

Project :Development of Pune Ring Road

Executive Summary

1. Introduction

Pune is historic city and PimpriChinchwadTownship was initially considered a satellite town but slowly gained importance as twin city owing to rapid industrial growth and IT hubs. The population of Pune Metropolitan Region (Dehu, Dehuroad, Kirkee, Pimpri, Chinchwad and Pune) as per 2011 censuses is 50.57 lacs. Numbers of prominent industries like Telco, Kirloskar, Bajaj Auto, Alfa Laval, Kinetic Industries, VolksWagan, General Motors, Mercedes, and Fiat have established their plants at PimpriChinchwadTownship. IT industries, a second largest in the country, has been developed at Hinjewadi similarly, industrial growth in PMR Region has taken place at Chakan (Nashik Highway), Kondhapuri, Karegaon, Ranjangaon(Ahemadnagar Highway), Wadaki (Saswad Highway)

An internationally recognized educational campus has been developed by symbiosis at Nande, Chande in PMR Region. The proposed Ring Road, as notified in the year 1997, passes through the PMR Region connecting above mentioned automobile, IT and educational hubs. Initially the Ring Road was 90 m. wide but due to vicinity of metropolitan city, Ring Road has potential to attract the city traffic, a metro corridor has been newly introduced and therefore the reversed width of Ring Road is increased from 90 m. to 110 m. Length of the proposed ring road is 126 km. The proposed Ring Road has 3 Lane Plus 3 Lane as service road for local traffic needs, 4 Lane Plus 4 Lane as access control intercity road for through traffic and 33.5 m. wide Metro corridor for mass transport. Suitable space is kept for beautification and land scrapping so that this Ring Road becomes a tourist destination by itself. There are about 9 townships coming up in the vicinity of the Ring Road and a similar number of town planning schemes (TPS) are proposed along the Ring Road. For sustainable growth of this townships and TPS, it is proposed to provide water, electricity, telephone lines through the medians in the Ring Road. The initial provision of water, electricity, telephone lines will not only give much needed impetus to the growth but also avoid unnecessary digging of already built up road.

It is proposed to provide truck terminus at all major highway junctions like old Pune Mumbai highway, Nashik highway, Ahemednagar highway, Saswad highway, Solapur highway and Satara highway. In addition to truck terminus, it is proposed to developed markets places for agricultural products such as fruits, vegetables, flowers, fish and meat etc. This will provide a necessary boost to agri based industry and also help in decongestion of the city by way of moving the markets to the periphery of the city.

It is proposed to provide bus terminus on all major highway junctions as mentioned above. The commuters can embark and take up city transport for travelling in the city. It is

proposed to provide multi-level car parking and all major highway junctions so that daily commuters can park their vehicles and travel to and fro to their work places.

It is proposed to develop air space above the Ring Road for the commercial use. Such developed air space can be used for offices, IT industries, Shopping malls, Theaters etc. for entertainment and night life.

In short the proposed Ring Road will not merely remain a transport project but it will be a infrastructure driven development project for PMR Region.

1.1. Project Road

The Project Road starts at Ch:0+000 Km on Mumbai-Pune Expressway at Urse and passes towards Vadgaon crossing Old Mumbai-Pune Highway Road at Ch:2+165 Km, Central Railway Line at Ch:3+190 Km, Indrayani River at Ch:4+462Km, Pune- Nashik Highway 50 Road at Ch:26+877 Km, Bhima river at Ch:40+547Km, Pune-Nagar Road SH-27 at Ch:48+427Km, Mutha river at Ch:57+800Km, Mumbai–Daund Rail line at Ch:59+000Km, Pune Solapur road at Ch:60+159Km, Railway line crossing at Ch:63+811Km, Hadpasar-Saswad-jejuri road at Ch:66+261Km, Saswad Bopdev Pune Road at Ch:74+864 Km, Pune – Satara road at Ch:79+091 Km, National Highway 04 at Ch:81+416Km, Mutha river at Ch:87+231Km, Paud road at Ch:95+562Km, Sus road at Ch:106+280Km, Mula River at Ch:106+924 Km, Hinjewadi Wakad Road crossing at Ch:112+765 Km, Pawana River Crossing at Ch:126+003Km and ends at Mumbai-Pune Expressway at Ch:128+595 Km

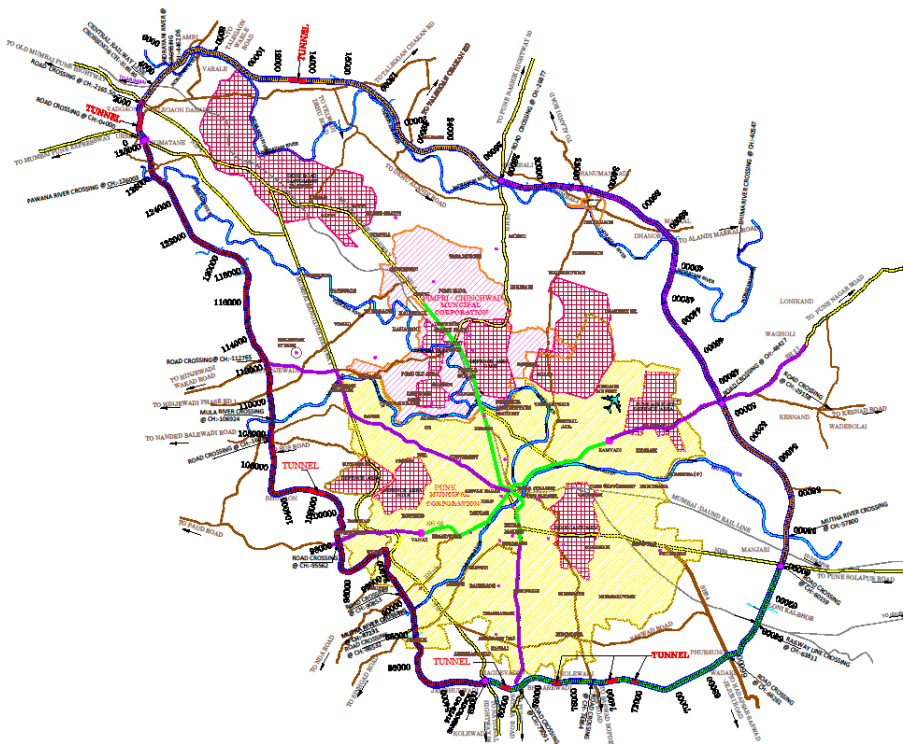


Figure 1.1 Location map of the Project road

SALIENT FEATURES OF PUNE INNER RING ROAD

Sl. No.	Description	Details		
1	Name of the Road	Ring Road around Pune City		
3	Start Chainage of the Project	Ch: 0+000 Km (at Pune – Mumbai Expressway)		
4	End Chainage of the Project	Ch: 128+080 Km (at Pune – Mumbai Expressway)		
5	Total Length of the Project Road after re-designing of curves and re-alignments	128.08 km		
6	Project Road Features	Proposed / Designed		
	Four Lane with Paved Shoulders	120.58 Km		
	Four Lane with Paved Shoulders + Footpath cum Drain	7.50 Km		
	Total (Km)	128.08 Km		
7	CD Structures			
	Sl. No.	Type of Proposed Structure	Proposed Nos.	Type of Crossing
	1	Major Bridges	18	River
	2	Minor Bridges	5	Stream
	3	Road Over Fly Over's	6	NH Road
	4	Road Over Bridges	3	Railway Lane
	5	RCC Box Culverts	200	Stream / Nallas
	6	Tunnels	7	Hillock
	7	Elevated Corridor / Structures (VUP, VOP, LVUP)	52	City Road
		Total	291 Nos.	
8	Proposed Right Of Way (ROW)	110 m (30 m For Metro, 40 m on LHS & 40 m on RHS For Roadway)		
9	Alignment - Terrain	Plain - 54%; Rolling - 39% and Mountainous - 7%		
10	Land use pattern of the project road			
	Sl. No.	Identified Classes	Remark	Approximate Percentage
	1	Agricultural fields	Included all the agricultural fields with current fallow land	8%
	2	Vegetation	Natural/planted vegetation mostly along the settlements and hill slopes	15%
	3	Water bodies	Rivers, Lakes, Ponds, Reservoirs, etc	7%
	4	Hills	Main hill complex, hill slopes, mostly without vegetation	22%

Sl. No.	Description		Details				
	5	Barren land	Included the barren hill slopes , bare rock surfaces, (mostly the exposed rock surface)			16%	
	6	Urban Built-up area	Included the densely built-up as well as sparsely built-up area			32%	
10	Proposed Lane Configuration in Open areas		Formation : 3 Lane with Shoulder on LHS and RHS of Metro Corridor Road Pavement : 2 Lane with Paved Shoulder on LHS and RHS of Proposed Metro Corridor				
11	Proposed Lane Configuration (Built-up areas)		2 Lane with Paved Shoulder on LHS and RHS of Proposed Metro Corridor				
12	Proposed Design Speed		80-100 Kmph				
13	Junctions						
	Major Junctions		12 Nos.				
	Minor Junctions		11 Nos.				
14	Traffic and Pavement Design Parametres						
	Traffic (CVPD) (AnjanVihari village)		PCU-36096 to 68832 CVPD- 3610 to 10325 Design CVPD – 3610 to 10325				
	Million Standard Axles (MSA)		10 years for Flexible Pavement = 45 to 124 msa 15 years for Flexible Pavement = 76 to 212 msa				
	4 days soaked CBR Modulus of Subgrade Reaction 'k'		Effective Design CBR – 10% 55 MPa / m				
	Construction Period		3 Years				
	Growth Rate		4.1667%				
	VDF		6.0				
	Lane Distribution Factor		0.75				
15	Proposed Flexible Pavement Layer Thicknesses (mm)		SSG	GSB	WMM	DBM	BC
			500	200	250	100 to 120 mm	50 mm
16	City/ Villages along the project stretch		58 Nos.				
	Length of Villages /Urban		7.50 Kms				
17.	Major Connectivity		Sl. No.	Chainage, Km			
			From				To
			1	West	-	Mumbai –Pune Expressway to NH 4	

Sl. No.	Description	Details			
			Northwest	(Mumbai-Pune)	
		2	Northwest to North	NH 4 (Mumbai-Pune) to Nasik-Pune road (NH 50)	
		3	North to Northeast	Nasik-Pune road (NH 50) to Pune – Nagar Road (SH 60)	
		4	Northeast to East	Pune –Nagar Road (SH 60) to Pune-Solapur Road (NH 65)	
		5	East to South	Pune-Solapur Road (NH 65) to NH 4 (Mumbai-Pune)	
		6	South to West	NH 4 (Mumbai-Pune) to Mumbai-Pune Expressway	
18	Forest Land along project road	List Of Forest Areas			
		Sl. No.	Chainage, Km		Length, Km
			From	To	Forest Range
		1	0+700	1+300	0.60 Forest
		2	12+600	13+600	1.00 Bhandara Parisar Forest Range
		3	94+400	96+000	1.60 Forest
		4	99+000	103+500	4.50 Forest
		5	113+600	114+100	0.50 Forest
		Total Length in Km			8.20
19	Proposed Bus Shelter = 13 No's.	2 x 25 Nos.			
20	Proposed bus bay cum Bus Shelter = 2 No's.	2 x 25 Nos.			
21	Proposed Truck laybye	6 Nos.			
22	Proposed Wayside Amenities	6 Nos.			
23	Proposed Toll Plaza	6 Nos.			
24	Length of proposed Crash barrier	150 Km			
25	Proposed Gantry	19 Nos.			
26	Project Safety Features Proposed	<ul style="list-style-type: none"> • Pedestrian Footpaths • Zebra Crossings Road Paintings with Petrol Reflection points Road Signage's Crash Barriers Guard Rails Guard Stones Median lights			

Sl. No.	Description	Details
		High mast lights Road Delineators
27	Proposed Project Facilities	<ul style="list-style-type: none"> • Bus Bay • Truck Lay bay • Bus Shelters • Way side Amenities • Medical Aid Post • Telephone Booths • Traffic Light Blinkers • Median Plantation • Roadside Drains (Kutcha and RCC Box Drains) • Tunnel Drainage • Tunnel Lighting • Tunnel Ventillations • Toll Paza • Gantry
28	Construction Cost	Phase 1 - Rs. 4081.23 Crores Phase 2 – Rs. 2417.08 Crores Phase 3 – Rs. 1544.93 Crores Total -- Rs. 8043.23 Crores
29	Total Project Cost	Phase 1 - Rs. 5217.68 Crores Phase 2 – Rs. 3058.96 Crores Phase 3 - Rs. 1957.40 Crores Total -- Rs. 10234.04Crores

Table 1. 1Pune Inner Ring Road Sections

Section	From	To	Chainage (Km)		Approx. Length in Km	Segments
			From	To		
1-2	Pune- Satara Road	Hadpasar- Saswad Road	79.36	66.39	12.97	Segment – 1, L=46.87 Km
2-3	Hadpasar - Saswad Road	Pune –Solapur Road	66.39	60.05	6.34	
3-4	Pune –Solapur Road	Pune- Nagar Road	60.05	48.98	11.07	
4-5	Pune- Nagar Road	Pune- Alanadi Road	48.98	32.49	16.49	
5-6	Pune- Alanadi Road	Pune – Nasik Road	32.49	27.53	4.96	Segment – 2 L=48.28 Km
6-7	Pune – Nasik Road	Talwade Road	27.53	21.41	6.12	
7-8	Talwade Road	Pune - Mumbai Road	21.41	2.3	19.11	
8-9	Pune - Mumbai Road	Mumbai- Pune	2.3	0,00 128.08	2.3	
9-10	Mumbai- Pune	Hinjawadi Road	0.000 128.08	112.34	15.74	
10-11	Hinjawadi Road	Pune-Sus Road	112.34	107.66	4.68	Segment – 3 L=21.88 Km
11-12	Pune-Sus Road	Pune- Paud Road	107.66	97.99	9.67	
12-13	Pune- Paud Road	Pune- Shivane Road	97.99	90.46	7.53	
13-14	Pune- Shivane Road	Pune- Sinhagad Road	90.46	88.3	2.16	Segment – 4 L=11.1 Km
14-15	Pune- Sinhagad Road	Westerly Bypass	88.3	81.28	7.02	
15-16	Westerly Bypass	Pune- Satara Road	81.28	79.36	1.92	
	Total (Km)				128.08	128.08 km

Table 1. 2 Final developmental traffic on ring road

Section	Production Trips in PCU	Trips Assign To Section (50%)	% assumed for attraction	Additional attraction Trips	Total Trips (PCU)	Trips on Main Carriage way (60%)	Trips on Service road (40%)	20% MCW	20 % SR	Final Trips on MCW	Final Trips on SR
MJ-05-MN-04	397267	198634	5	9931.68	208566	125140	83427	25028	16686	149523	99683
MN-04-MJ-04	48906	24453	10	2445.3	26899	16140	10760	3228	2152	46738	31160
MJ-04-MN-03	88407	44203.5	5	2210.18	46414	27849	18566	5570	3714	37777	25185
MN-03-MJ-03	109474	54737.1	2	1094.74	55832	33500	22333	6700	4467	47819	31880
MJ-03-MN-02	142956	71478	2	1429.56	72908	43745	29164	8749	5833	52863	35243
MN-02-MN-01	39501	19750.5	2	395.01	20146	12088	8059	2418	1612	22518	15013
MN-01-MJ-02	27462.6	13731.3	2	274.626	14006	8404	5603	1681	1121	10822	7215
MJ-02-MJ-01	0	0	0	0	0	0	0	0	0	2215	1477
MJ-01-MN-08	8464.5	4232.25	5	211.613	4444	2667	1778	534	356	4682	3122
MN-08-MJ-11	31977	15988.5	5	799.425	16788	10073	6716	2015	1344	22553	15036

Total Traffic

By adding external and developmental traffic, the year wise traffic along pune ring road is presented below.

Table 1. 3Year wise total traffic(External plus Developmental) for each segment of Pune ring road

Sr. No.	Section	2017		2020		2025		2030		2035		2040	
		MCW	SR	MCW	SR	MCW	SR	MCW	SR	MCW	SR	MCW	SR
1	MJ-05-MJ06	54551	13637	63658	16299	81469	22291	103766	30753	126833	39406	152323	49628
2	MJ-06-MJ-07	38588	9646	46567	12553	65312	20889	92610	34557	120452	48361	153849	65836
3	MJ-07-MN-05	38588	9646	45325	11725	59098	16746	77073	24199	95593	31789	116561	40977
4	MN-05-MJ-08	38588	9646	45458	11814	59765	17191	78743	25312	98264	33569	120568	43648
5	MJ-08-MN-06	37233	9308	44634	11916	61533	19168	85644	30871	110280	42705	139534	57586
6	MN-06-MJ-09	36849	9212	44776	12194	63905	20974	92278	35563	121169	50282	156135	69018
7	MJ-09-MN-07	38314	9578	45189	11767	59611	17251	78860	25585	98648	34054	121335	44423
8	MN-07-MJ-10	36875	9218	45063	12372	65227	21839	95532	37714	126358	53719	163901	74169
9	MJ-10-MJ-11	36096	9023	43220	11517	59396	18409	82383	29496	105878	40711	133723	54792
10	MJ-11-MN-08	38051	9512	44211	11240	55861	14905	69965	19841	84606	24912	100454	30754

Sr. No.	Section	2017		2020		2025		2030		2035		2040	
		MCW	SR	MCW	SR	MCW	SR	MCW	SR	MCW	SR	MCW	SR
11	MN-08- MJ-01	40441	10110	46602	11690	57442	14557	69539	17874	82206	21334	95193	24972
12	MJ-01- MJ-02	39806	9951	45822	11474	56299	14167	67847	17193	79956	20359	92260	23621
13	MJ-02- MN-01	59699	14924	68871	17308	85185	21747	103629	27034	122914	32532	142867	38422
14	MN-01- MN-02	64146	16036	74219	18743	92618	24094	114070	30865	136425	37862	160041	45643
15	MN-02- MJ-03	67770	16942	78994	20189	100759	27393	127783	37453	155763	47753	186528	59850
16	MJ-03- MN-03	68832	17208	80114	20428	101750	27431	128317	37062	155854	46936	185927	58440
17	MN-03- MJ-04	66367	16591	77079	19584	97274	25892	121641	34345	146942	43031	174273	53012
18	MJ-04- MN-04	66367	16591	77258	19704	98170	26489	123881	35838	150527	45421	179649	56597
19	MN-04- MJ-05	67795	16948	80956	21485	110461	33846	151991	53574	194477	73542	244582	98529

Table 1. 4Design Traffic Considered For Pune Ring Road

Sl. No.	Section Considered					Parameters Considered For Design		
	Section Between Junction	Section ID	From Ch.	To Ch.	Length In Km	2017 PCU On Main Carriageway	Excepted Comercial Vehicle in %	Number of Commerical Vehicles
1	MJ-05-MJ06	MP Expway to Old Mumbai Pune road	0+000	2+300	2+300	54551	15	8183
2	MJ-06-MJ-07	Old Mumbai Pune road –Pune Nasik Road	2+300	27+600	25+300	38588	10	3859
3	MJ-07-MN-05					38588	10	3859
4	MN-05-MJ-08					38588	10	3859
5	MJ-08-MN-06	Pune Nasik Road - Markal Road	27+600	37+900	10+300	37233	10	3723
6	MN-06-MJ-09	Markal Road-Pune Nagar Road	37+900	49+100	11+200	36849	10	3685
7	MJ-09-MN-07	Pune Nagar Road –Kesnand Road	49+100	52+000	2+900	38314	10	3831
8	MN-07-MJ-10	Kesnand Road -Pune Solapur Road	54+200	60+200	6+000	36875	10	3688
9	MJ-10- MJ-11	Pune Solapur Road –Jejuri Road	60+200	66+500	6+300	36096	10	3610
10	MJ-11-MN-08	Jejuri Road –HadapsarSaswad Road	66+500	75+000	8+500	38051	10	3805
11	MN-08-MJ-01	HadapsarSaswad Road –Old Pune	75+000	79+500	4+500	40441	10	4044
12	MJ-01-MJ-02	Old Pune Satara Road – New Pune	79+500	81+400	1+900	39806	10	3981
13	MJ-02-MN-01	New Pune Satara Road -Singhgad Road	81+400	88+700	7+300	59699	15	8955
14	MN-01-MN-02	Singhgad Road –NDA Road	88+700	90+800	2+100	64146	15	9622
15	MN-02-MJ-03	NDA Road –Bhugaon Road	90+800	98+400	7+600	67770	15	10166
16	MJ-03-MN-03	Bhugaon Road –Sus Road	98+400	108+100	9+700	68832	15	10325
17	MN-03-MJ-04	Sus Road –Hinjawadi Road	108+100	112+800	4+700	66367	15	9955
18	MJ-04-MN-04					66367	15	9955
19	MN-04-MJ-05	Hinjawadi Road – Express Way	112+800	127+700	14+900	67795	15	10169

1.8 Proposed Structures

Table 1. 15 Abstract of Proposed Structures along The Project Road

Sl. No.	Type of Proposed Structure	Proposed Nos.	Name of Crossing
1	Major Bridges	18	River
2	<i>Minor Bridges</i>	5	Stream
3	Road Over Fly Over's	6	NH Road
4	Road Over Bridges	3	Railway Lane
5	RCC Box Culverts	200	Stream / Nallas
6	Tunnels	7	Hillock
7	Elevated Corridor / Structures (VUP, VOP, LVUP)	52	City Road
	Total	291 Nos.	

1.9 Project Costing

SUMMARY OF COST ESTIMATE					
Rs. In Crores					
Sl. No.	ITEM OF WOTKS	Phase I Cost	Phase 2 Cost	Phase 3 Cost	Phase 1,2,3 Cost
Bill No: 1	Site Clearance - Service Road	14.49	9.66	0.00	24.14
Bill No: 2	Earthwork	851.41	510.84	0.00	1,362.25
Bill No: 3	Sub bases and Base Works	251.05	502.09	0.00	753.14
Bill No: 4	Pavement Bituminous Layers	299.77	599.53	0.00	899.30
Bill No: 5	Kutchra Earthen Drain	1.54	0.00	0.00	1.54
Bill No: 6	RCC Box Drain	166.50	166.50	0.00	333.01
Bill No: 7	Road Furnitures	10.25	10.25	10.25	30.74
Bill No: 8	Cross Drainage Works (Box Culvert's)	358.97	192.35	0.00	551.33
Bill No: 9	Minor Bridge (RCC Slab Bridge)	17.23	14.08	0.00	31.32
Bill No: 10	Minor Bridge (RCC Girder Bridge)	31.13	31.13	0.00	62.25
Bill No: 11	Major Girder Bridge	432.76	288.51	0.00	721.27
Bill No: 12	Grade Separator	0.00	0.00	0.00	0.00
	a.PSC - Box	0.00	0.00	63.50	63.50
	b.PSC - Viaduct	0.00	0.00	203.12	203.12
	c.PSC - Viaduct - U Box	0.00	0.00	425.33	425.33
Bill No: 13	a.LVUP	0.00	0.00	53.77	53.77
	b.VUP	0.00	0.00	539.96	539.96
	c.RoB	161.51	0.00	0.00	161.51
	d.VOP	0.00	0.00	96.00	96.00
Bill No: 14	Protection Works	63.69	58.32	0.00	122.01
Bill No: 15	Road Furnitures	38.64	3.00	0.00	41.64
Bill No: 16	Major junction	92.00	0.00	0.00	92.00
Bill No: 17	Utility Ducts (Horizontal)	0.00	22.69	0.00	22.69
Bill No: 18	Horticulture	0.00	5.12	0.00	5.12
Bill No: 19	Rain water Harvesting	0.00	0.00	5.00	5.00
Bill No: 20	Project Facalities (vehicle for PIU staff)	6.00	3.00	3.00	12.00
Bill No: 21	Tunnel's	1,284.30	0.00	0.00	1,284.30
Bill No: 22	Bus bay cum Bus shulter	0.00	0.00	5.00	5.00
Bill No: 23	Truck lay bay	0.00	0.00	30.00	30.00
Bill No: 24	Toll Plaza	0.00	0.00	60.00	60.00
Bill No: 25	Wayside amenities and Truck Teminal	0.00	0.00	50.00	50.00
	Total Construction cost (A)	4,081.23	2,417.08	1,544.93	8,043.23
	Construction Cost per Km (128.08)	31.86	18.87	12.06	62.80
26	Add 5% Contingency	204.06	120.85	77.25	402.16
	Total cost (B)	4,285.29	2,537.93	1,622.17	8,445.39

SI. No.	ITEM OF WOTKS	Phase I Cost	Phase 2 Cost	Phase 3 Cost	Phase 1,2,3 Cost
27	Agency charges @ 3% of B	128.56	76.14	48.67	253.36
28	Quality control charges @ 0.25% of B	10.71	6.34	4.06	21.11
29	Road safety charges @ 0.25% of B	10.71	6.34	4.06	21.11
30	Supervision charges at 3 % of B	128.56	76.14	48.67	253.36
31	Price Escallation charges at 10 % of A	408.12	241.71	154.49	804.32
32	Maintenance charges @ 2.5% of B	107.13	63.45	40.55	211.13
	Total cost (C)	5,079.08	3,008.06	1,922.66	10,009.80
	LA & Utility Shifting			0.00	0.00
33	Afforestation charges at 3 Lakhs/ Km	16.16	2.56	3.84	22.56
34	Shifting of watersupply and sanitary lines (1% of A)	40.81	24.17	15.45	80.43
35	Shifting of electrical poles (1% of A)	81.62	24.17	15.45	121.24
	Total Project Completion Cost	5,217.68	3,058.96	1,957.40	10,234.04
	Project completion Cost per Km (128.080)	40.74	23.88	15.28	79.90