	<b>640,000</b>	<b>130,957</b>	<b>148,477</b>			<b>168,532</b>
<b>Life Cycle Cost for Unreinforced Jointed Concrete Pavement</b>							
Stages	Ori. Cost	Inflated Cost	#@12%	#@11%			#@10%
Initial Cost	8,524,950		8,068,256	8,102,543			8,137,452
Maintenance cost							
Joint sealing	106,680	234,818	57,572	63,830			70,934
Conc. Spalling	33,600	33,600	8,624	9,604			10,706
Texturing	640,000	640,000	130,957	148,477			168,532
<b>Total</b>	<b>9,305,230</b>	<b>908,418</b>	<b>8,265,409</b>	<b>8,324,453</b>			<b>8,387,624</b>

**COMPARISON**

**Pavement Type**

**A) Flexible**

**Life Cycle Cost**

Stages	Original Cost	Discounted Cost		
		12%	11%	10%
Initial Cost	6,793,570	6,429,629	6,456,952	6,484,771
Maintenance Cost	2,363,760	1,782,172	1,968,545	2,179,231
Overlay	3,132,080	1,528,432	1,702,106	1,897,362
<b>Total</b>	<b>12,289,410</b>	<b>9,740,233</b>	<b>10,127,603</b>	<b>10,561,365</b>

**B) Concrete**

Stages	Ori.Cost	Discounted Cost		
		#@12%	#@11%	#@10%
Initial Cost	8,524,950	8,068,256	8,102,543	8,137,452
Maintenance cost				
Joint sealing	106,680	57,572	63,830	70,934
Conc. Spalling	33,600	8,624	9,604	10,706
Texturing	640,000	130,957	148,477	168,532
<b>Total</b>	<b>9,305,230</b>	<b>8,265,409</b>	<b>8,324,453</b>	<b>8,387,624</b>

## MAINTAINANCE COST OF FLEXIBLE & RIGID PAVEMENT

### Maintenance Cost of Rigid Pavement

Rate of Joint sealing	150 Rs
Contraction Joint	100 Rs
Longitudinal joint	9.45 SQm/1000m
Concrete Spalling	3550 Rs./Sqm
Rate of Spalling	80 Rs

Road No.	Length	Lane	Joint Sealing						Repair of Concrete spalling		Re-texturing		Total Cost
			Contraction Joint			Longitudinal joint			Quantity	Amount	Quantity	Amount	
			Quantity	Amount	Amount for 20 years	Quantity	Amount	Amount for 20	Quantity	Amount	Quantity	Amount	
1	750	7.5 x2	1250	187500	562500	750	75000	225000	9.45	33548	11250	900000	1,721,048
2	540	12.6	756	113400	340200	540	54000	162000	9.45	33548	6804	544320	1,080,068
3	760	7.5 x2	1267	190000	570000	760	76000	228000	9.45	33548	11400	912000	1,743,548
7	3000	7.5 x2	5000	750000	2250000	3000	300000	900000	28.35	100643	45000	3600000	6,850,643
8	3050	7.5 x2	5083	762500	2287500	3050	305000	915000	28.8225	102320	45750	3660000	6,964,820

### Maintenance Cost of Flexible Pavement

Routine Maintainace at every year at the rate of Rs.1 Lakh/lane/Km  
Overlay Cost at every 10thyear at the rate of Rs.17.15 Lakh/lane/Km  
Periodic Maintainance Cost at every 5thyear at the rate of Rs.6.60 Lakh/lane/Km

Road No.	Length	Lane	Routine Maintainance		Overlay		Periodic Maintainance		Total
			Quantity	Amount	Quantity	Amount	Quantity	Amount	
9	2800	10.5 x2	58.8	99960000	58.8	100733220	58.8	7761600	208,454,820

**A ) Life Cycle Costing of Flexible Pavement**

**I) Initial Cost**

Pavement Crust	Cost/km	Length (m)	Thickness(mn)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
DBM	4,351,200	1000	150	7	4144/Cu m
WMM	1,181,250	1000	225	7	750/Cu m
GSBI	1,008,000	1000	200	7	720/Cu m
GSBI	883,400	1000	200	7	631/Cu m
Prime Coat	112,000	1000	1 Coat	7	16/Sq m
Tack Coat	140,000	1000	2 Coats	7	10/Sq m
<b>Initial Cost</b>	<b>9,009,210</b>				

**Investment Cost**

Construct	Cost (Rs.)
Year	
1st	#####
2nd	#####
<b>Total</b>	<b>#####</b>

Discounted Cost (Rs.)		
#@12%	#@11%	#@10%
4,504,605	4,504,605	4,504,605
4,021,969	4,058,203	4,095,095
<b>8,526,574</b>	<b>8,562,808</b>	<b>8,599,700</b>

**II) Overlay Cost**

Overlay shall be provided at every 10 th year

Overlay Crust	Cost/km	Length (m)	Thickness(mn)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
BM	1,046,850	1000	50	7	2991/Cu m
Profile Correction C	1,046,850	1000	50	7	2991/Cu m
<b>Initial Cost</b>	<b>3,427,060</b>				

Overlay	Cost (Rs)	Inflated Cost@5.5%	Discounted Cost(Rs)		
			#@12%	#@11%	#@10%
10th Year	#####	6,515,552.13	1,672,380	1,862,411	2,076,056
<b>Total</b>	<b>#####</b>	<b>6,515,552</b>	<b>1,672,380</b>	<b>1,862,411</b>	<b>2,076,056</b>

**III) Maintenance Cost**

Periodic Maintenance in every 5 years by roviding BC of 40 mm

Pavement Crust	Cost/km	Length (m)	Thickness(mn)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
	666,680				

Year	Cost	Inflated Cost@5.5%	Discounted Cost(Rs)		
			#@12%	#@11%	#@10%
5th	#####	1,939,611.01	877,382	934,230	995,327

10th	#####								2,534,994.01	650,670	724,605	807,727
15th	#####								3,313,135.79	482,539	562,016	655,486
<b>Total</b>	<b>#####</b>								<b>7,787,741</b>	<b>2,010,591</b>	<b>2,220,851</b>	<b>2,458,541</b>

**Total Life cycle Cost of Flexible Pavement**

Life Cycle	Original Cost	Inflated Cost @5.5%	Discounted Cost		
			#@12%	#@11%	#@10%
Initial Cos	9,009,210		8,526,574	8,562,808	8,599,700
Maintena	2,666,720	7,787,741	2,010,591	2,220,851	2,458,541
Overlay	3,427,060	6,515,552	1,672,380	1,862,411	2,076,056
<b>Total</b>	<b>15,102,990</b>		<b>12,209,545</b>	<b>12,646,069</b>	<b>13,134,297</b>

**B) Life Cycle Costing for Unreinforced Jointed Concrete Pavement**

**I) Initial Cost**

Pavement Crust	Cost/km	Length (m)	Thickness(mn)	Width(m)	Rate (Rs)
PQC	8,257,200	1000	300	7	3932/Cu m
DLC	1,641,150	1000	150	7	1563/Cu m
GSSI	1,008,000	1000	200	7	720/Cu m
GSSII	858,200	1000	200	7	631/Cu m
<b>Initial Cost</b>	<b>#####</b>				

Year of Construction	Ori. cost
1st	5,882,275
2nd	5,882,275
<b>Total</b>	<b>#####</b>

Discounted Cost		
#@12%	#@11%	#@10%
5,882,275	5,882,275	5,882,275
5,252,031	5,299,347	5,347,523
<b>11,134,306</b>	<b>11,181,622</b>	<b>11,229,798</b>

**II) Maintenance Cost**

**A) Joint Sealing**

50 % of the joint sealants are to be replaced in every 5 year

Joint Length	
Contraction Joint length	1700 m
Longitudinal Joint length	2000 m
Length to be replaced every 5 years	
Contraction Joint	850 m
Longitudinal Joint	1000 m

**Joint Seals (Preformed Seals)**

	Unit	Quantity	Rate	Cost
Contraction Joint	m	850	150	127500
Longitudinal Joint	m	1000	100	100000
			<b>Total</b>	<b>227500</b>
Repairs for Concrete Spalling	Sq m	9.47	3550	33619
Re-texturing	Sq m	8000	80	640000

Year	Cost	Inflated Cost@5.5%	#@12%	Discounted Cost		#@10%
				#@11%		
5th	227,500	330,939.51	149,700	159,400		169,824
10th	227,500	432,524.70	111,018	123,633		137,816
15th	227,500	738,814.67	107,604	125,327		146,171
<b>Total</b>	<b>682,500</b>	<b>1,502,279</b>	<b>368,323</b>	<b>408,360</b>		<b>453,811</b>

**Concrete Spalling**

0.5% of Joint length for a width of .50m in every 10 years

10th year spalling concrete =9.465 Sqm

Year	Cost	Inflated Cost@5.5%	#@12%	#@11%	#@10%
10th	33,600	33,600	8,624	9,604	10,706
<b>Total</b>	<b>33,600</b>	<b>33,600</b>	<b>8,624</b>	<b>9,604</b>	<b>10,706</b>

**Surface Texture**

Year	Cost	Inflated Cost	#@12%	Discounted Cost		#@10%
				#@11%		
12th	640,000	640,000	130,957	148,477		168,532
<b>Total</b>	<b>640,000</b>	<b>640,000</b>	<b>130,957</b>	<b>148,477</b>		<b>168,532</b>
<b>Life Cycle Cost for Unreinforced Jointed Concrete Pavement</b>						
Stages	Ori.Cost	Inflated Cost	#@12%	Discounted Cost		#@10%
				#@11%		
Initial Cos	#####		11,134,306	11,181,622		11,229,798
Maintenance cost						
Joint seal	682,500	1,502,279	368,323	408,360		453,811
Conc. Sp	33,600	33,600	8,624	9,604		10,706
Texturing	640,000	640,000	130,957	148,477		168,532
<b>Total</b>	<b>#####</b>	<b>2,175,879</b>	<b>11,642,210</b>	<b>11,748,063</b>		<b>11,862,846</b>

**COMPARISON**

**Pavement Type**

**A) Flexible**

**Life Cycle Cost**

Stages	Original Cost		Discounted Cost		
			12%	11%	10%
Initial Cos		9,009,210	8,526,574	8,562,808	8,599,700
Maintenai		2,666,720	2,010,591	2,220,851	2,458,541
Overlay		3,427,060	1,672,380	1,862,411	2,076,056
<b>Total</b>		<b>15,102,990</b>	<b>12,209,545</b>	<b>12,646,069</b>	<b>13,134,297</b>

<b>B) Concrete</b>					
Stages	Ori.Cost		Discounted Cost		
			#@12%	#@11%	#@10%
Initial Co		11,764,550	11,134,306	11,181,622	11,229,798
Maintenance cost					
Joint seal		682,500	368,323	408,360	453,811
Conc. Sp		33,600	8,624	9,604	10,706
Texturing		640,000	130,957	148,477	168,532
<b>Total</b>		<b>13,120,650</b>	<b>11,642,210</b>	<b>11,748,063</b>	<b>11,862,846</b>

## LIFE CYCLE COST ANALYSIS

### A ) Life Cycle Costing of Flexible Pavement

#### I) Initial Cost

Pavement Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
DBM	4,351,200	1000	150	7	4144/Cu m
WMM	1,181,250	1000	225	7	750/Cu m
GSBI	1,008,000	1000	200	7	720/Cu m
GSBII	883,400	1000	200	7	631/Cu m
Prime Coat	112,000	1000	1 Coat	7	16/Sq m
Tack Coat	140,000	1000	2 Coats	7	10/Sq m
<b>Initial Cost</b>	<b>9,009,210</b>				

#### Investment Cost

Construction Year	Cost (Rs.)
1st	4,504,605
2nd	4,504,605
<b>Total</b>	<b>9,009,210</b>

Discounted Cost (Rs.)		
#@12%	#@11%	#@10%
4,504,605	4,504,605	
4,021,969	4,058,203	
<b>8,526,574</b>	<b>8,562,808</b>	

#### II) Overlay Cost

Overlay shall be provided at every 10 th year

Overlay Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
BM	1,046,850	1000	50	7	2991/Cu m
Profile Correction Course (BM)	1,046,850	1000	50	7	2991/Cu m
<b>Initial Cost</b>	<b>3,427,060</b>				

Overlay	Initial Cost (Rs)	Inflated Cost@5.5%	Discounted Cost(Rs)		
			#@12%	#@11%	#@10%
10th Year	3,427,060	6,515,552.13	1,672,380	1,862,411	
<b>Total</b>	<b>3,427,060</b>	<b>6,515,552</b>	<b>1,672,380</b>	<b>1,862,411</b>	

#### III) Maintenance Cost

Periodic Maintenance in every 5 years by roviding BC of 40 mm

Pavement Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m

### Total Life cycle Cost of Flexible Pavement

Life Cycle Cost	Original Cost	Inflated Cost @5.5%	Discounted Cost		
			#@12%	#@11%	#@10%
Initial Cost	9,009,210		8,526,574	8,562,808	
Maintenance Cost	2,666,720	7,787,741	2,010,591	2,220,851	
Overlay	3,427,060	6,515,552	1,672,380	1,862,411	
<b>Total</b>	<b>15,102,990</b>		<b>12,209,545</b>	<b>12,646,069</b>	

### B) Life Cycle Costing for Unreinforced Jointed Concrete Pavement

#### I) Initial Cost

Pavement Crust	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
PQC	8,257,200	1000	300	7	3932/Cu m
DLC	1,641,150	1000	150	7	1563/Cu m
GSBI	1,008,000	1000	200	7	720/Cu m
GSBII	858,200	1000	200	7	631/Cu m
<b>Initial Cost</b>	<b>11,764,550</b>				

Year of Construction	Ori. cost
1st	5,882,275
2nd	5,882,275
<b>Total</b>	<b>11,764,550</b>

Discounted Cost		
#@12%	#@11%	#@10%
5,882,275	5,882,275	
5,252,031	5,299,347	
<b>11,134,306</b>	<b>11,181,622</b>	

#### II) Maintenance Cost

##### A) Joint Sealing

50 % of the joint sealants are to be replaced in every 5 year

Joint Length

Contraction Joint length 1700 m

Longitudinal Joint length 2000 m

Length to be replaced every 5 years

Contraction Joint 850 m

Longitudinal Joint 1000 m

Joint Seals (Preformed Seals)

	Unit	Quantity	Rate	Cost
Contraction Joint	m	850	150	127500
Longitudinal Joint	m	1000	100	100000
			<b>Total</b>	<b>227500</b>

Repairs for Concrete Spalling Sq m 9.47 3550 33619

Re-texturing Sq m 8000 80 640000

Cost	227500								
Year	Cost	Inflated Cost@5.5%	#@12%	Discounted Cost		#@11%			
5th	227,500	330,939.51	149,700			159,400			
10th	227,500	432,524.70	111,018			123,633			
15th	227,500	738,814.67	107,604			125,327			
<b>Total</b>	<b>682,500</b>	<b>1,502,279</b>	<b>368,323</b>			<b>408,360</b>			

### Concrete Spalling

0.5% of Joint length for a width of .50m in every 10 years

10th year spalling concrete =9.465 Sqm

Year	Cost	Inflated Cost@5.5%	#@12%	#@11%	#@10%
10th	33,600	33,600	8,624	9,604	10,706
<b>Total</b>	<b>33,600</b>	<b>33,600</b>	<b>8,624</b>	<b>9,604</b>	<b>10,706</b>

### Surface Texture

Year	Cost	Inflated Cost	#@12%	Discounted Cost		#@11%	#@10%
12th	640,000	640,000	130,957			148,477	
<b>Total</b>	<b>640,000</b>	<b>640,000</b>	<b>130,957</b>			<b>148,477</b>	
Life Cycle Cost for Unreinforced Jointed Concrete Pavement							
Stages	Ori.Cost	Inflated Cost	#@12%	Discounted Cost		#@11%	#@10%
Initial Cost	11,764,550		11,134,306			11,181,622	

**COMPARISON**

**Pavement Type**

**A) Flexible**

**Life Cycle Cost**

Stages	Original Cost	Discounted Cost		
		12%	11%	10%
Initial Cost	9,009,210	8,526,574	8,562,808	8,599,700
Maintenance Cost	2,666,720	2,010,591	2,220,851	2,458,541
Overlay	3,427,060	1,672,380	1,862,411	2,076,056
<b>Total</b>	<b>15,102,990</b>	<b>12,209,545</b>	<b>12,646,069</b>	<b>13,134,297</b>

**B) Concrete**

Stages	Ori.Cost	Discounted Cost		
		#@12%	#@11%	#@10%
Initial Cost	11,764,550	11,134,306	11,181,622	11,229,798
Maintenance cost				
Joint sealing	682,500	368,323	408,360	453,811
Conc. Spalling	33,600	8,624	9,604	10,706
Texturing	640,000	130,957	148,477	168,532
<b>Total</b>	<b>13,120,650</b>	<b>11,642,210</b>	<b>11,748,063</b>	<b>11,862,846</b>

### LIFE CYCLE COST ANALYSIS

#### Life Cycle Costing of Flexible Pavement

Initial Cost

	Cost/km	Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
BC	1,333,360	1000	40	7	4762/Cu m
DBM	4,351,200	1000	150	7	4144/Cu m
WMM	1,181,250	1000	225	7	750/Cu m
GSBI	1,008,000	1000	200	7	720/Cu m
GSBII	883,400	1000	200	7	631/Cu m
Prime Coat	112,000	1000	1 Coat	7	16/Sq m
Tack Coat	210,000	1000	3 Coats	7	10/Sq m
<b>Initial Cost</b>	<b>9,079,210</b>				

Year	Cost (Rs.)
<b>Construction</b>	
1st	4,539,605
2nd	4,539,605
<b>Total</b>	<b>9,079,210</b>

Discounted Cost (Rs.)		
#@12%	#@11%	#@10%
4,539,605	4,539,605	
4,126,914	4,282,646	
<b>8,666,519</b>	<b>8,822,251</b>	

#### OVERLAY AT 10th & 20th YEAR

AC =	957,000
DBM=	2,610,000
PCC=	826,500
<b>Total</b>	<b>4,393,500</b>

Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
1000	40	7.25	3300/Cu m
1000	120	7.25	2850/Cu m
1000	40 Av	7.25	2850/Cu m

PCC - Profile Corrective Course

	Initial Cost (Rs)
10th Year	4,393,500
20th Year	4,393,500
	8,787,000

Inflated Cost@5.5%	Discounted Cost(Rs)		
	#@7%	#@6%	#@5%
4,393,500	1,399,904	2,183,435	
4,393,500	539,724	1,219,219	
8,787,000	1,939,628	3,402,654	

#### Periodic Maintenance in every 5 years

Cost	957,000
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Length(m)	Thick (mm)	Width(m)	Rate (Rs)
1000	AC - 40 mm	7.25	3300/cu m

Inflated Cost@7.5%	Discounted Cost(Rs)		
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**Flexible Pavement**

**Discounted Cost**

Life Cycle Cost	Original Cost	Inflated Cost @7.5%	#@7%	#@6%	#@5%
Initial Cost	9,079,210		8,666,519	8,822,251	
Maintenance Cost	3,828,000	3,828,000	798,753	1,338,601	
Overlay	8,787,000	8,787,000	1,939,628	3,402,654	
<b>Total</b>	<b>21,694,210</b>		<b>11,404,900</b>	<b>13,563,506</b>	

**Life Cycle Cost for Unreinforced Jointed Concrete Pavement**

Initial Cost

		Length (m)	Thickness(mm)	Width(m)	Rate (Rs)
PQC	7,395,000	1000	300	7.25	3932/Cu m
DLC	2,517,563	1000	150	7.25	1563/Cu m
GSB	736,125	1000	150	7.55	720/Cu m
GSB	736,125	1000	150	7.55	720/Cu m
<b>Total</b>	<b>11,384,813</b>				

Discounted Cost		
#@7%	#@6%	#@5%
5,692,406	5,692,406	
5,174,915	5,370,195	
10,867,321	11,062,601	

Year of Construct	Ori. cost
1st	5,692,406
2nd	5,692,406
<b>Total</b>	<b>11,384,813</b>

**MAINTENANCE COST**

**Joint Sealing**

50 % of the joint sealants are to be replaced in every 5 year

Joint Length	
Contraction Joint length	1786 m
Longitudinal Joint length	2000 m

Length to be replaced every 5 years

Contraction Joint	893 m
Longitudinal Joint	1000 m

Year	Cost	Inflated Cost@7.5%	Discounted Cost #@7%	#@6%
5th	234,000	234,000	120,079	155,623
10th	234,000	234,000	74,560	116,291
22nd	234,000	234,000	28,746	64,936
27th	234,000	234,000	14,751	43,186
<b>Total</b>	<b>936,000</b>	<b>936,000</b>	<b>238,136</b>	<b>380,037</b>

### Concrete Spalling

0.5% of Joint length for a width of .50m in every 10 years

10th year spalling concrete =9.465 Sqm

Cost = 33600

Year	Cost	Inflated Cost@7.5%	#@7%	#@6%	#@5%
10th	33,600	33,600	10,706	16,698	18,710
20th	33,600	33,600	4,128	9,324	11,486
<b>Total</b>	<b>67,200</b>	<b>67,200</b>	<b>14,834</b>	<b>26,022</b>	<b>30,196</b>

### Surface Texture

2 Times in 30 years ie at 12th and 24th year

Cost = 640,000

Year	Cost	Inflated Cost	#@7%	Discounted Cost #@6%	#@5%
12th	640,000	640,000	168,532	283,073	
24th	640,000	640,000	53,699	140,678	
<b>Total</b>	<b>1,280,000</b>	<b>1,280,000</b>	<b>222,231</b>	<b>423,751</b>	

**COMPARISON**

**Pavement Type**

**A) Flexible**

**Life Cycle Cost**

Stages	Original Cost		Discounted Cost		
			7%	6%	5%
Initial Cost	9,079,210		8,666,519	8,822,251	8,863,038
Maintenance Cost	3,828,000		798,753	1,338,601	1,554,831
Overlay	8,787,000		1,939,628	3,402,654	3,948,383
<b>Total</b>	<b>21,694,210</b>		<b>11,404,900</b>	<b>13,563,506</b>	<b>14,366,252</b>

**B) Concrete**

Stages	Ori.Cost	Discounted Cost		
		#@7%	#@6%	#@5%
<b>Initial Cost</b>	11,384,813	10,867,321	11,062,601	11,113,746
Maintenance cost				
Joint sealing	936,000	238,136	380,037	433,442
Conc. Spalling	67,200	14,834	26,022	30,196
Texturing	1,280,000	222,231	423,751	503,238
<b>Total</b>	<b>13,668,013</b>	<b>11,342,522</b>	<b>11,892,411</b>	<b>12,080,621</b>

Initial Cost

AC	2904000
DBM	7128000
BM	2310000
WMM	5183200
GSB	6494400
Prime Coat	396000
Tack Coat	594000

Initial Cost 25009600

Year	Cost		#@8%	Discounted Cost #@7%	#@6%	#@5%
1st	12504800		12504800	12504800	12504800	12504800
2nd	12504800	13442660	11578518.52	11686728.97	11796981.13	11909333.33
<b>Total</b>	<b>25009600</b>	<b>13442660</b>	<b>24083318.52</b>	<b>24191528.97</b>	<b>24301781.13</b>	<b>24414133.33</b>

Maintenance in every 5 years

Year	Cost	Inflated Cost	#@8%	Discounted Cost #@7%	#@6%	#@5%
5th	2904000	4817878.703	2811185.949	3000332.719	3204164.504	3423976.445
10th	2904000	6916687.956	2746711.951	3071092.171	3437382.011	3851470.664
15th	2904000	9929800.069	2683716.653	3143520.404	3687574.429	4332338.879
<b>Total</b>	<b>8712000</b>	<b>21664366.73</b>	<b>8241614.553</b>	<b>9214945.293</b>	<b>10329120.94</b>	<b>11607785.99</b>

Life Cycle Cost	Original Cost	#@8%	Discounted Cost #@7%	#@6%	#@5%
Initial Cost	25009600	24083318.52	24191528.97	24301781.13	24414133.33
Maintenance Cost	8712000	8241614.553	9214945.293	10329120.94	11607785.99
<b>Total</b>	<b>33721600</b>	<b>32324933.07</b>	<b>33406474.27</b>	<b>34630902.08</b>	<b>36021919.32</b>

**Life Cycle Cost for Unreinforced Jointed Concrete Pavement**

Initial Cost

PQC	24420000
DLC	7590000
WMM	1943700
GSB	3247200

**Total 37200900**

	Ori. cost	#@8%	Discounted Cost #@7%	#@6%	#@5%
1st	18600450	0 18600450	18600450	18600450	18600450
2nd	18600450	19995483.75 17222639	17383598.13	17547594.34	17714714.29
<b>Total</b>	<b>37200900</b>	<b>19995483.75 35823089</b>	<b>35984048.13</b>	<b>36148044.34</b>	<b>36315164.29</b>

**Joint Sealing**

50 % of the joint sealants are to be replaced in every 5 year

Joint Length  
 Contraction Joint length 1786m  
 Longitudinal Joint length 2000m

Length to be replaced every 5 years  
 Contraction Joint 893 m  
 Longitudinal Joint 1000m

Cost		Discounted Cost				
Year	Cost	Inflated Cost	#@8%	#@7%	#@6%	#@5%
5th	234000	388217.4988	226521.2	241762.3	258186.8	275898.9
10th	234000	557336.4262	325200.5	347081.1	370660.6	396088.6
15th	234000	800128.518	216249.9	253300.2	297139.3	349093.4
<b>Total</b>	<b>702000</b>	<b>1745682.443</b>	<b>767971.5</b>	<b>842143.7</b>	<b>925986.6</b>	<b>1021081</b>

**Concrete Spalling**

0.5% of Joint length for a width of .50m in every 10 years

10th year spalling concrete =9.465 Sqm

Cost = 33600

Year	Cost	Inflated Cost	#@8%	Discounted Cost		
				#@7%	#@6%	#@5%
10th	33600	80027.79453	46695.45	49837.29	53223.05	56874.26
<b>Total</b>	<b>33600</b>	<b>80027.79453</b>	<b>46695.45</b>	<b>49837.29</b>	<b>53223.05</b>	<b>56874.26</b>

**Surface Texture**

2 Times in year ie at 12th year

Cost = 640000

Year	Cost	Inflated Cost	#@8%	Discounted Cost		
				#@7%	#@6%	#@5%
12th	640000	1761564.191	1027856	1097014	1171541	1251911
<b>Total</b>	<b>640000</b>	<b>1761564.191</b>	<b>1027856</b>	<b>1097014</b>	<b>1171541</b>	<b>1251911</b>

Year	Ori.Cost	Inflated Cost	Discounted Cost			
			#@8%	#@7%	#@6%	#@5%
Initial Cost	37200900		35823089	35984048	36148044	36315164
Maintenance cost						
Joint sealing	702000	1745682.443	767971.5	842143.7	925986.6	1021081
Conc. Spalling	33600	80027.79453	46695.45	49837.29	53223.05	56874.26
Texturing	640000	1761564.191	1027856	1097014	1171541	1251911
<b>Total</b>	<b>38576500</b>	<b>3587274.429</b>	<b>37665612</b>	<b>37973043</b>	<b>38298795</b>	<b>38645030</b>

**Pavement Type**

	Original Cost	Inflated cost	#@8%	Discounted Cost #@7%	#@6%	#@5%
Flexible						
Initial Cost	25009600		24083319	24191529	24301781	24414133
Maintenance Cost	8712000	21664366.73	8241615	9214945	10329121	11607786
<b>Total</b>	<b>33721600</b>	<b>46673966.73</b>	<b>32324933</b>	<b>33406474</b>	<b>34630902</b>	<b>36021919</b>
Concrete						
Initial Cost	37200900		35823089	35984048	36148044	36315164
Maintenance Cost	1375600	3587274.429	1842523	1988995	2150750	2329866
<b>Total</b>	<b>38576500</b>	<b>40788174.43</b>	<b>37665612</b>	<b>37973043</b>	<b>38298795</b>	<b>38645030</b>