

TABLE OD MATRICES OF ALL VEHICLE TYPE (CONSOLIDATED ZONE - 2015)

2015 UNIT: PCU

MODE	DESTINATION	TOTAL									
		21	22	23	24	25	OTHER	TOTAL			
ORIGIN											
1	1152	539	4	370	363	0	95407				
2	226	77	0	197	77	0	12948				
3	55	395	252	774	282	0	34345				
4	943	1798	150	467	369	0	85163				
5	4393	5324	112	287	423	0	51200				
6	1014	1361	551	385	495	0	65114				
7	399	499	87	1704	262	0	56073				
8	426	1056	58	847	2425	24	89117				
9	297	149	0	6	17	64	22109				
10	90	8	0	110	3	0	11040				
11	103	0	0	0	0	0	16975				
12	1043	617	16	269	84	34	42018				
13	0	2	0	0	0	0	14063				
14	5	6	0	92	0	0	20801				
15	170	176	0	0	191	0	10564				
16	186	0	0	0	348	0	4848				
17	0	0	0	0	7	0	940				
18	164	116	4	0	52	0	6957				
19	62	85	0	41	191	41	9003				
20	119	7	0	44	116	0	4584				
21	0	133	0	85	49	0	11184				
22	172	418	17	89	172	0	13159				
23	0	0	0	0	0	0	1252				
24	54	174	0	16	182	0	5798				
25	68	68	0	38	2915	0	9030				
OTHER	0	0	0	0	0	0	161				
TOTAL	11141	13008	1251	5821	9043	163	693853				

APPENDIX 6-3 ROAD NETWORK FOR TRAFFIC ASSIGNMENT

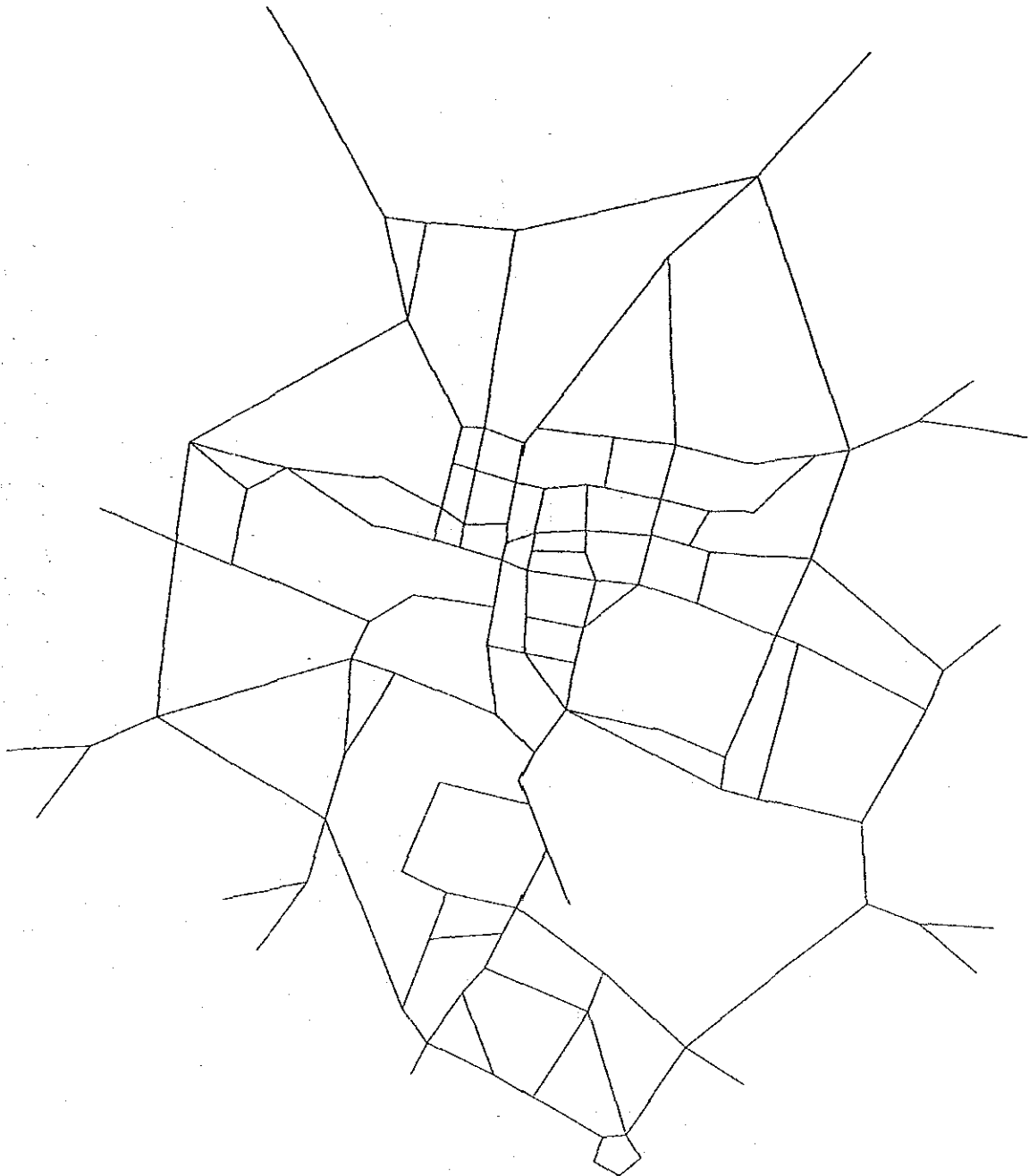


FIG. ROAD NETWORK FOR TRAFFIC ASSIGNMENT INSIDE THE RING ROAD (1991)

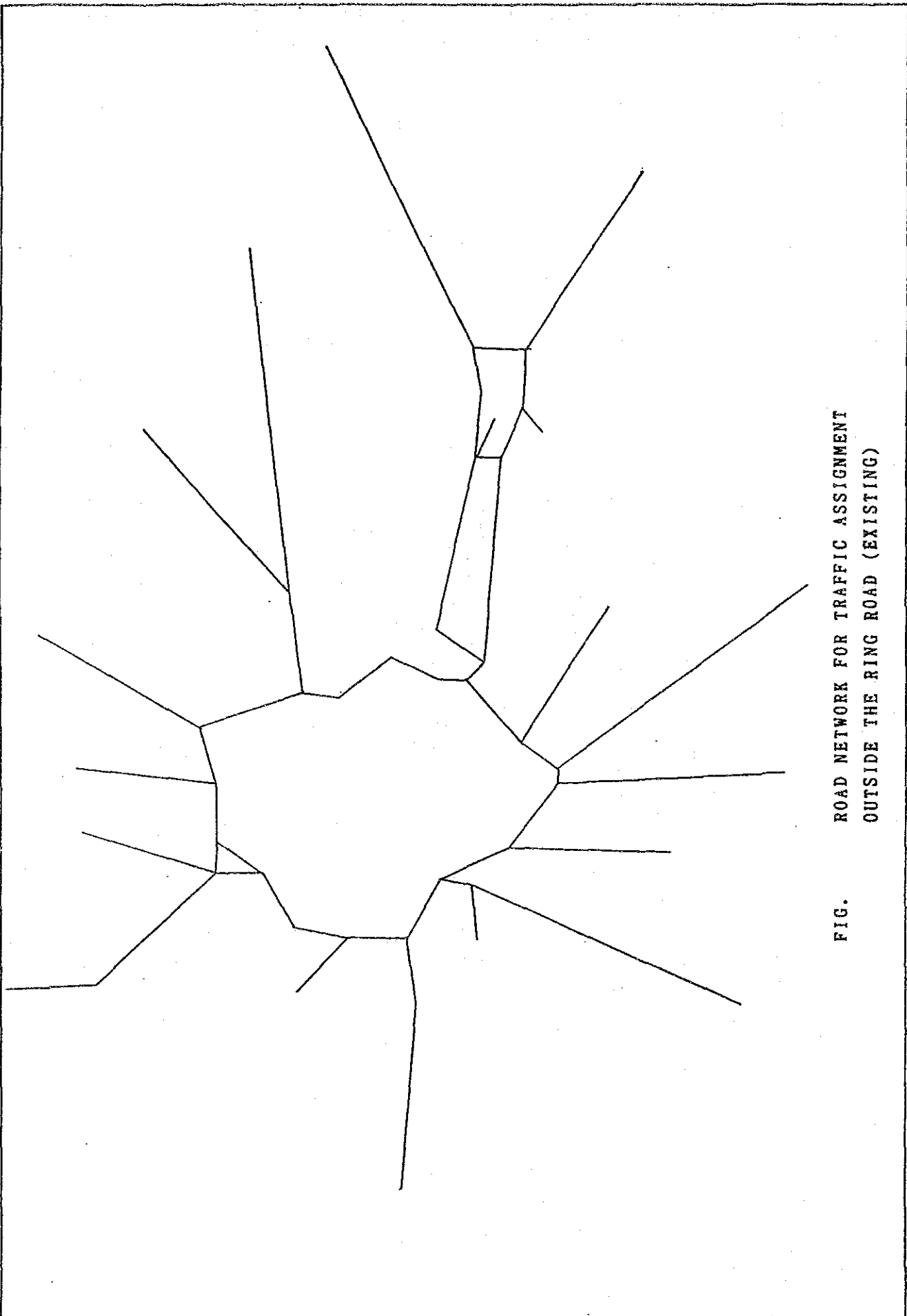


FIG. ROAD NETWORK FOR TRAFFIC ASSIGNMENT
OUTSIDE THE RING ROAD (EXISTING)

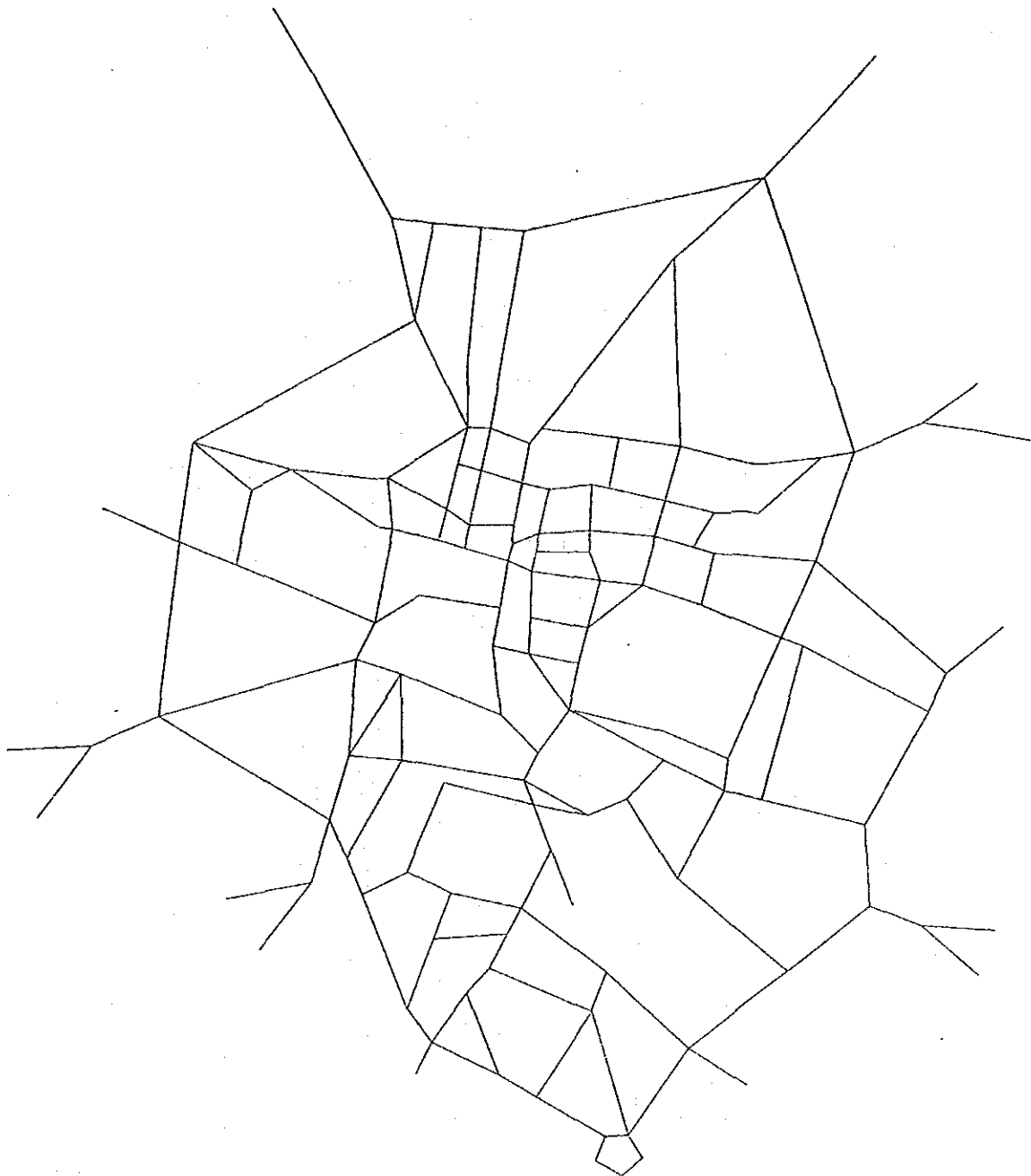


FIG. ROAD NETWORK FOR TRAFFIC ASSIGNMENT INSIDE THE RING ROAD (1997)

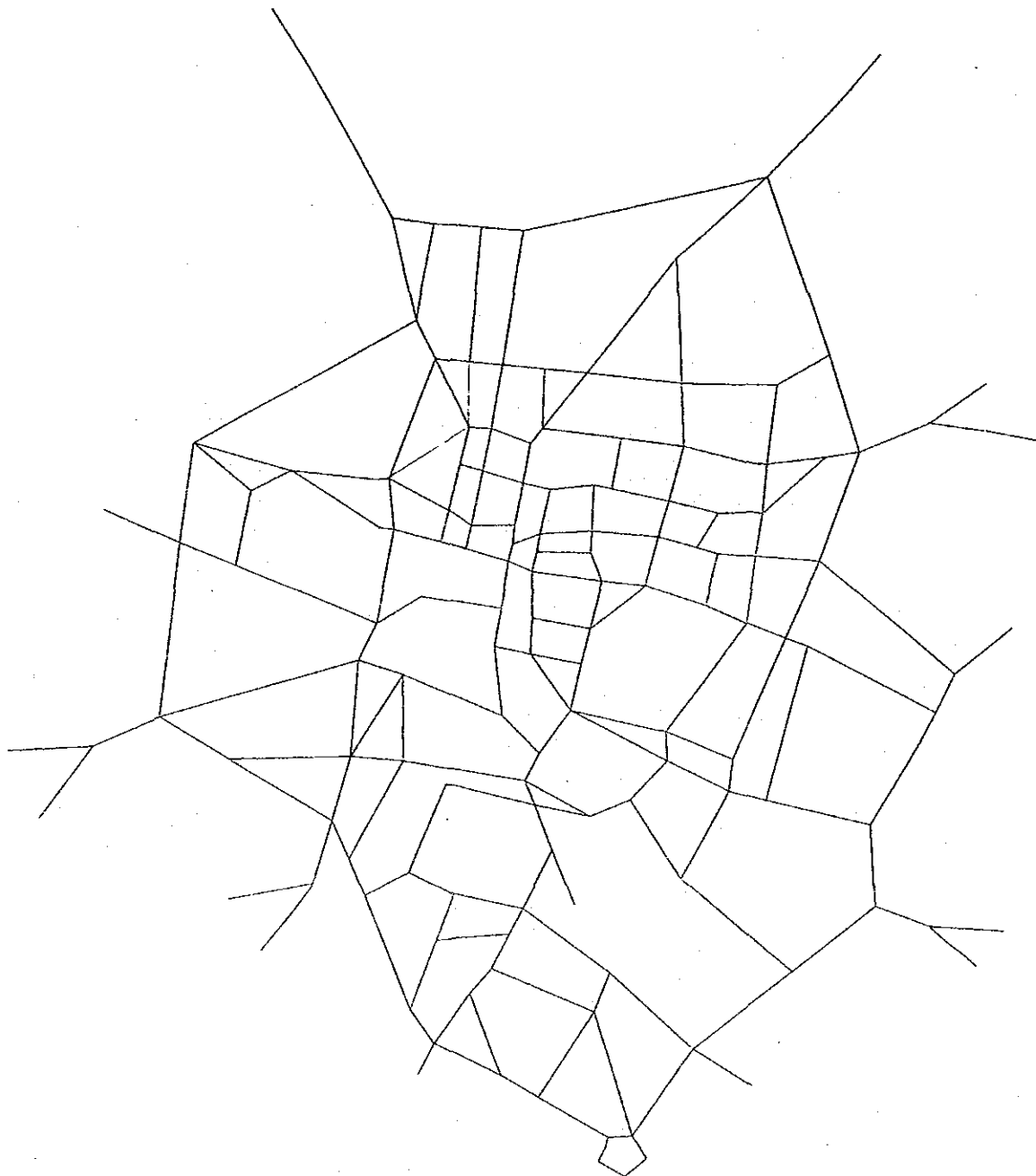


FIG. ROAD NETWORK FOR TRAFFIC ASSIGNMENT INSIDE THE RING ROAD (2015)

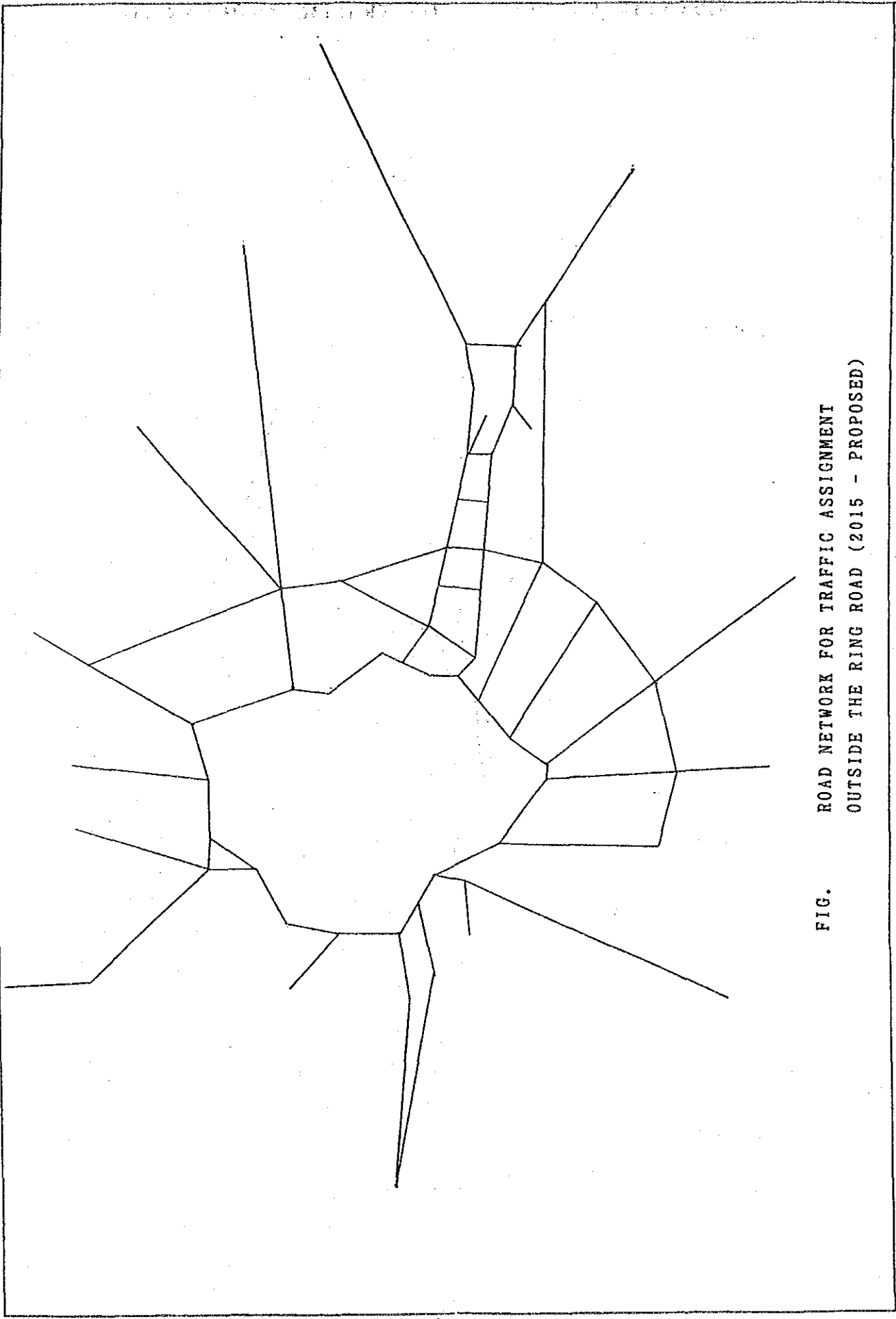
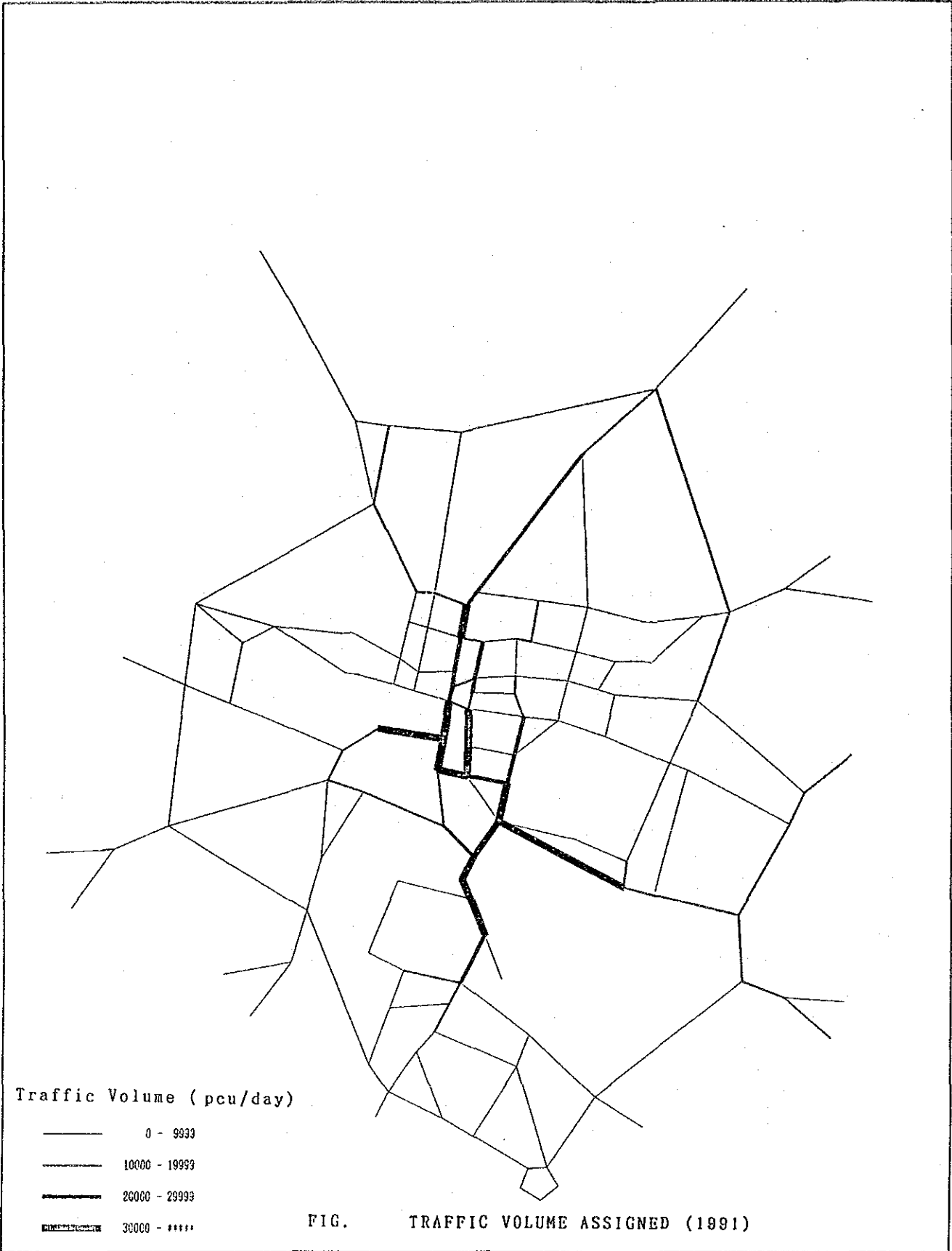


FIG. ROAD NETWORK FOR TRAFFIC ASSIGNMENT
OUTSIDE THE RING ROAD (2015 - PROPOSED)

APPENDIX 6-4 RESULTS OF TRAFFIC ASSIGNMENT



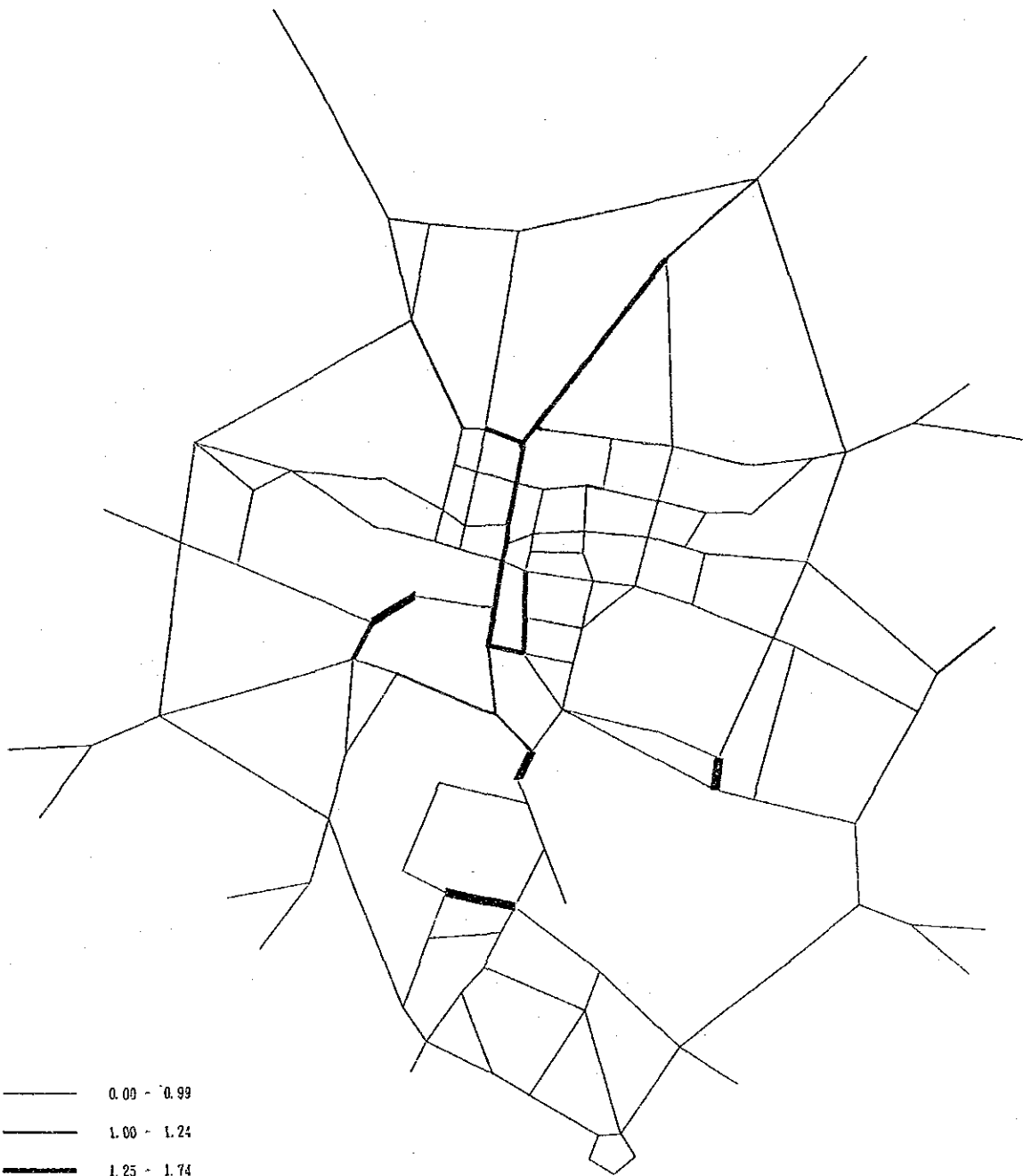


FIG. CONGESTION DEGREE (1991)

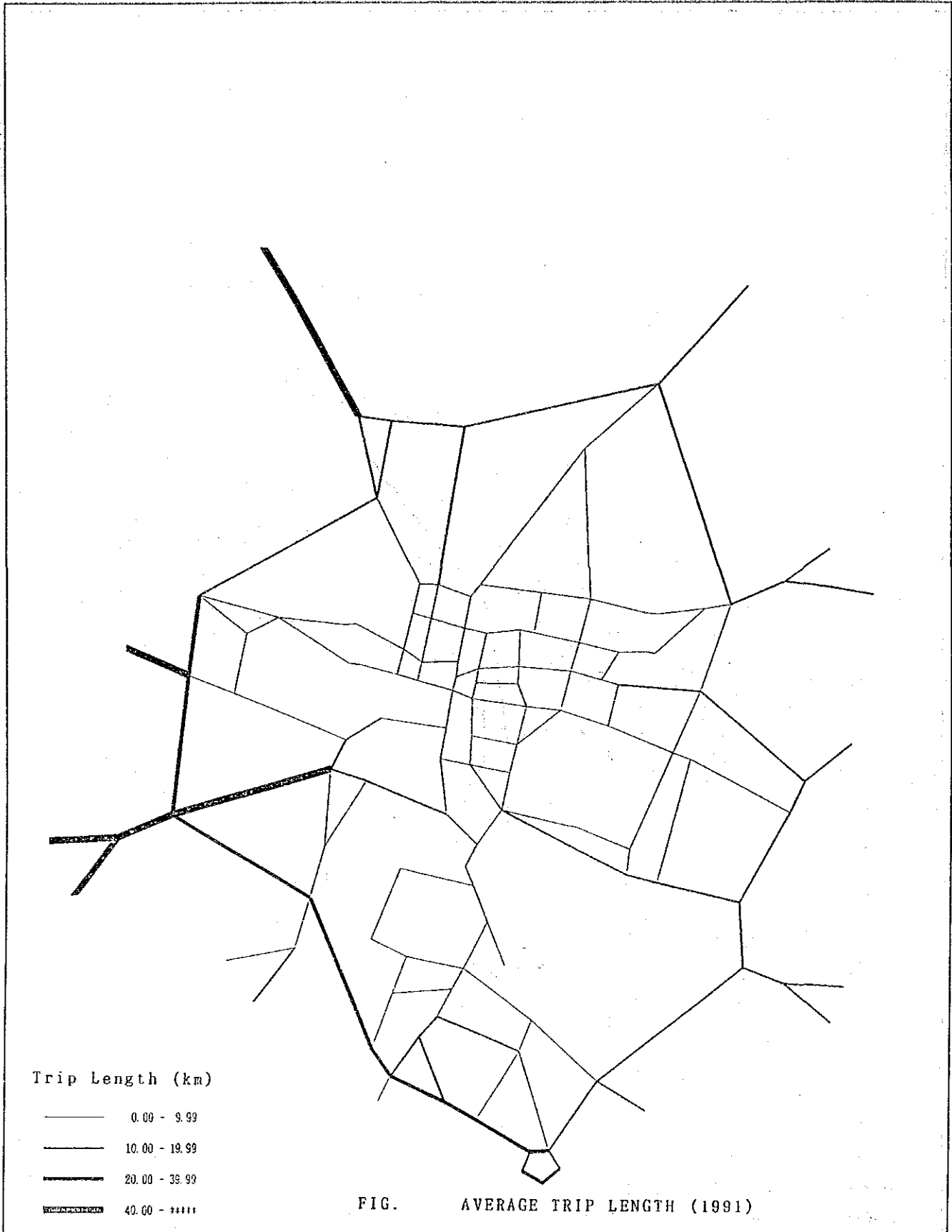
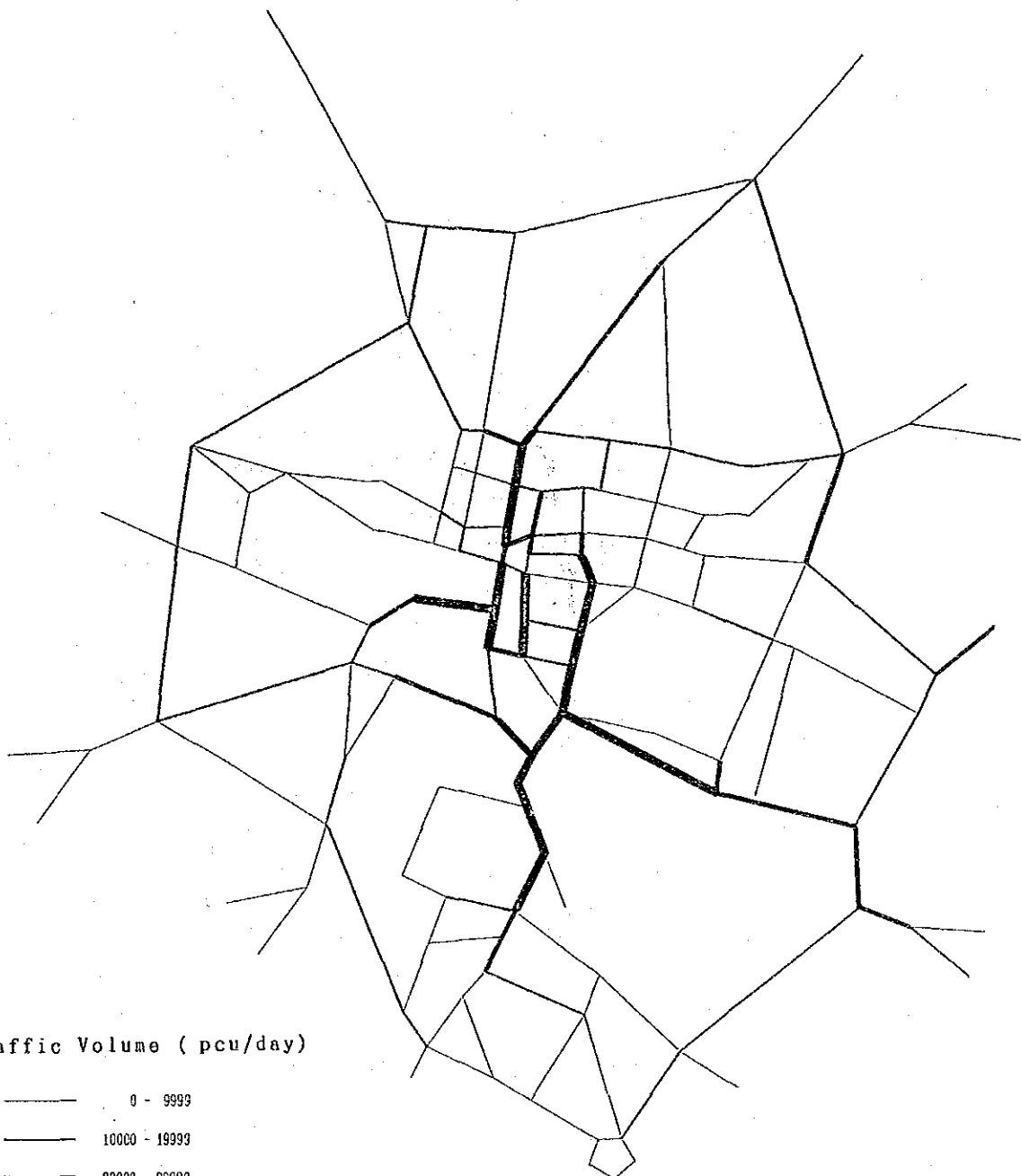


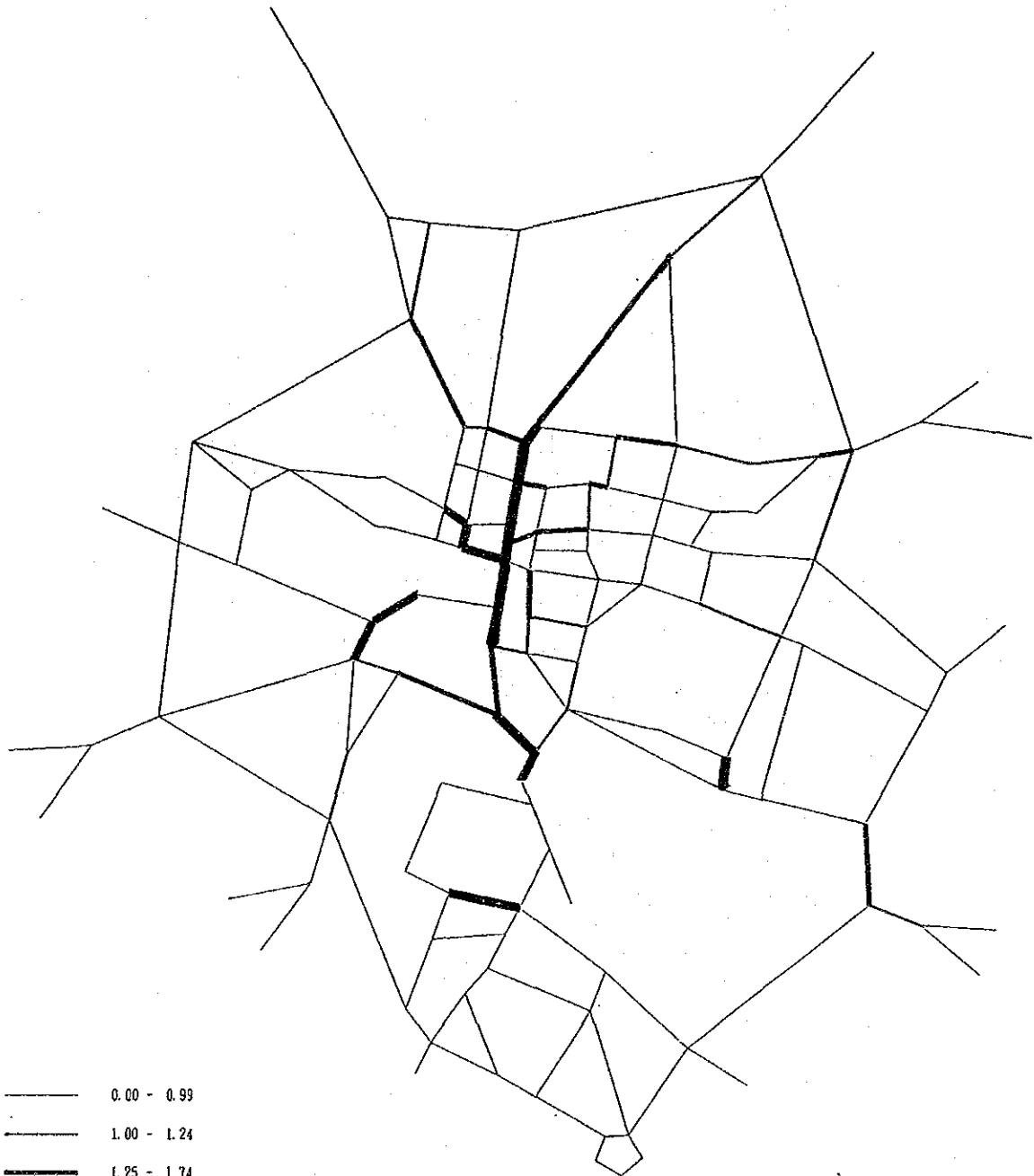
FIG. AVERAGE TRIP LENGTH (1991)



Traffic Volume (pcu/day)

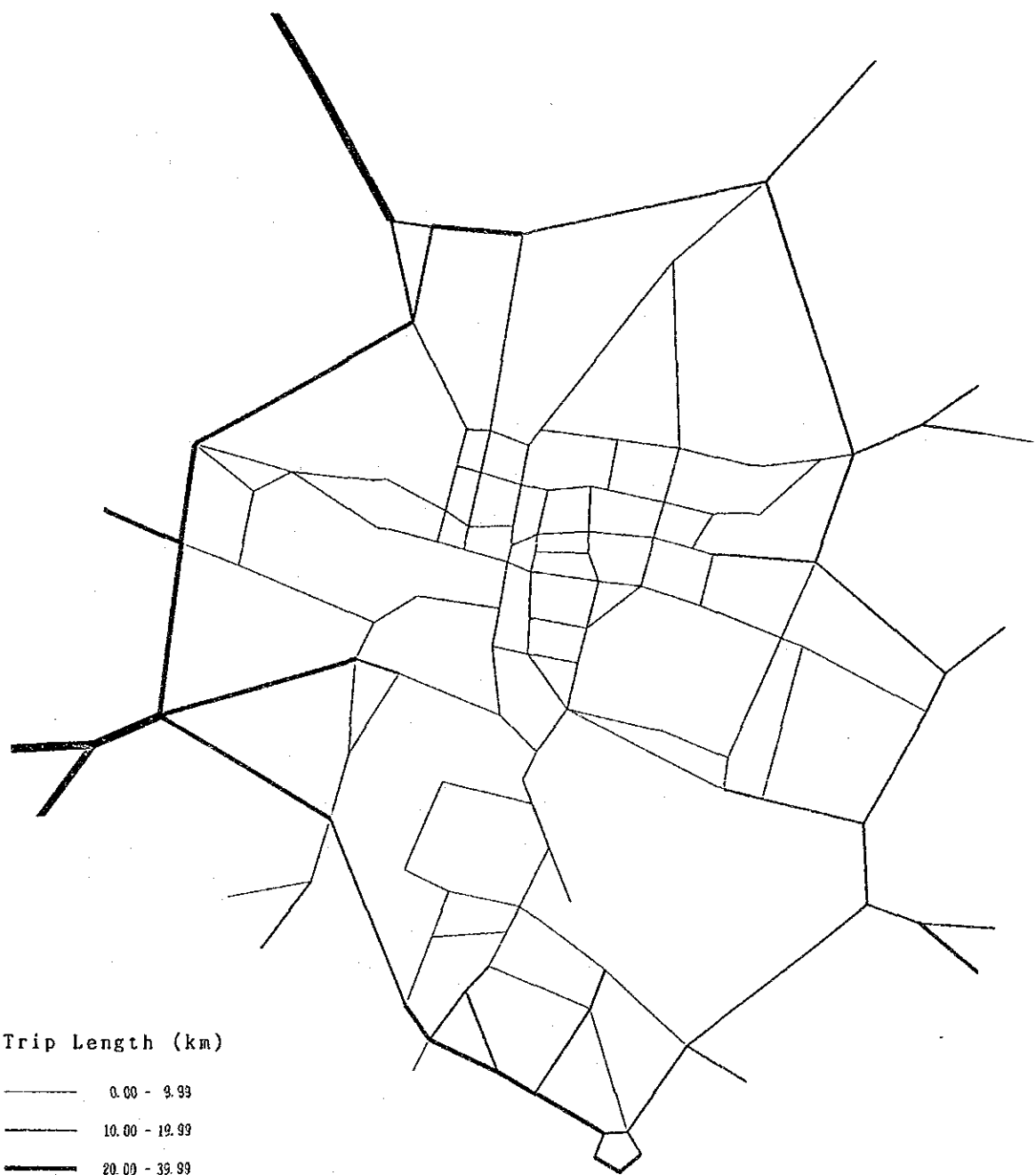
- 0 - 9999
- 10000 - 19999
- 20000 - 29999
- 30000 - 39999

FIG. TRAFFIC VOLUME ASSIGNED (1997 - EXISTING NETWORK)



- 0.00 - 0.99
- 1.00 - 1.24
- 1.25 - 1.74
- 1.75 - *****

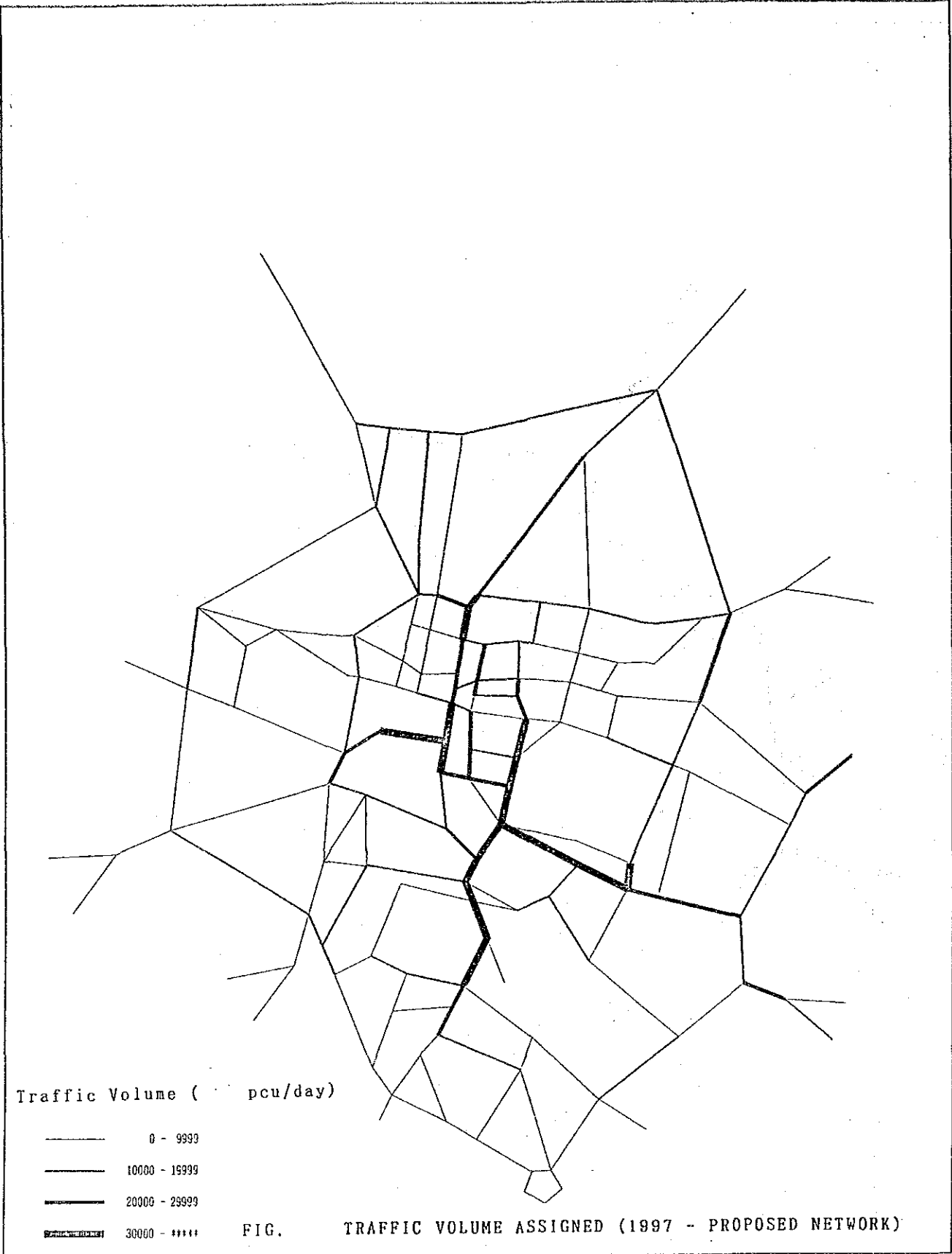
FIG. CONGESTION DEGREE (1997 - EXISTING NETWORK)

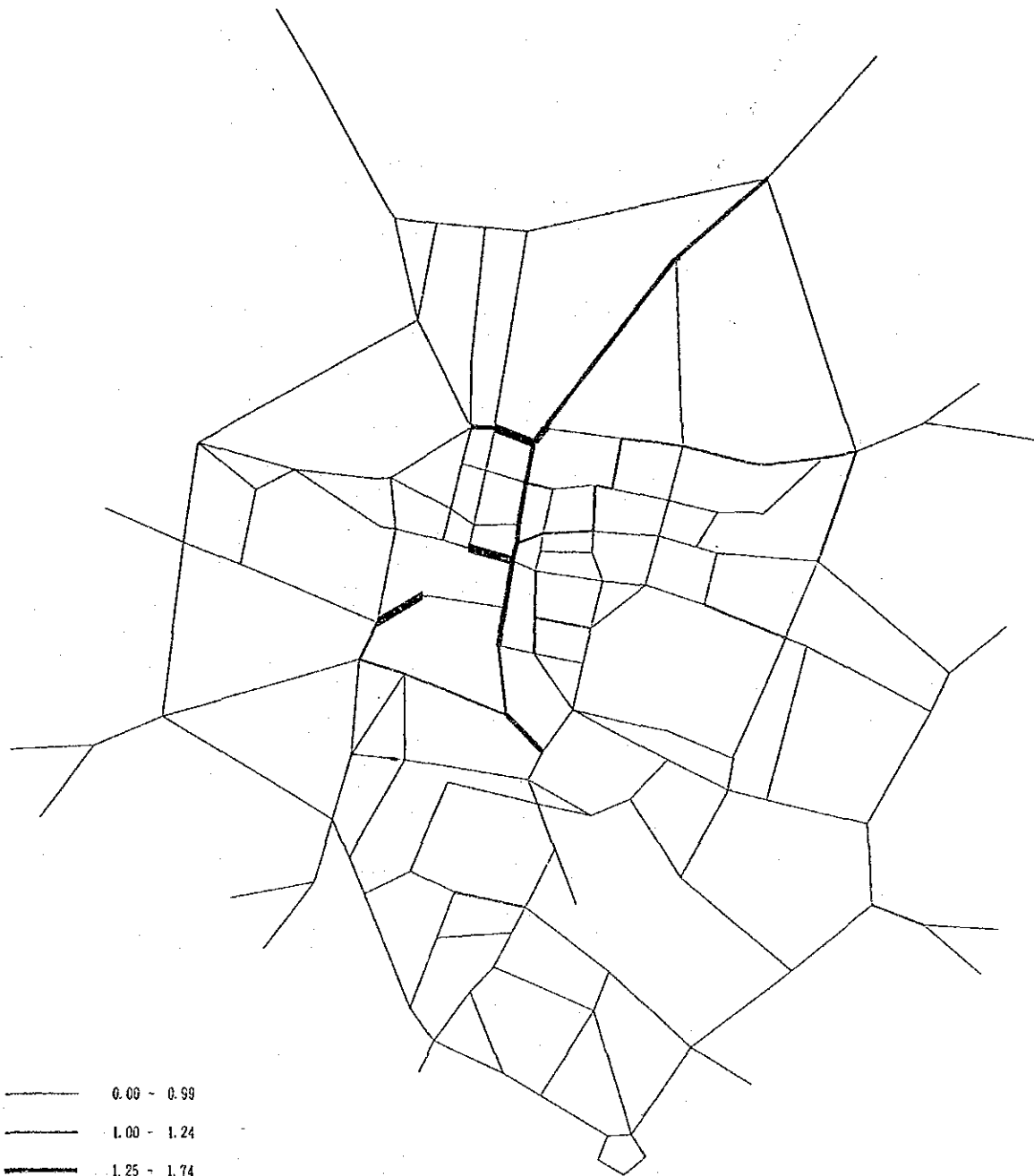


Trip Length (km)

—	0.00 - 9.99
—	10.00 - 19.99
—	20.00 - 39.99
—	40.00 - 49.99

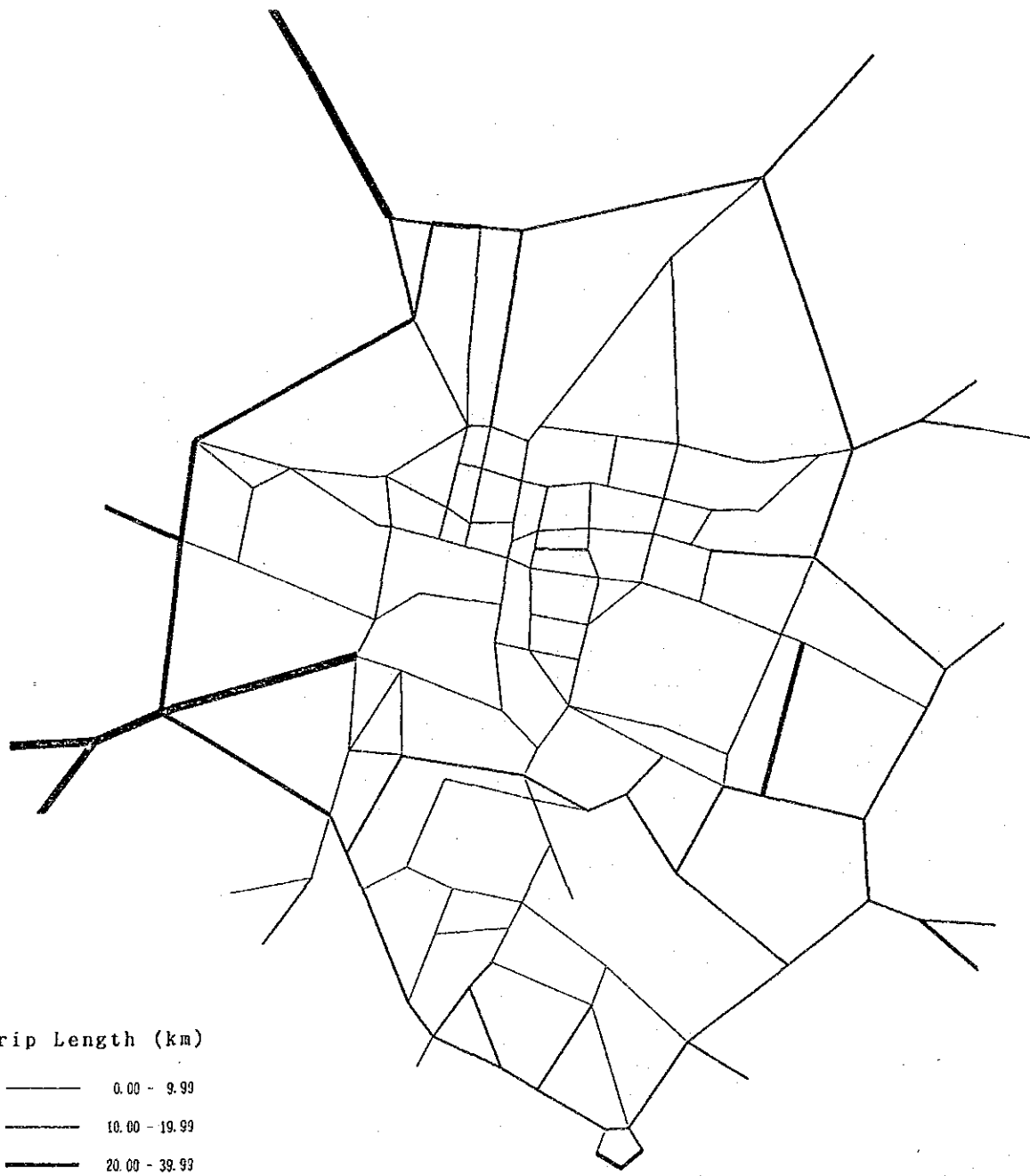
FIG. AVERAGE TRIP LENGTH (1997 - EXISTING NETWORK)





- 0.00 ~ 0.99
- 1.00 ~ 1.24
- 1.25 ~ 1.74
- 1.75 ~ 4.44

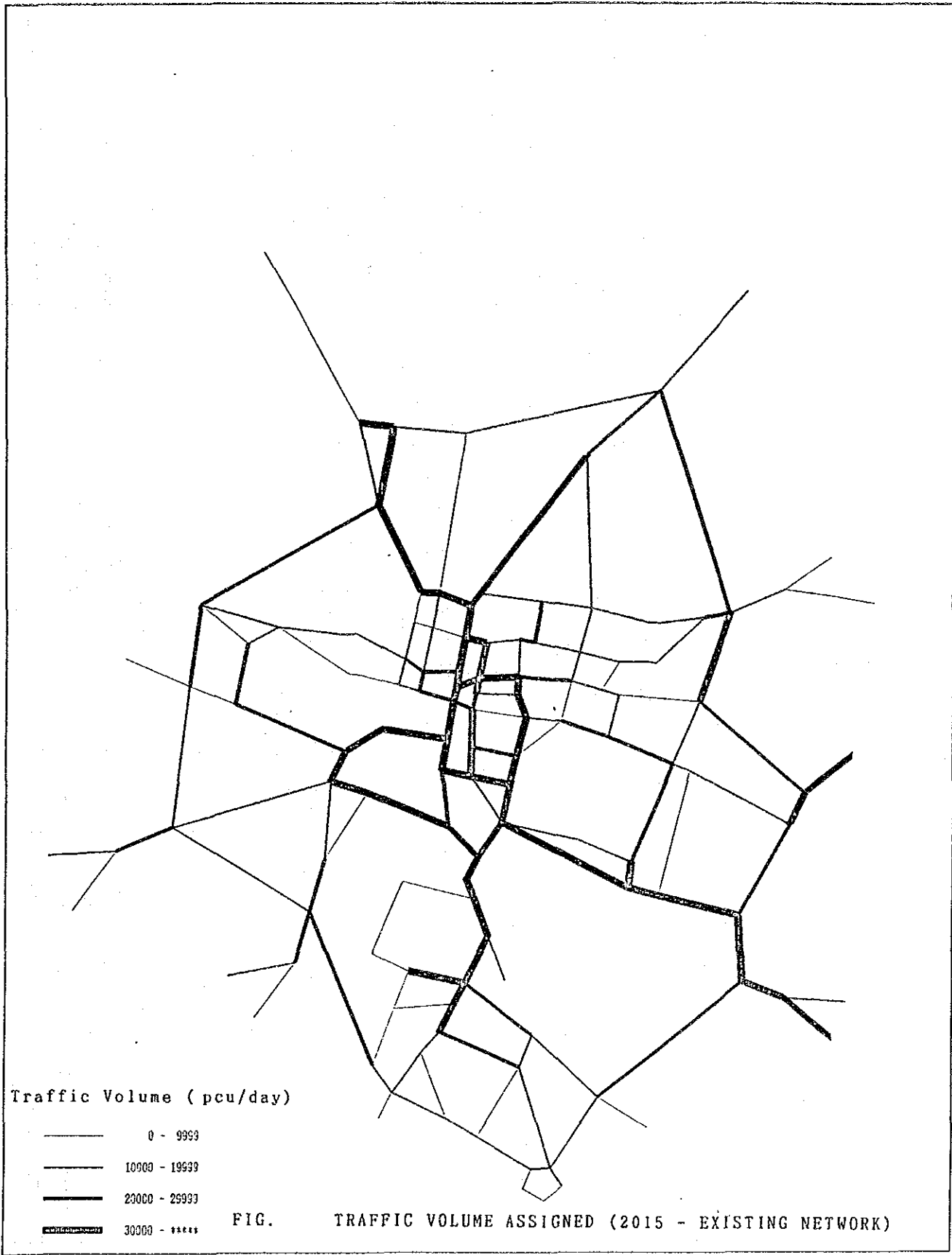
FIG. CONGESTION DEGREE (1997 - PROPOSED NETWORK)



Trip Length (km)

- 0.00 - 9.99
- 10.00 - 19.99
- 20.00 - 39.99
- 40.00 - 49.99

FIG. AVERAGE TRIP LENGTH (1997 - PROPOSED NETWORK)

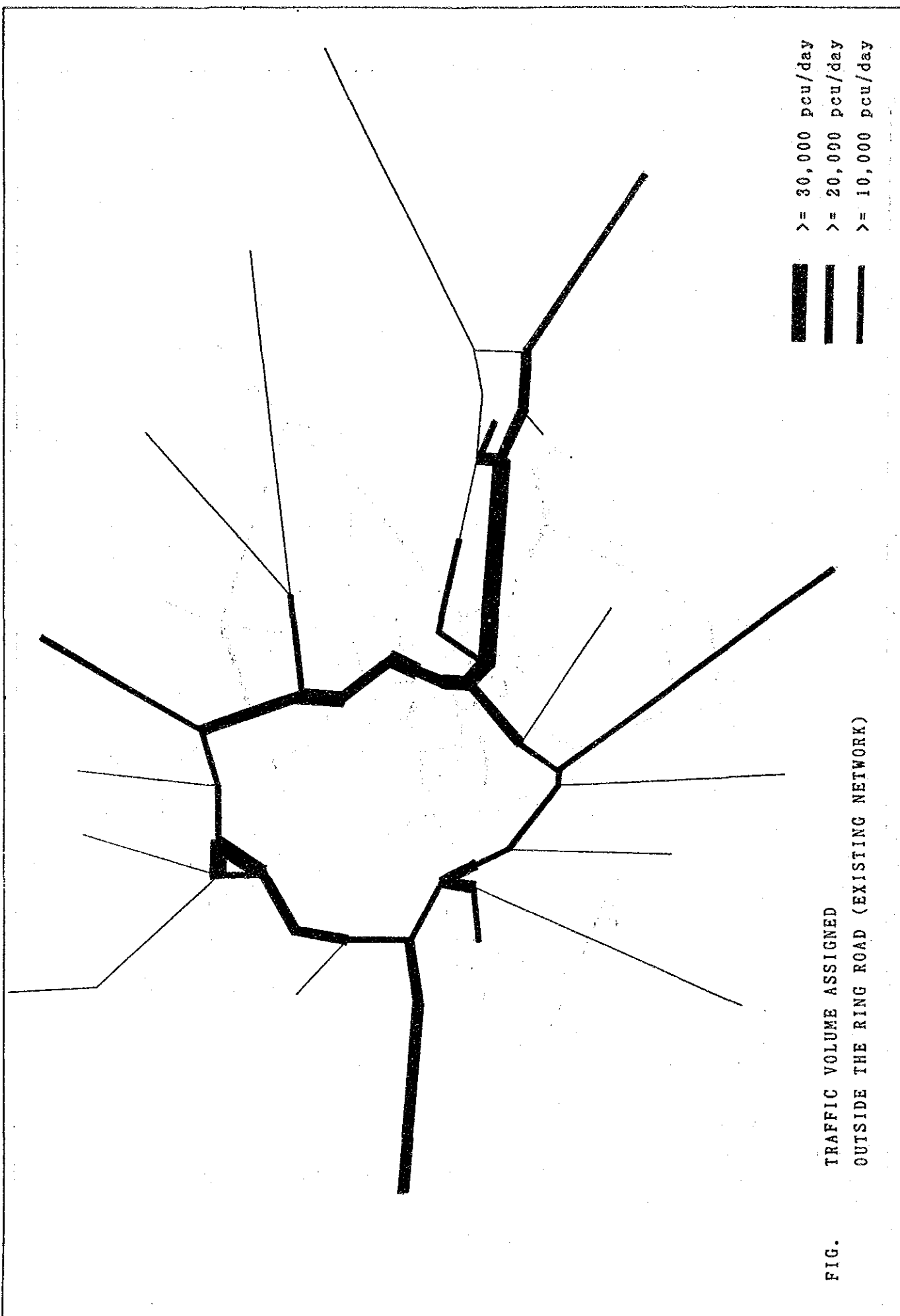


Traffic Volume (pcu/day)

- 0 - 9999
- 10000 - 19999
- 20000 - 29999
- 30000 - 39999

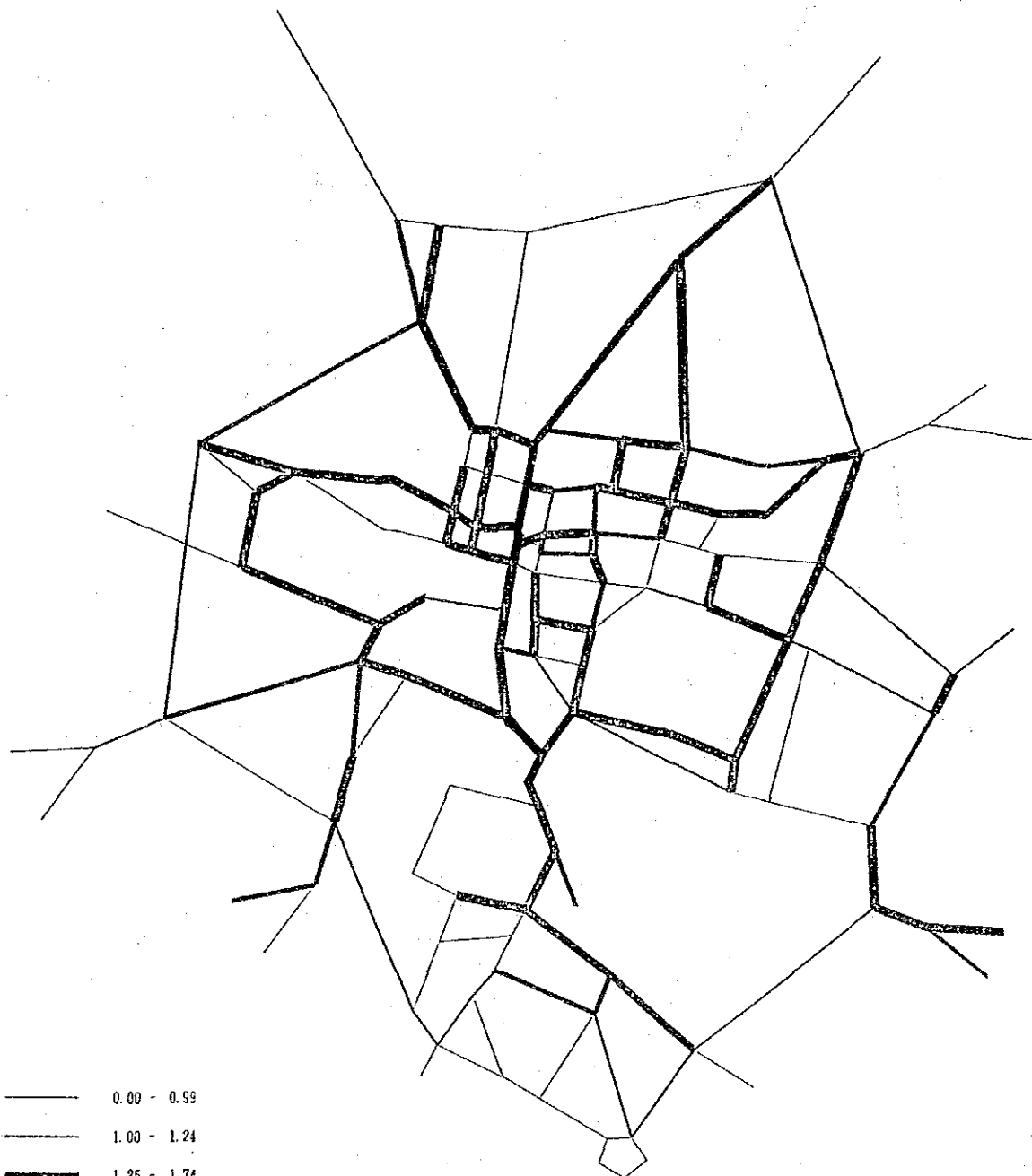
FIG. TRAFFIC VOLUME ASSIGNED (2015 - EXISTING NETWORK)

6E 1E



■ >= 30,000 pcu/day
 ■ >= 20,000 pcu/day
 ■ >= 10,000 pcu/day

FIG. TRAFFIC VOLUME ASSIGNED
 OUTSIDE THE RING ROAD (EXISTING NETWORK)



- 0.00 - 0.99
- 1.00 - 1.24
- 1.25 - 1.74
- 1.75 - *****

FIG. CONGESTION DEGREE (2015 - EXISTING NETWORK)

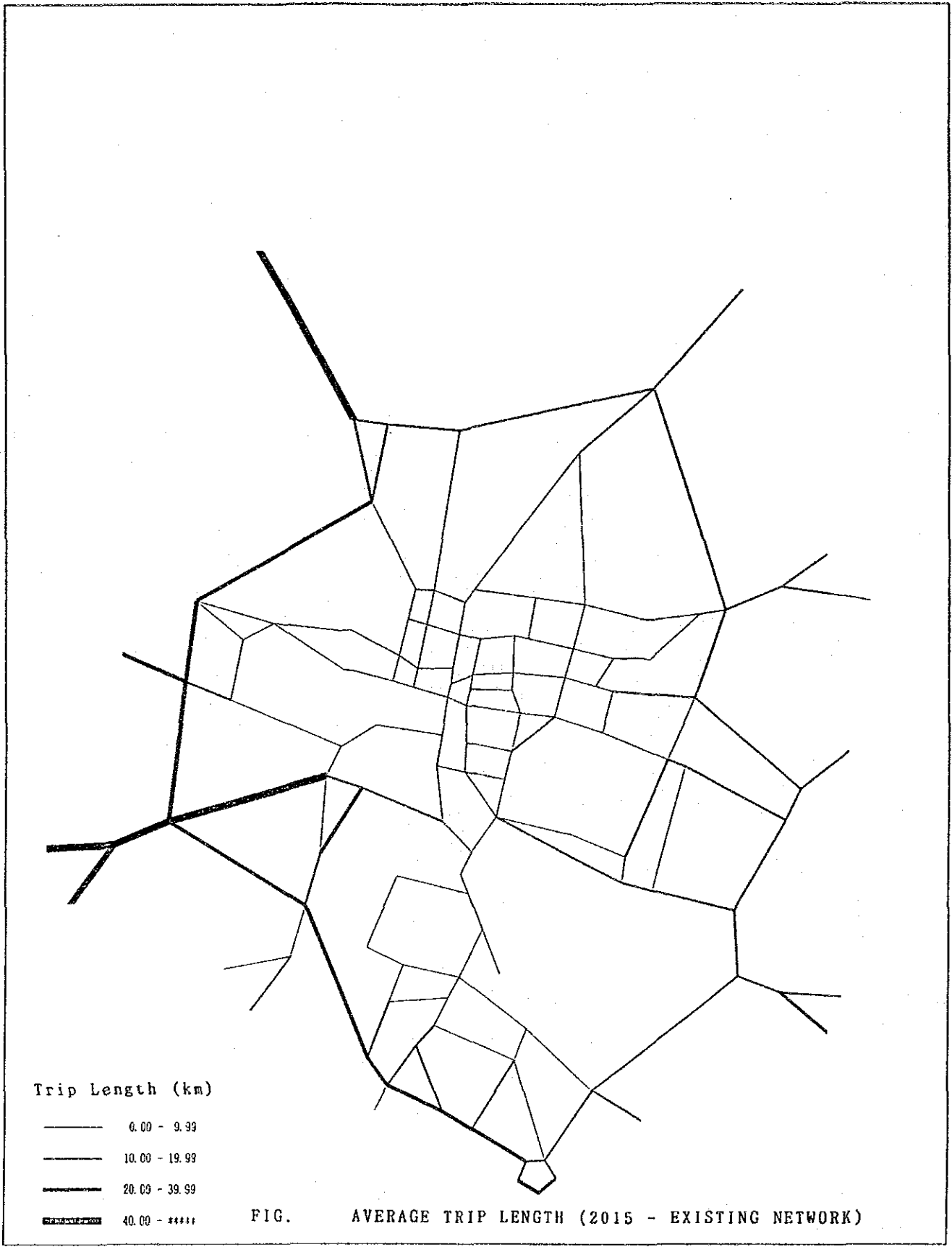
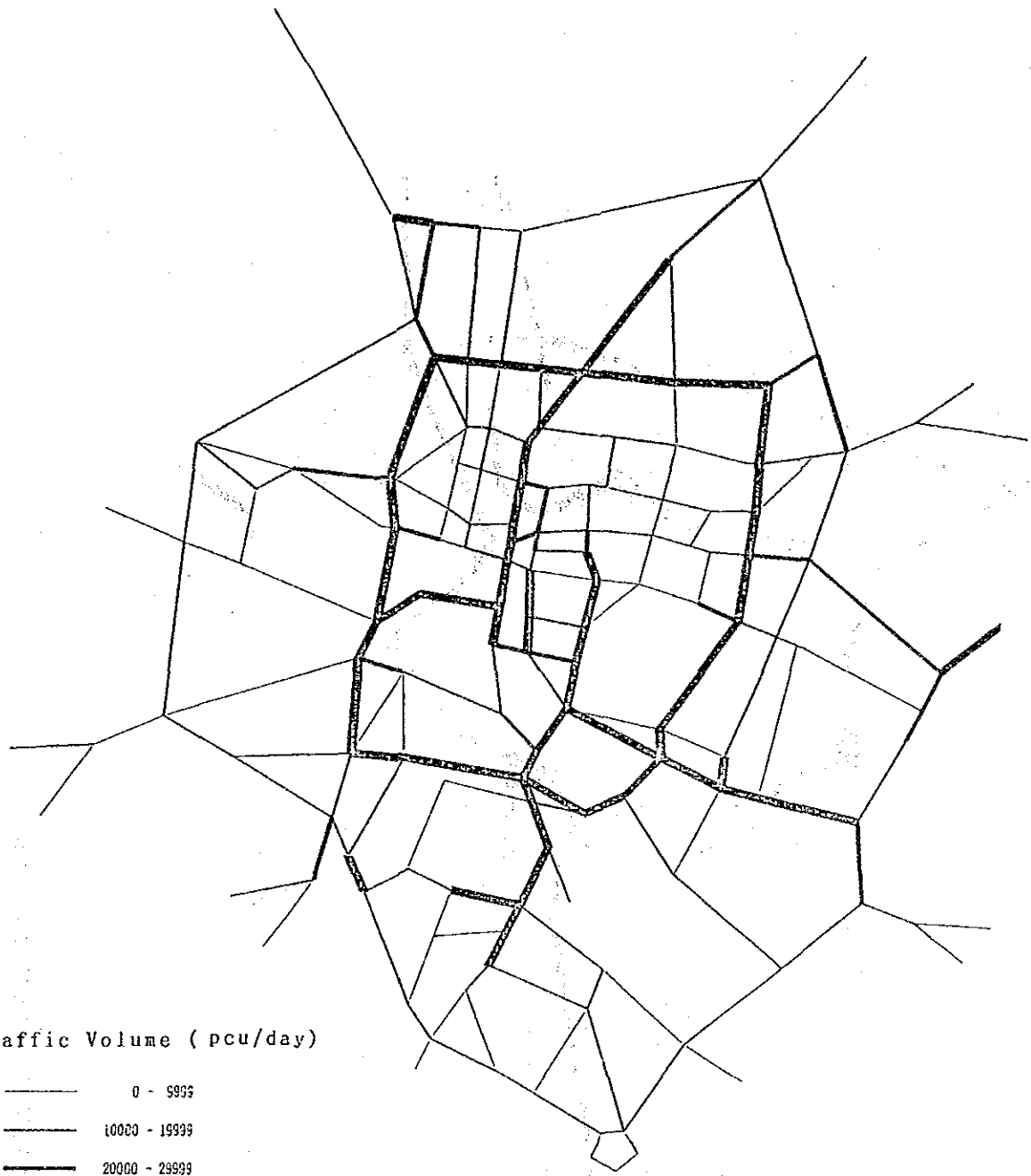


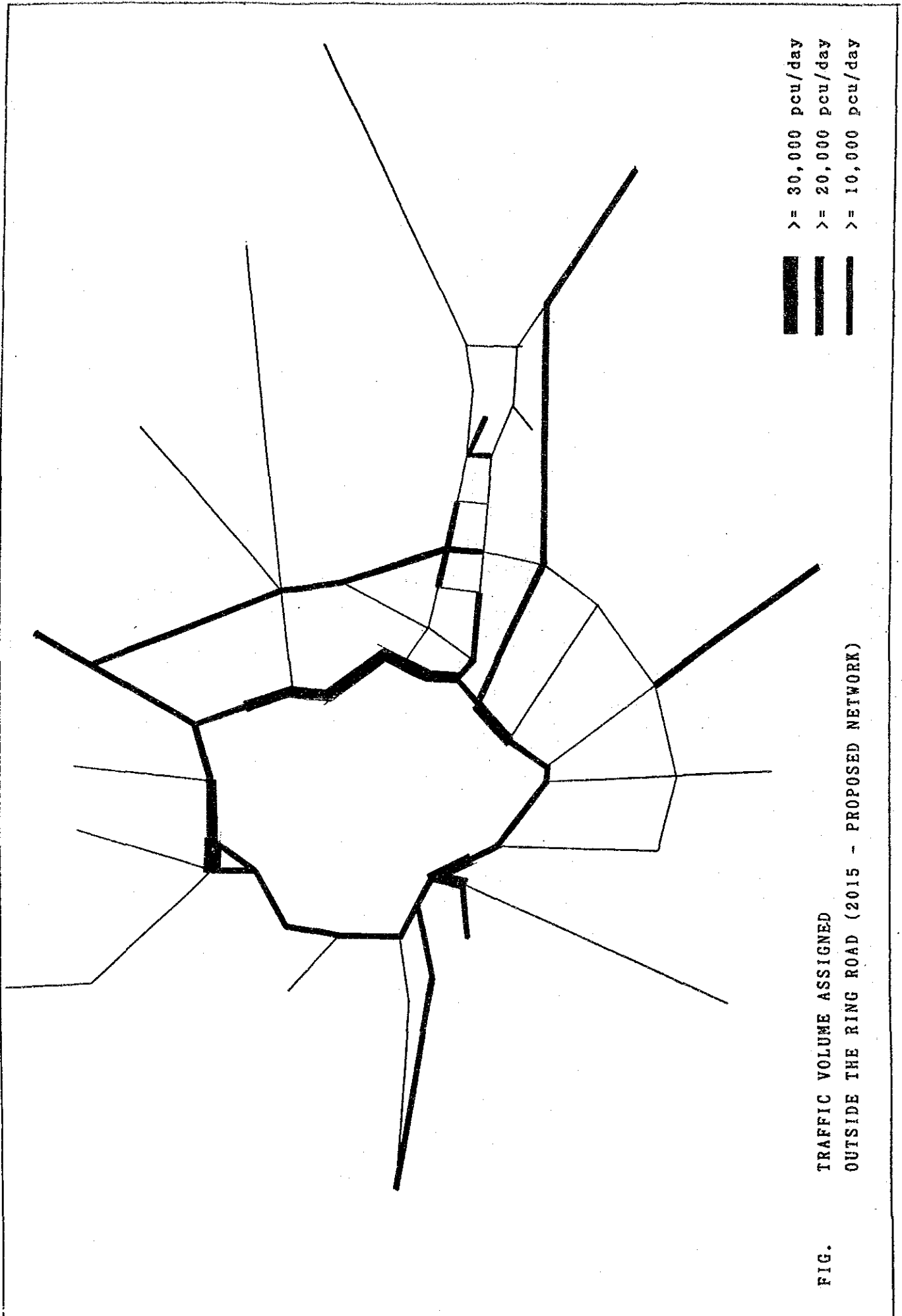
FIG. AVERAGE TRIP LENGTH (2015 - EXISTING NETWORK)



Traffic Volume (pcu/day)

- 0 - 9999
- 10000 - 19999
- 20000 - 29999
- 30000 - 39999

FIG.6.5 TRAFFIC VOLUME ASSIGNED (2015 - PROPOSED NETWORK)



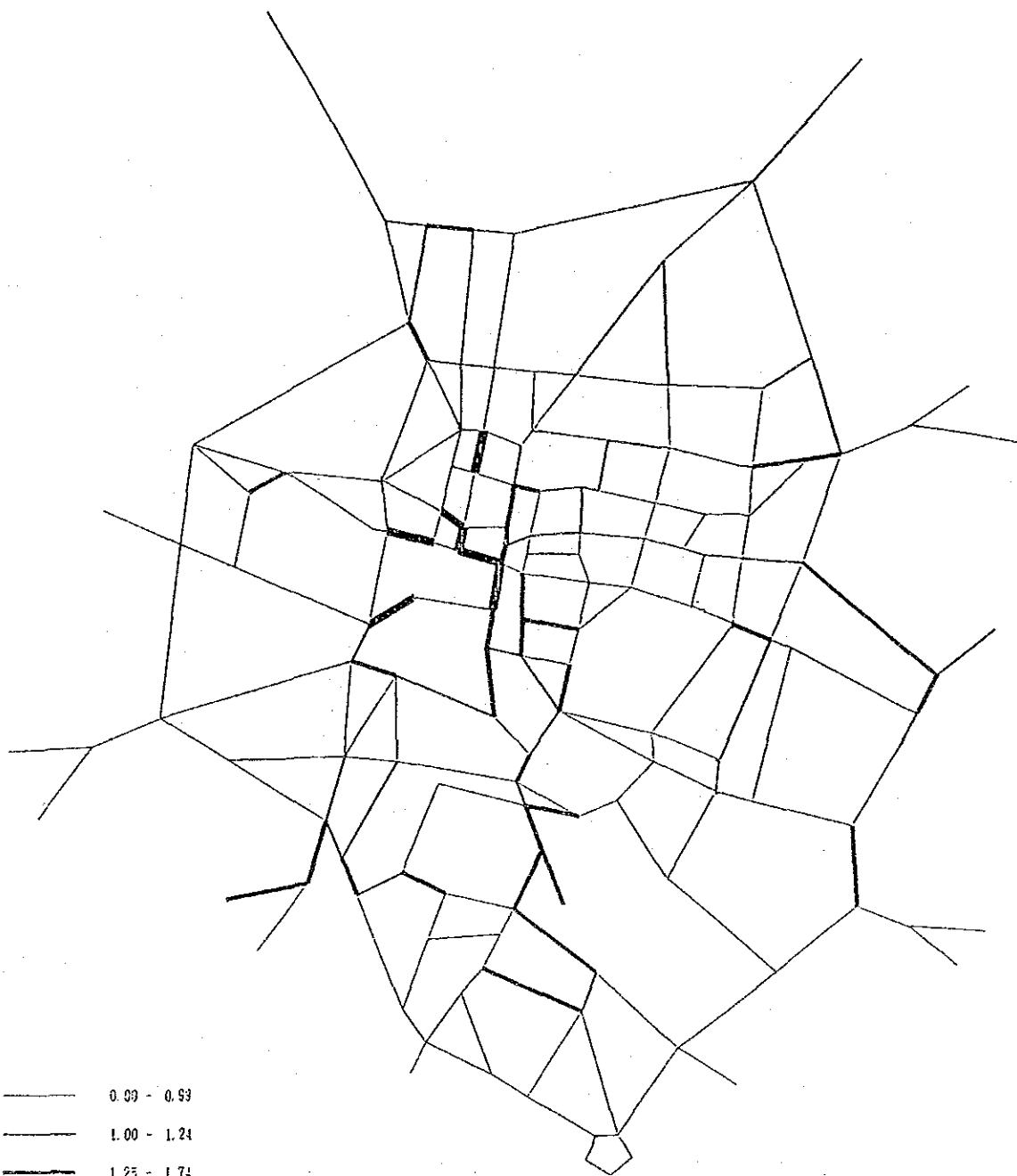
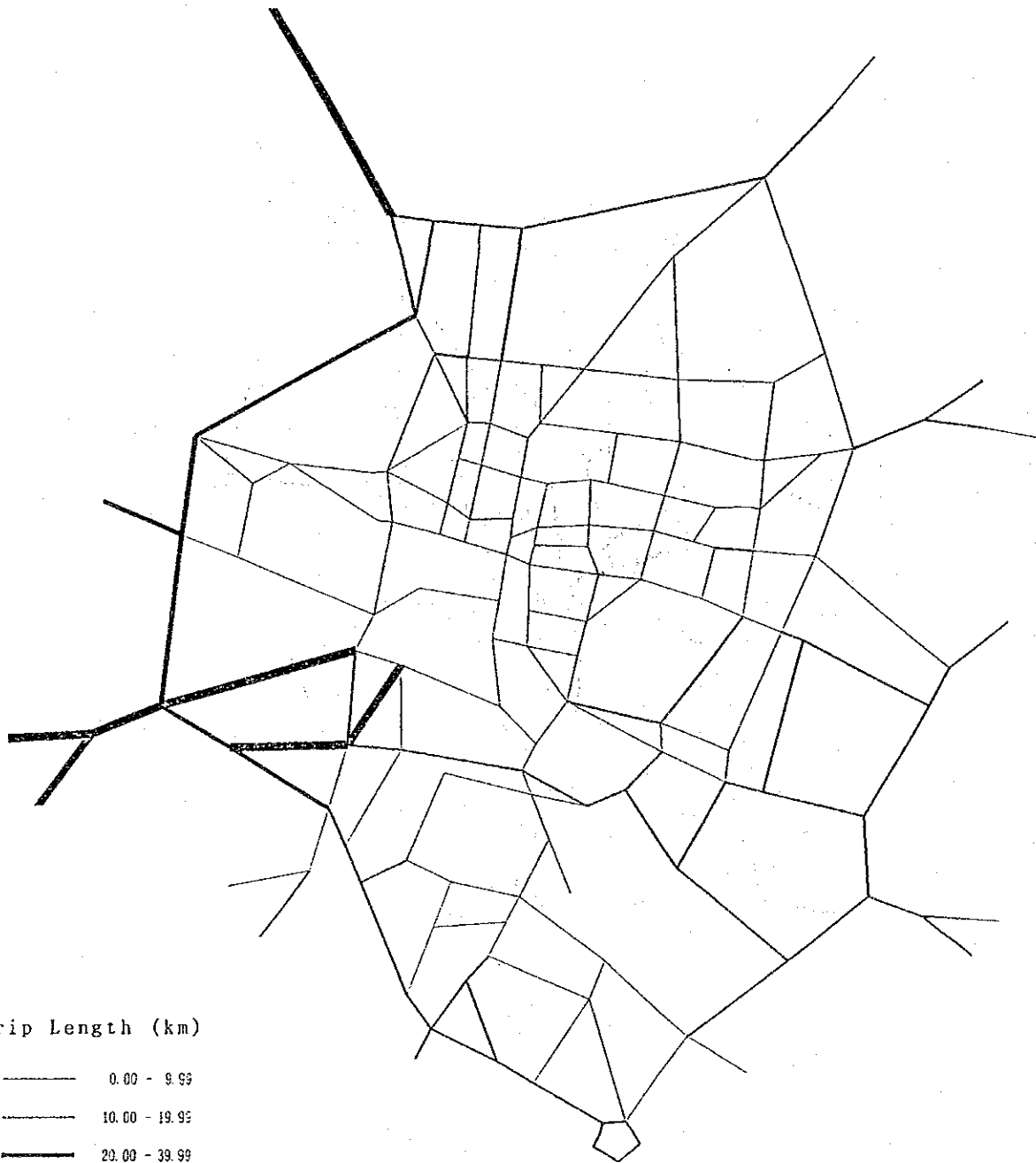


FIG.6.6 CONGESTION DEGREE (2015 - PROPOSED NETWORK)



Trip Length (km)

- 0.00 - 9.99
- 10.00 - 19.99
- 20.00 - 39.99
- 40.00 - +++++

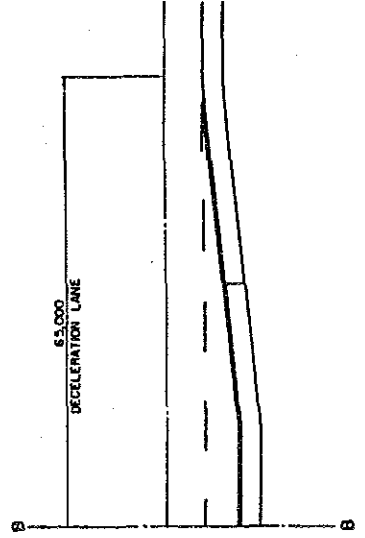
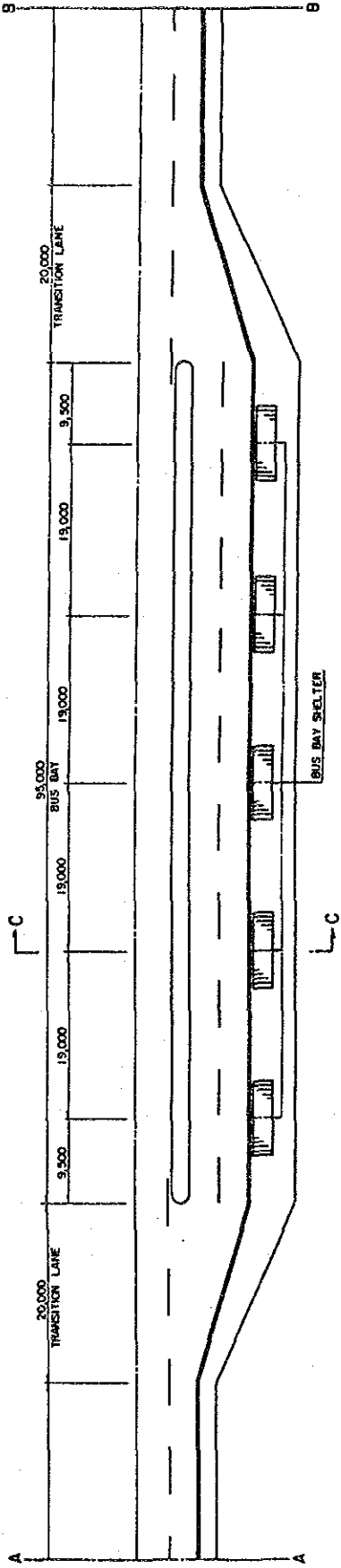
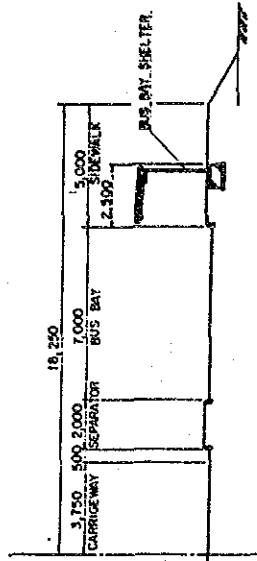
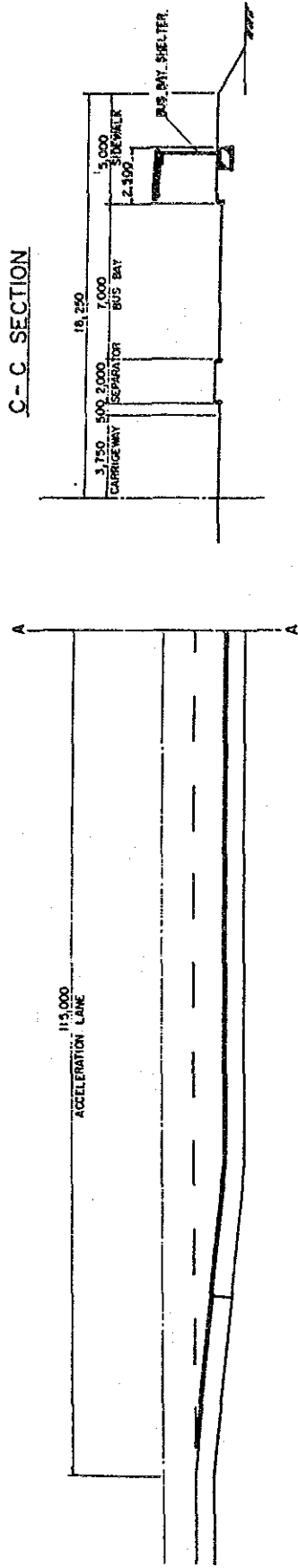
FIG. AVERAGE TRIP LENGTH (2015 - PROPOSED NETWORK)

CHAPTER 7 PUBLIC TRANSPORT DEVELOPMENT PLAN

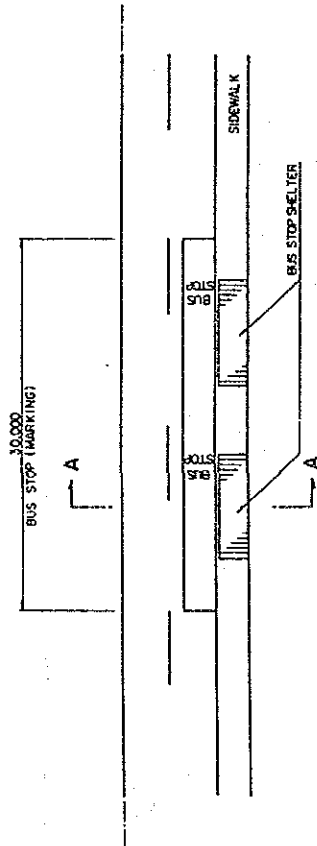
Appendix 7-1 GROUND PLAN OF BUS STOPS

BUS BAY (TYPE - A) PLAN

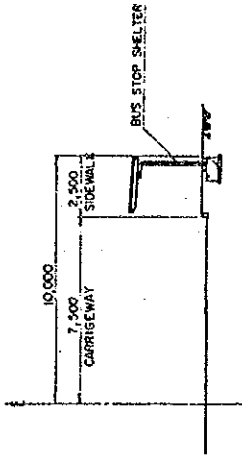
C - C SECTION



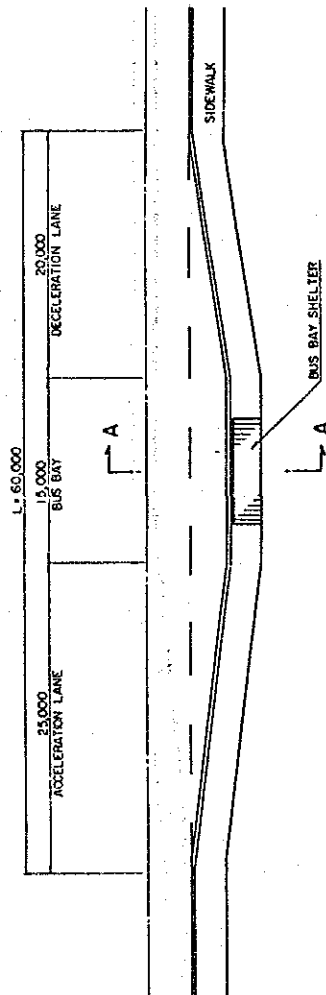
BUS STOP (TYPE-B) PLAN



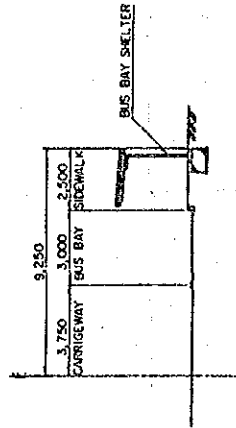
A-A SECTION



BUS BAY (TYPE-C) PLAN



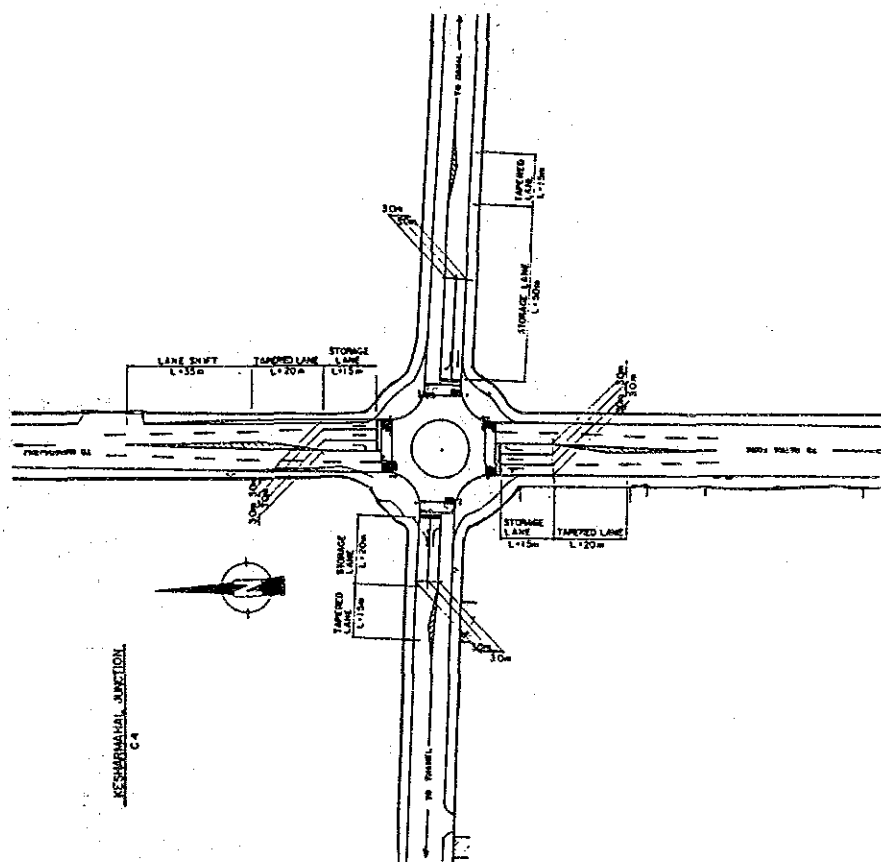
A-A SECTION

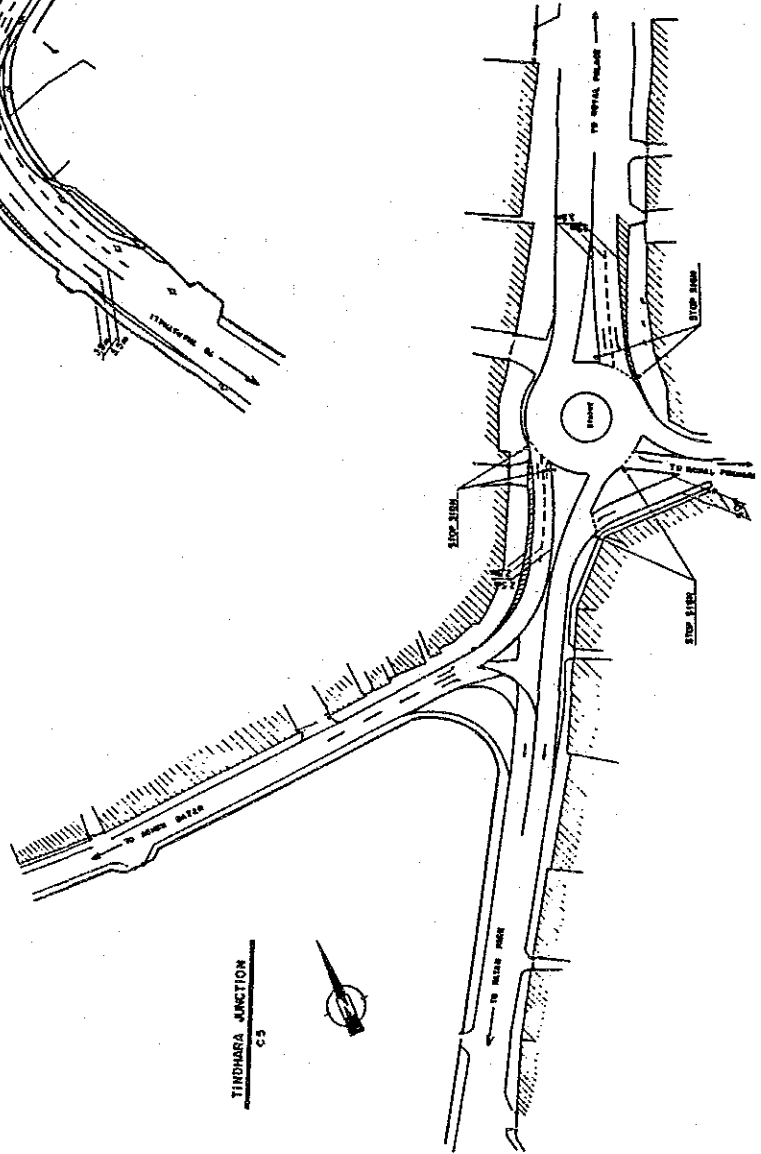
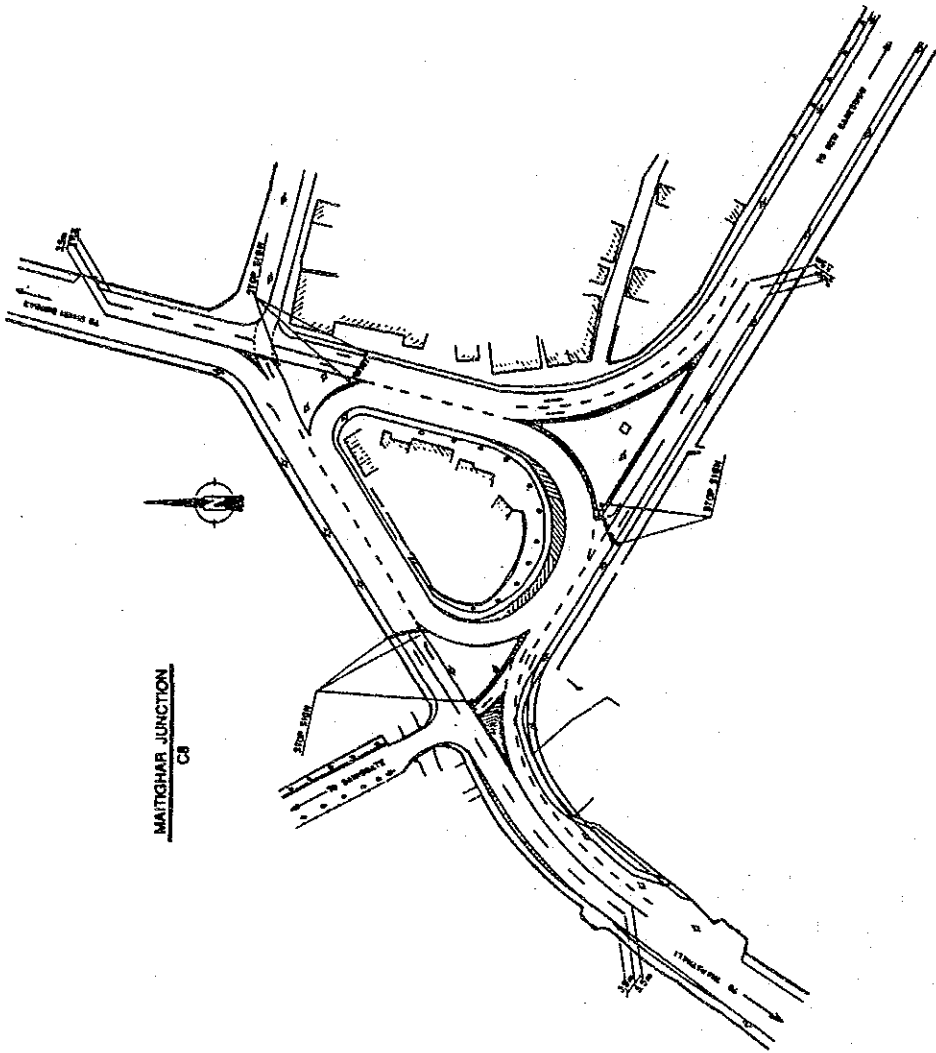


CHAPTER 8 TRAFFIC MANAGEMENT PLAN

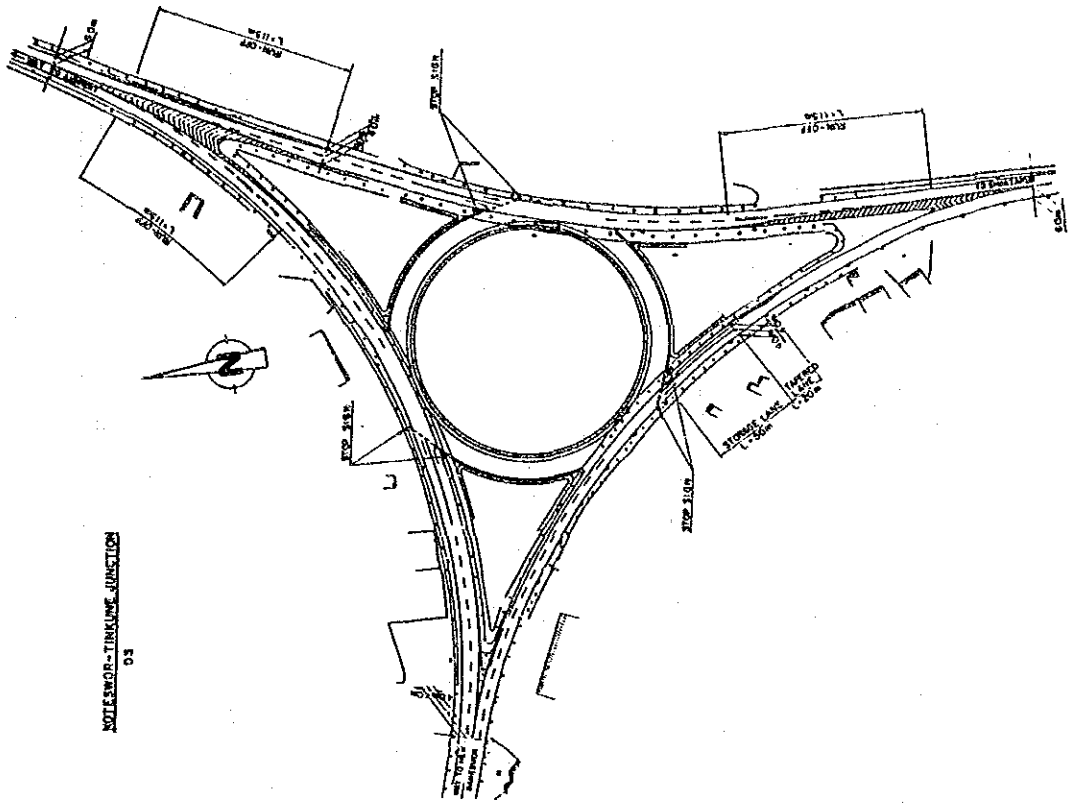
Appendix 8-1 Intersection Development Plan

Appendix 8-2 Traffic Volumes at Intersections

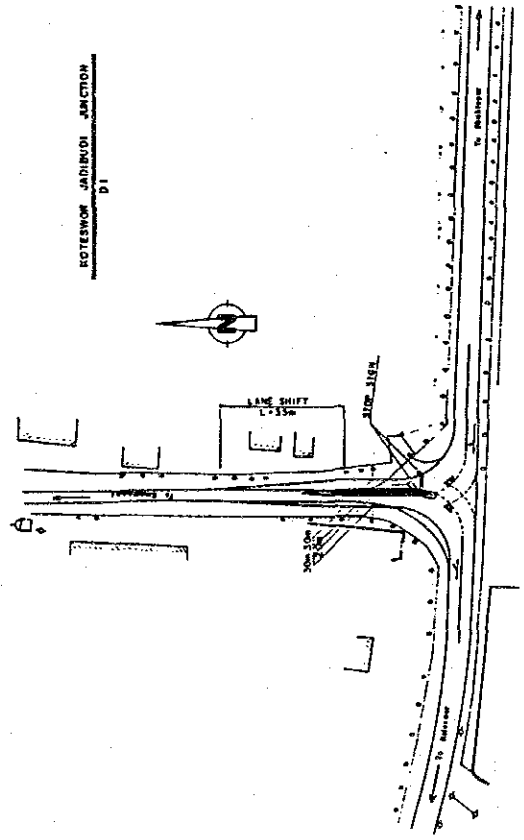




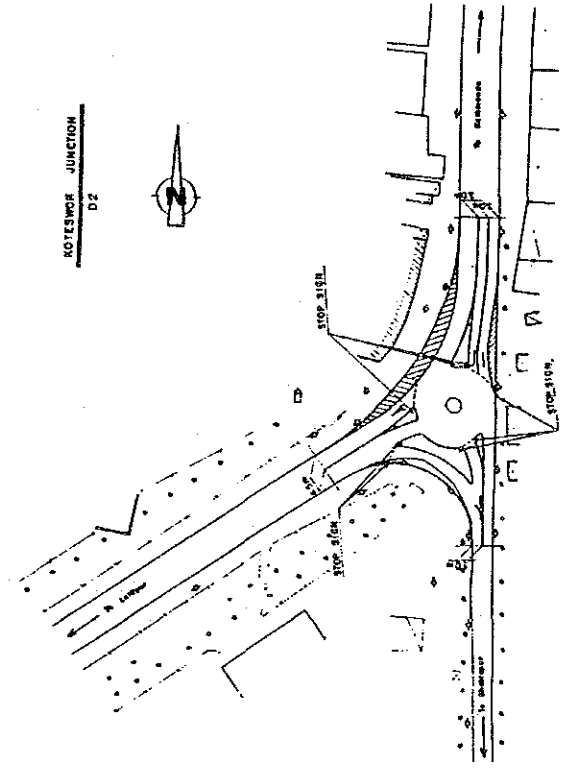
NOTESWOR-TINKLAME JUNCTION
D3



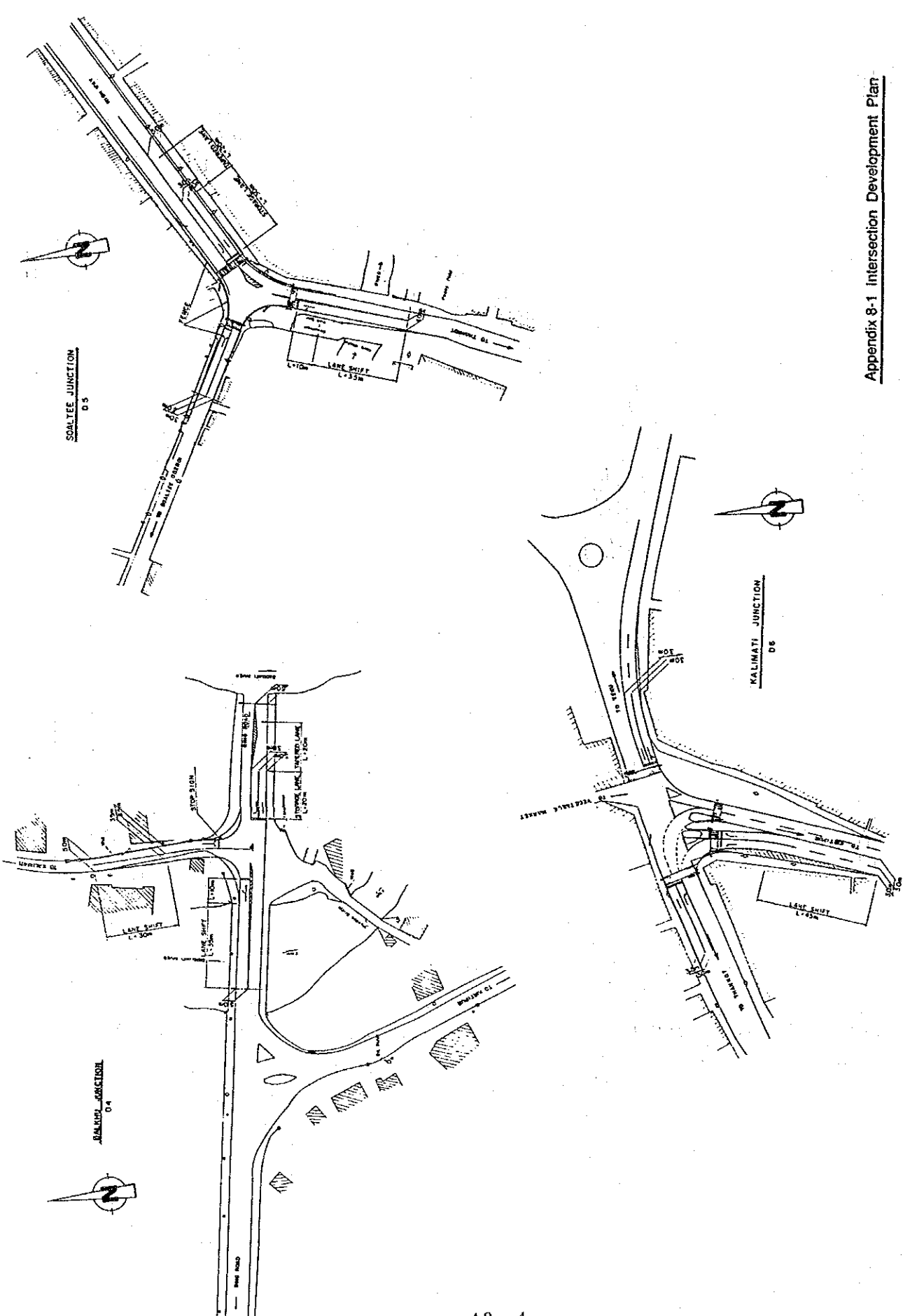
NOTESWOR JADIKUDI JUNCTION
D1



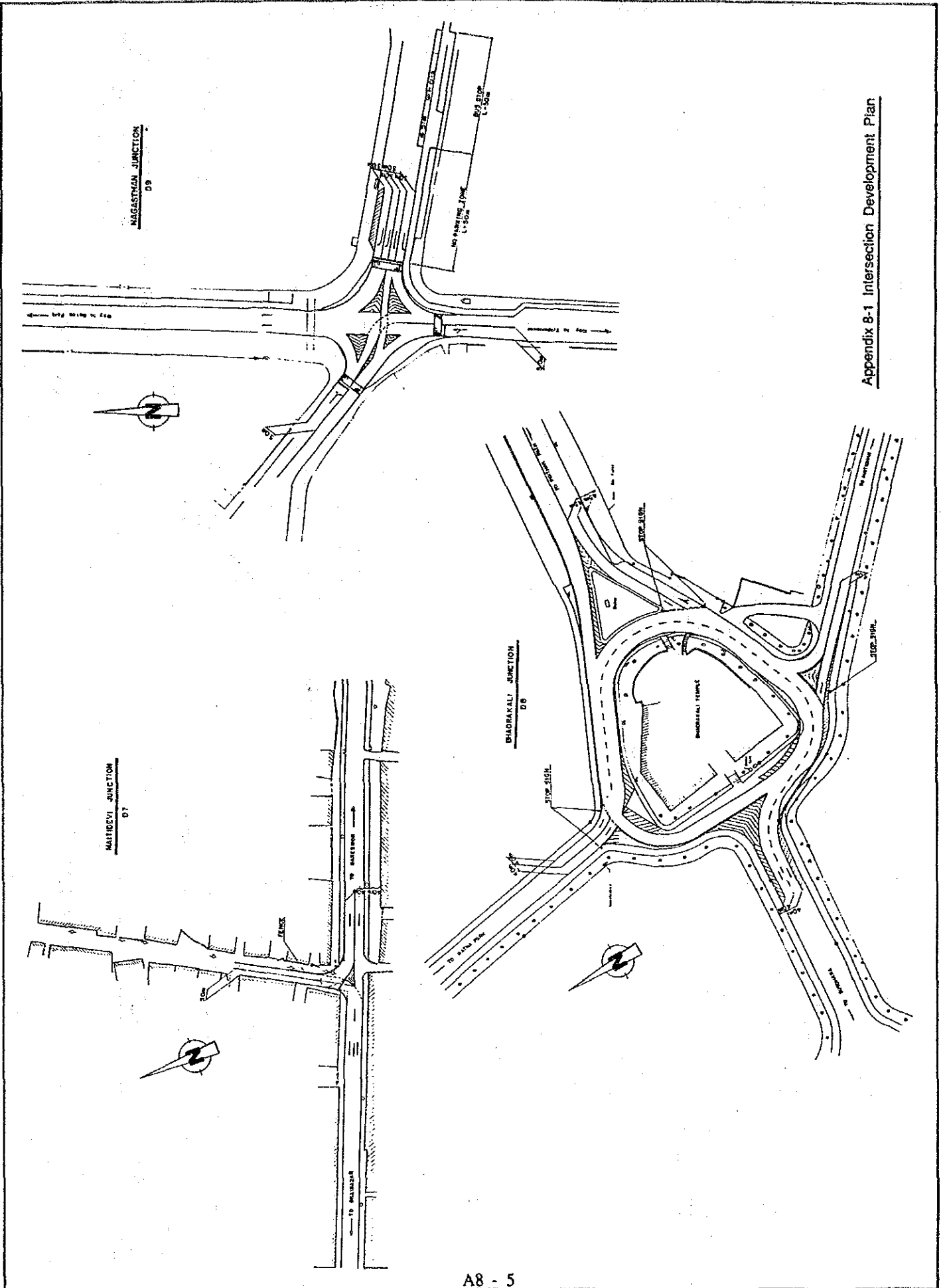
NOTESWOR JUNCTION
D2



Appendix 8-1 Intersection Development Plan

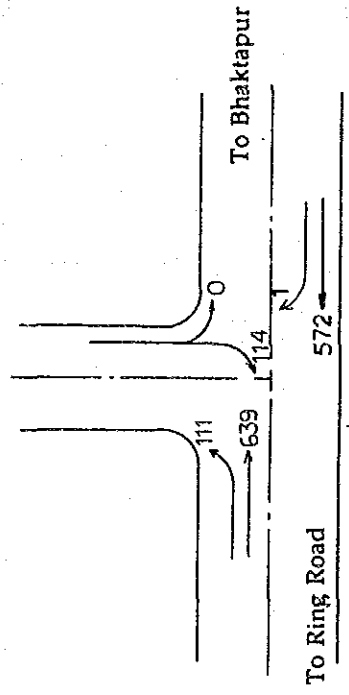
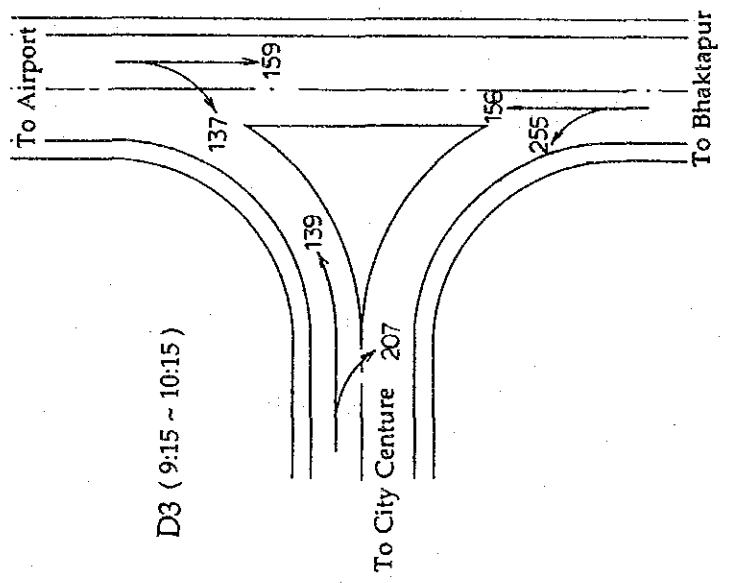
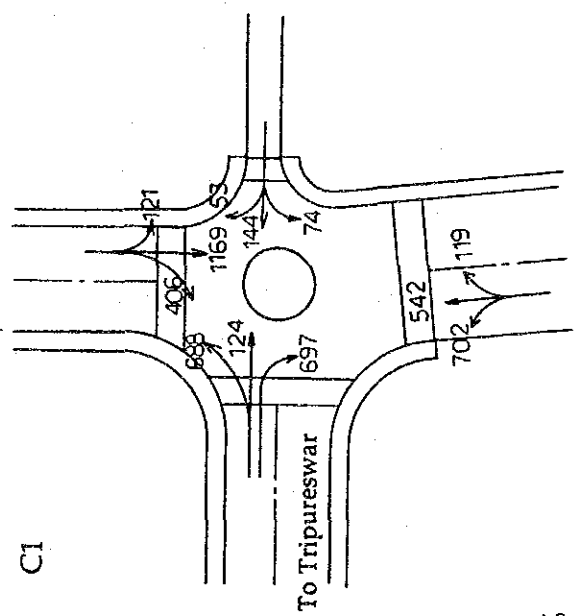
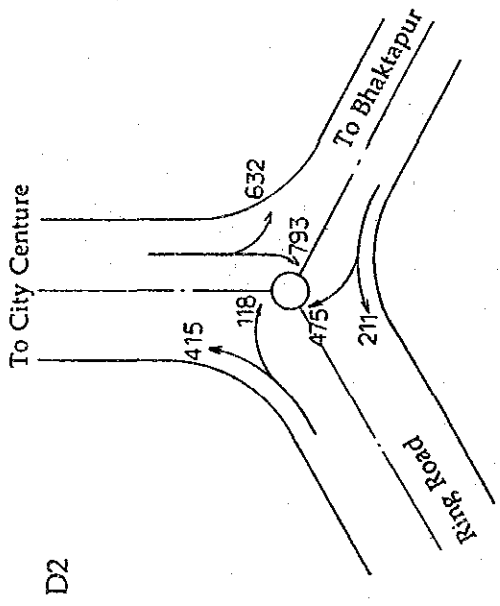
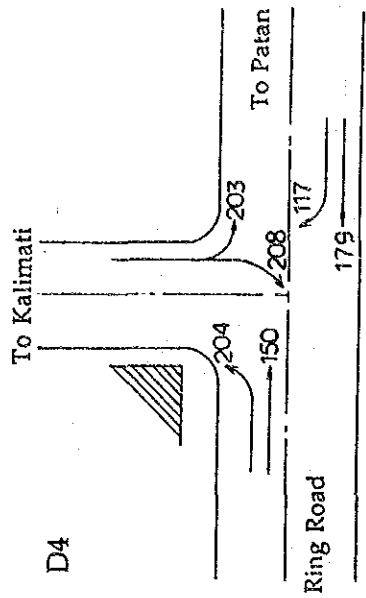


Appendix 8-1 Intersection Development Plan



Appendix 8-1 Intersection Development Plan

APPENDIX 8-2 TRAFFIC VOLUMES AT INTERSECTIONS

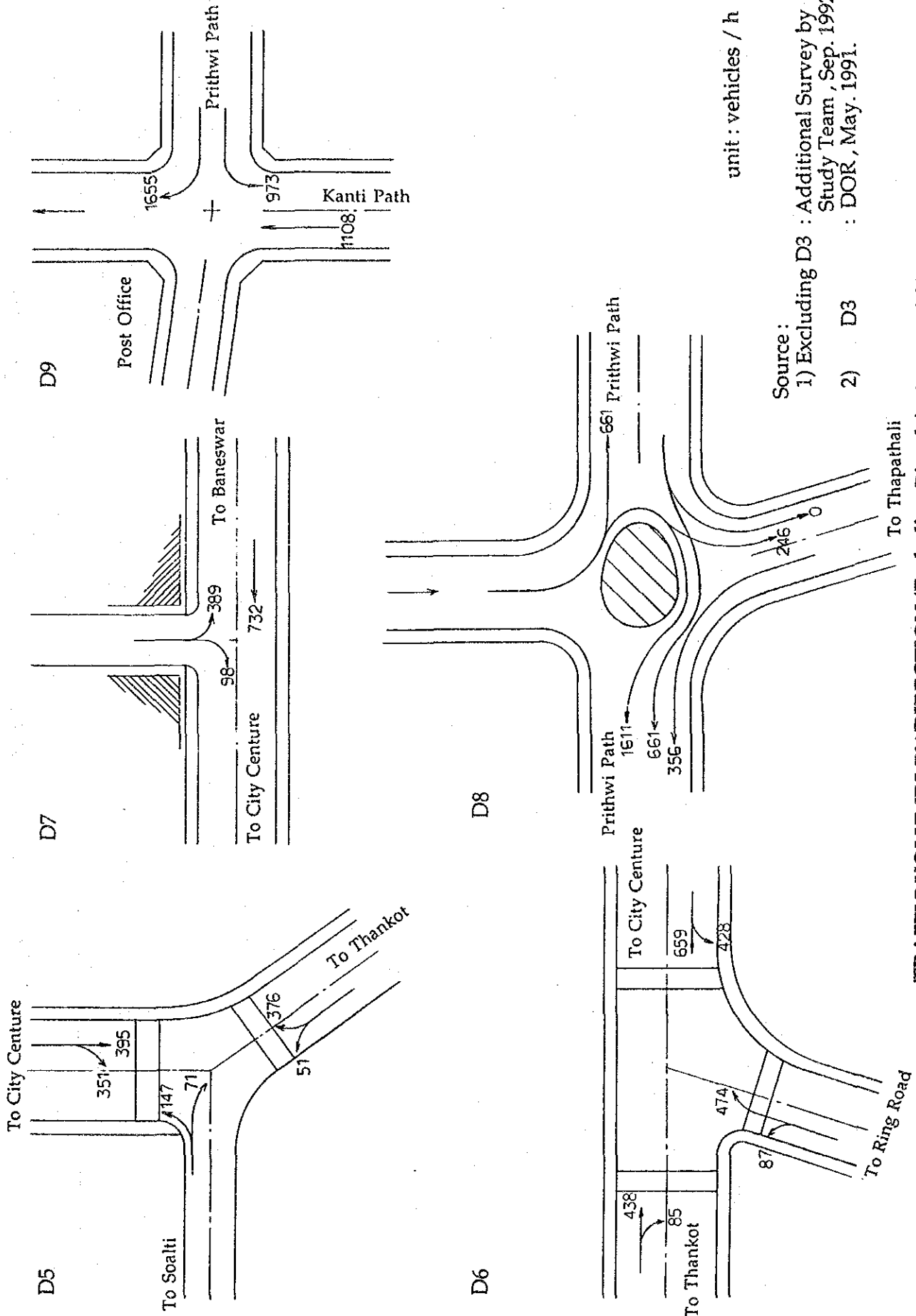


unit : vehicles / h

Source :
 1) Excluding D3 : Additional Survey by Study Team , Sep. 1992.
 2) D3 : DOR, May. 1991.

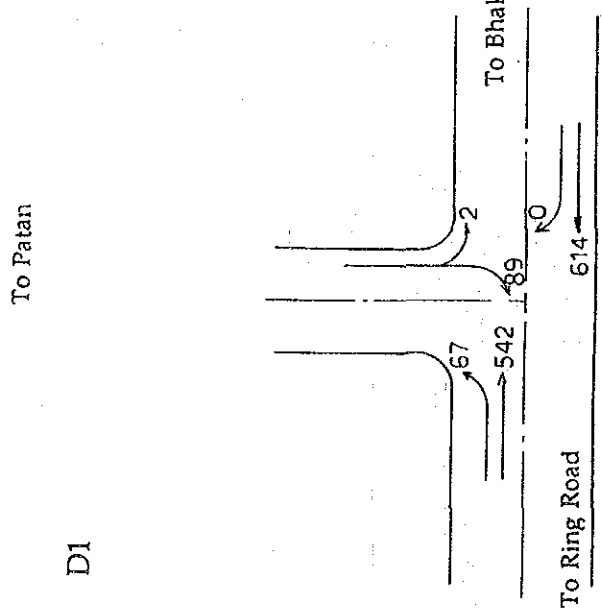
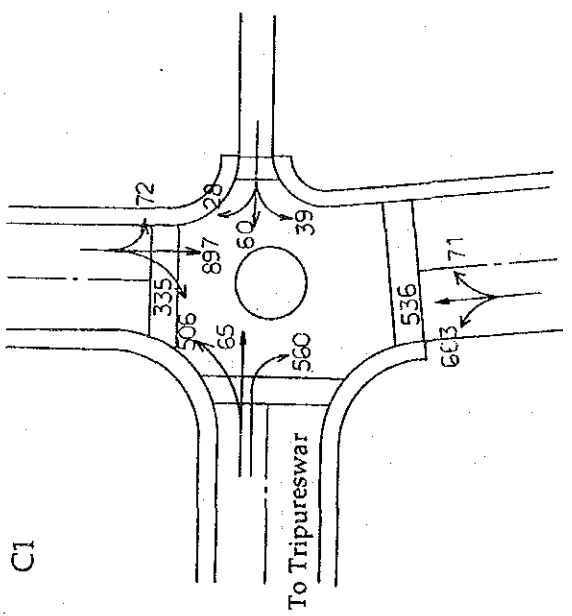
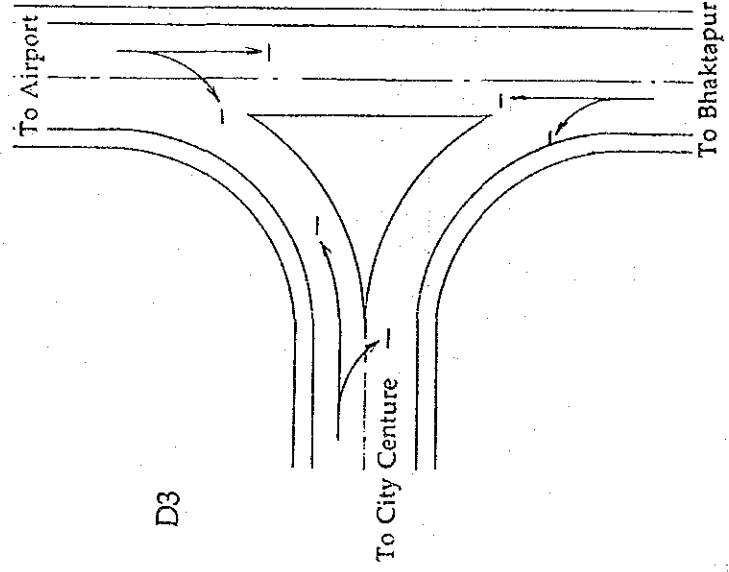
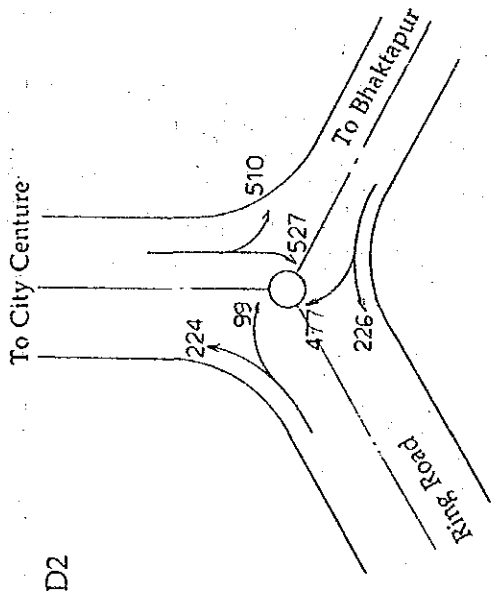
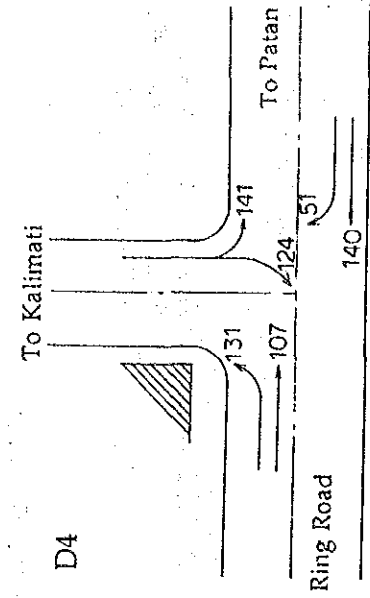
TRAFFIC VOLUMES BY DIRECTION (Excluding Bicycle) 10:00 ~ 11:00

APPENDIX 8-2 TRAFFIC VOLUMES AT INTERSECTIONS



TRAFFIC VOLUMES BY DIRECTION (Excluding Bicycle) 10:00 ~ 11:00

APPENDIX 8-2 TRAFFIC VOLUMES AT INTERSECTIONS

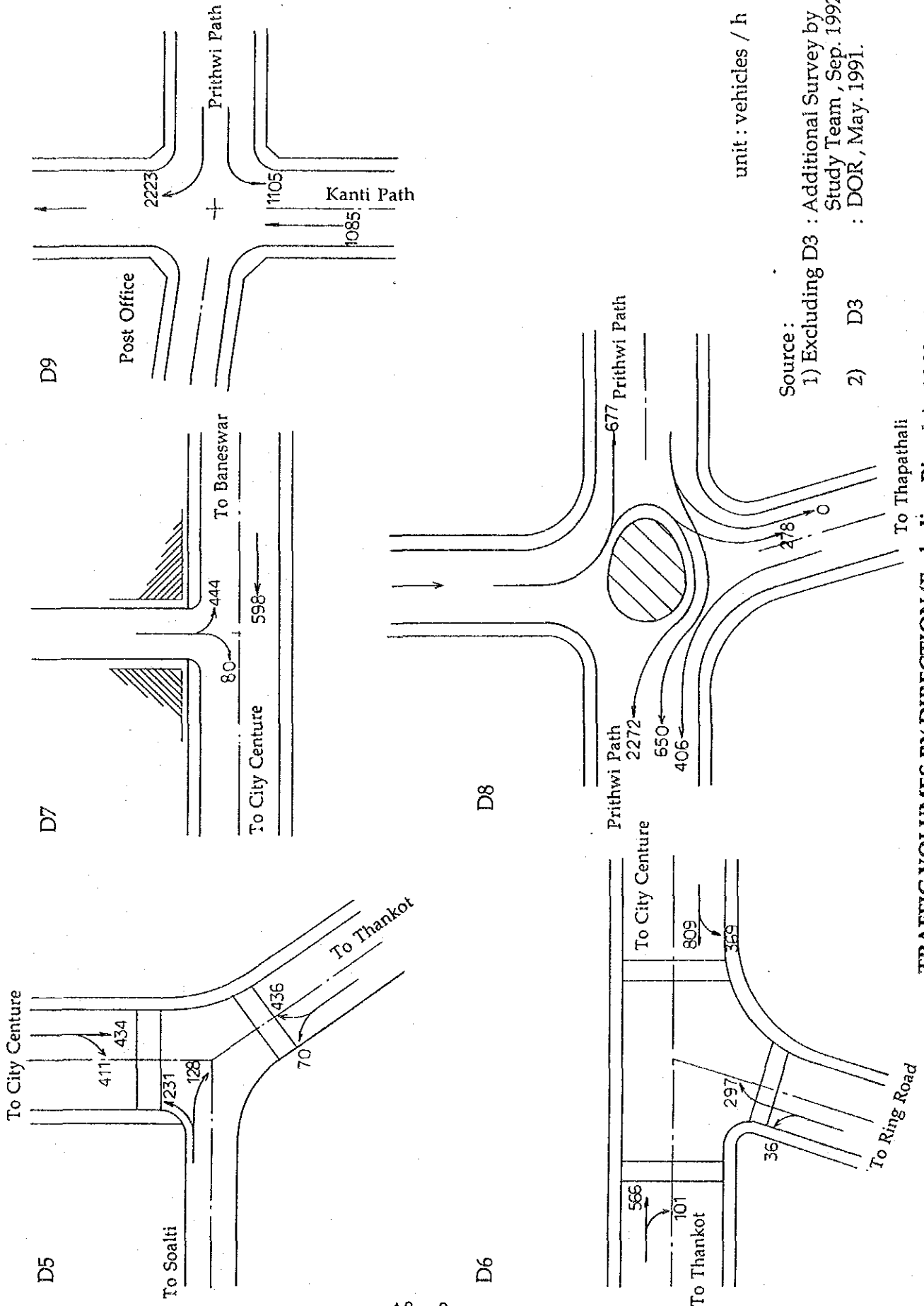


unit : vehicles / h

Source:
 1) Excluding D3 : Additional Survey by Study Team, Sep. 1992.
 2) D3 : DOR, May. 1991.

TRAFFIC VOLUMES BY DIRECTION (Excluding Bicycle) 16:00 ~ 17:00

APPENDIX 8-2 TRAFFIC VOLUMES AT INTERSECTIONS



**CHAPTER 9 DEVELOPMENT PLAN AND IMPLEMENTATION
SCHEDULE**

Appendix 9-1 Basic Information for Economic Evaluation

Appendix 9-2 Result of Economic Evaluation (Master Plan)

APPENDIX 9-1 BASIC INFORMATION FOR ECONOMIC EVALUATION

(1) Fuel Consumption Rates

Vehicle Type	Representative Vehicle	Fuel Consumption Rate (l/1000 km)	
		Gasoline	Diesel
Motorcycle	Hero Honda	33.33	-
Passenger Car	TOYOTA Corrola (Deluxe)	111.11	-
Truck	7 - 8 Ton TATA	-	222.22
Bus	63 Seater Long Chassis TATA	-	285.71

(2) Fuel Prices

Fuel Type	Retail Price	Duty and Tax	(Unit : NRs/litter)
			Economic Cost
Gasolin MS 87 Octan	25.0	9.0	16.0
Diesel HSD Diesel	10.0	3.6	6.4

Duty and Tax : 36%

* Source : TATA Company Kathmandu (Kalimati)
TOYOTA House Kathmandu (Lazimpat)
HERO Honda Company (Jyoti Bhawan)

(3) Oil Consumption Rate

Vehicle Type	Representative Vehicle	Oil Consumption	
		Type of Oil Used	Oil Consumption Rate (l/1,000 km)
Motorcycle	Hero Honda	Engine Oil 30 - 40	2.00
Passenger Car	TOYOTA Corrola (Deluxe)	Engine Oil 30 - 40	1.75
Truck	7 - 8 Ton TATA	Diesel Oil 30 - 40	3.50
Bus	63 Seater Hong Chassis TATA	Diesel Oil 30 - 40	3.75

(4) Oil Prices

Oil Type	Retail Price	Duty and Tax	(Unit : NRs/litter)
			Economic Cost
Engine Oil 30 - 40 (Gulf super duty)	150.0	54.0	96.0
Engine Oil 30 - 40 (Gulf super duty)	125.0	45.0	80.0

Duty and Tax : 36%

(5) Index for Fuel and Engine Oil Consumption Rate by Speed Level

Speed Level (km/h)	Index		
	Motorcycle/ Passenger Car	Truck	Bus
5	292	331	329
10	233	253	256
15	195	205	209
20	167	172	177
25	149	148	153
30	135	134	135
35	124	119	124
40	117	113	115
45	110	105	110
50	106	102	105
55	103	<u>100</u>	102
60	101	101	<u>100</u>
65	<u>100</u>	102	102
70	101	105	107
75	102	110	112
80	104	119	121
85	106	129	131

- Source :
- 1) Kanto Engineering Office, "Fuel Consumption the Vehicle Running on Roads - The Review on the Reports of Survey on Vehicle Fuel Consumption" 1979 Japan.
 - 2) M. Sano, "Fuel consumption on Roads" Traffic Engineering Vol. 14 No. 2, 1979 in Japan.

(6) Vehicle Prices

Vehicle Type	Representative Vehicle	Engine Capacity (cc)	Selling Price (NRs)	Price exclud. Taxes (NRs)	Remarks
Motorcycle	Hero Honda	100	63,000	37,170	Duty and Tax 41%
Passenger Car	TOYOTA Corrola (Deluxe)	1,300	1,850,000	646,850	186%
Truck	7 - 8 Ton TATA	4,788	880,000	519,200	41%
Bus	63 Seater Long Chassis TATA	4,788	1,080,000	637,200	41%

(7) Annual Travel Distance and Salvage Value

Vehicle Type	Representative Vehicle	Service Life (Years)	Annual Distance Travelled (Thousand km) (NRs)	Salvage Value of Vehicle (exclud. Taxes) (NRs)
Motorcycle	Hero Honda	7	29.2	19,700
Passenger Car	TOYOTA Corrola (Deluxe)	10	29.2	213,460
Truck	7 - 8 Ton TATA	8	36.5	244,020
Bus	63 Seater Long Chassis TATA	8	36.5	299,480

Salvage Value : 60% of initial value
(after 6 years' use)

(8) Depreciation, Capital and Interest Cost

Description	Motorcycle	Passenger Car	Truck	Bus
(A) Initial Vehicle Cost (Economic Cost W. O Tire)	37,170	646,850	519,200	637,200
(B) Vehicle Use in Year	7	10	8	8
(C) Salvage Value	19,700	213,460	244,020	299,480
(D) Depreciation Value (a) - (C)	17,470	433,390	275,180	337,720
(E) Capital Recovery Factor (r = 12%)	0.2191	0.1770	0.2013	0.2013
(F) Annual Cost (d) x (e)	3,828	76,710	55,394	67,983
(G) Life Operation (km)	204,400	292,000	292,000	292,000
(H) Annual Operation (km)	29,200	29,200	36,500	36,500
(I) Distance - Related Cost $\frac{(d)}{(B)} \times 1/2$ (H) (NRs/km)	0.0427	0.7421	0.4712	0.5783
(J) Annual Operation Hours (Hour)	2,880	2,880	2,880	2,880
(K) Time-Related Cost $\frac{(d)}{(B)} \times 1/2$ (J) (NRs/Hr)	0.4333	7.524	5.9719	7.3292
(L) Interest Charge $\frac{[(F) - (D)]}{(B)}$ (J) (NRs/Hr)	0.4625	11.5871	7.2903	8.9472
(M) Capital Cost (K) + (L) (NRs/Hr)	0.8958	19.1111	13.2622	16.2764

(9) Prices of Tire and Average Life Length of Tire

Vehicle Type	Representative Vehicle	Number of Tires	Average Life (km)	Unit Price of Tire & Tube		Share of Custom and Duty
				Retail Price (NRs)	Economic Cost (NRs)	
Motorcycle	Hero Honda	2	18,000	750	470	37%
Passenger Car	TOYOTA Corrola (Deluxe)	4	35,000	2,300	1,450	37%
Truck	7 - 8 Ton TATA	6	30,000	13,500	8,500	37%
Bus	63 Seater Long Chassis TATA	6	30,000	13,500	8,500	37%

Costom and Duty

= 37%

= (36% of Government Tax + 1% of Town Tax)

(10) Annual Repair and Maintenance Costs

Vehicle Type	Representative Vehicle	Annual expenditure on Parts (Excluding Tires)		Annual Expenditure on Labor		
		In Terms of % of Initial Price (1)	In Terms of NRs. (2)	Labor Hours for Maintenance per Annum	Wage Rate * per Hours (NRs/h)	Labor Cost per Annum (NRs/Year)
Motorcycle	Hero Honda	5%	1,860	8 x 6 = 48	11	530
Passenger Car	TOYOTA Corrola (Deluxe)	5%	32,340	24 x 6 = 144	18	2,590
Truck	7 - 8 Ton TATA	10%	51,920	28 x 6 = 168	18	3,020
Bus	63 Seater Long Chassis TATA	10%	63,720	28 x 6 = 168	18	3,020

(11) Crew Cost

Vehicle Type	Representative Vehicle	Crew Type	* Monthly Income per Person (NRs)	Annual Income per Person (NRs)	Operation Hours per Day	Annual Operation Hours	Remarks (if any)
Motor cycle	Hero Honda	-	-	-	8	2,880	
Passenger Car	TOYOTA Corrola (Deluxe)	Driver	18,000	21,600	8	2,880	
Truck	7 - 8 Ton TATA	Driver	3,000	36,000	8	2,880	
		Assistant	1,250	15,000	8	2,880	
Bus	63 Seater Long Chassis TATA (L.P.O. 55)	Driver	3,000	36,000	8	2,880	
		Assistant	1,250	15,000	8	2,880	

* 1.8 times of 1985 value

(12) Estimation of Unit Vehicle Operating Costs
(Tire Cost, Maintenance Cost, Crew Cost and Overhead)

Description		Motorcycle	Passenger Car	Truck	Bus
Tire (Set)	Price of a Set	NRs 470 x 2 = NRs 940	NRs 1,450 x 4 = NRs 5,800	NRs 8,500 x 6 = NRs 51,000	NRs 8,500 x 6 = NRs 51,000
	Tire Lift in km	18,000 km	35,000 km	30,000 km	30,000 km
	Tire Cost per km	NRs 0.0522	NRs 0.1657	NRs 1.7000	NRs 1.7000 km
Main- tenance	Part Cost (per year)	NRs 1,860	NRs 32,340	NRs 51,920	NRs 63,720
	Labor Cost (per year)	NRs 530	NRs 2,590	NRs 3,020	NRs 3,020
	Total Main- tenance Cost (per year)	NRs 2,390	NRs 34,930	NRs 54,940	NRs 66,740
	Annual Distance Travelled (km)	29,200 km	29,200 km	36,500 km	36,500 km
	Part Cost per 1,000 km	NRs 63.70	NRs 1,107.53	NRs 1,422.47	NRs 1,745.75
	Labor Cost per 1,000 km	NRs 18.15	NRs 88.70	NRs 82.74	NRs 82.74
	Total Mainte- nance Cost per 1,000 km	NRs 81.85	NRs 1,196.23	NRs 1,505.21	NRs 1,828.49
Crew Cost	Wage per Hour (driver)	-	NRs 7.500	NRs 12.500	NRs 12.500
	Wage per Hour (Assistant)	-	-	NRs 5.208	NRs 5.208
	Total Wage per Hour	-	NRs 7.500	NRs 17.708	NRs 17.708
Overhead*		15% of total Vehicle Oper- ating Cost	15% of total Vehicle Oper- ating Cost	25% of total Vehicle Oper- ating Cost	25% of total Vehicle Oper- ating Cost

* Percentages in this table are assumed based upon the existing study about the second east-west highway, the World Bank, 1986.

(13) Cost Factor per km and per Hour

Vehicle Operating Cost

Description	Speed Level (km/h)	Vehicle Type				
		Motorcycle	Taxi	Bus	Passenger Car	Truck
Fuel (NRs/1000km)	5	1,557	5,191	6,016	5,191	4,708
	10	1,243	4,142	4,681	4,142	3,598
	15	1,040	3,467	3,822	3,467	2,916
	20	891	2,969	3,237	2,969	2,446
	25	795	2,649	2,798	2,649	2,105
	30	720	2,400	2,469	2,400	1,906
	35	661	2,204	2,267	2,204	1,692
	40	624	2,080	2,103	2,080	1,607
	45	587	1,956	2,011	1,956	1,493
	50	565	1,884	1,920	1,884	1,451
	55	549	1,831	1,865	1,831	1,422
	60	539	1,796	1,829	1,796	1,436
	65	533	1,778	1,865	1,778	1,451
	70	539	1,796	1,957	1,796	1,493
	75	544	1,813	2,048	1,813	1,564
	80	555	1,849	2,213	1,849	1,692
85	565	1,884	2,395	1,884	1,835	
Oil (NRs/1000km)	5	561	491	987	491	927
	10	447	391	768	391	708
	15	374	328	627	328	574
	20	321	281	531	281	482
	25	286	250	459	250	414
	30	259	227	405	227	375
	35	238	208	372	208	333
	40	225	197	345	197	316
	45	211	185	330	185	294
	50	204	178	315	178	286
	55	198	173	306	173	280
	60	194	170	300	170	283
	65	192	168	306	168	286
	70	194	170	321	170	294
	75	196	171	336	171	308
	80	200	175	363	175	333
85	204	178	393	178	361	
Tire (NRs/1000km)		52	166	1,700	166	1,700
Maintenance -Parts (NRs/1000km)		64	1,108	1,746	1,108	1,422
Maintenance -Labor (NRs/1000km)		18	89	83	89	83
Depreciation (NRs/1000km)		43	74	58	74	47
Crew (NRs/h)		0.00	7.50	17.71	7.50	17.71
Capital (NRs/h)		0.90	19.11	16.28	19.11	13.26

(NRs/1000km)

(14) Vehicle Operating Cost : Motorcycle

Speed Level (km/h)	Fuel	Oil	Tire	Maintenance		Depreciation	Crew	Capital	Subtotal	Overhead (15%)	Total
				Parts	Labor						
5	1,557	561	52	64	18	43	0	179	2,474	371	2,845
10	1,243	447	52	64	18	43	0	90	1,956	293	2,250
15	1,040	374	52	64	18	43	0	60	1,651	248	1,898
20	891	321	52	64	18	43	0	45	1,433	215	1,648
25	795	286	52	64	18	43	0	36	1,293	194	1,487
30	720	259	52	64	18	43	0	30	1,186	178	1,363
35	661	238	52	64	18	43	0	26	1,102	165	1,267
40	624	225	52	64	18	43	0	22	1,048	157	1,205
45	587	211	52	64	18	43	0	20	994	149	1,144
50	565	204	52	64	18	43	0	18	963	145	1,108
55	549	198	52	64	18	43	0	16	940	141	1,081
60	539	194	52	64	18	43	0	15	924	139	1,063
65	533	192	52	64	18	43	0	14	916	137	1,053
70	539	194	52	64	18	43	0	13	922	138	1,060
75	544	196	52	64	18	43	0	12	928	139	1,068
80	555	200	52	64	18	43	0	11	942	141	1,083
85	565	204	52	64	18	43	0	11	956	143	1,099
							0.00	0.90			

(15) Vehicle Operating Cost : Taxi and Passenger Car (NRs/1000km)

Speed Level (km/h)	Fuel	Oil	Tire	Maintenance		Depreciation	Crew	Capital	Subtotal	Overhead (15%)	Total
				Parts	Labor						
5	5,191	491	166	1,108	89	74	1,500	3,822	12,440	1,866	14,306
10	4,142	391	166	1,108	89	74	750	1,911	8,631	1,295	9,926
15	3,467	328	166	1,108	89	74	500	1,274	7,005	1,051	8,055
20	2,969	281	166	1,108	89	74	375	956	6,016	902	6,919
25	2,649	250	166	1,108	89	74	300	764	5,400	810	6,210
30	2,400	227	166	1,108	89	74	250	637	4,950	743	5,693
35	2,204	208	166	1,108	89	74	214	546	4,609	691	5,301
40	2,080	197	166	1,108	89	74	188	478	4,378	657	5,035
45	1,956	185	166	1,108	89	74	167	425	4,168	625	4,793
50	1,884	178	166	1,108	89	74	150	382	4,031	605	4,636
55	1,831	173	166	1,108	89	74	136	347	3,924	589	4,513
60	1,796	170	166	1,108	89	74	125	319	3,845	577	4,422
65	1,778	168	166	1,108	89	74	115	294	3,791	569	4,360
70	1,796	170	166	1,108	89	74	107	273	3,782	567	4,349
75	1,813	171	166	1,108	89	74	100	255	3,776	566	4,342
80	1,849	175	166	1,108	89	74	94	239	3,793	569	4,361
85	1,884	178	166	1,108	89	74	88	225	3,812	572	4,384
							7.50	19.11			

(NRs/1000km)

(16) Vehicle Operating Cost : Bus

Speed Level (km/h)	Fuel	Oil	Tire	Maintenance		Depreciation	Crew	Capital	Subtotal	Overhead (25%)	Total
				Parts	Labor						
5	6,016	987	1,700	1,746	83	58	3,542	3,255	17,386	4,347	21,733
10	4,681	768	1,700	1,746	83	58	1,771	1,628	12,434	3,108	15,542
15	3,822	627	1,700	1,746	83	58	1,181	1,085	10,301	2,575	12,876
20	3,237	531	1,700	1,746	83	58	885	814	9,053	2,263	11,316
25	2,798	459	1,700	1,746	83	58	708	651	8,202	2,051	10,253
30	2,469	405	1,700	1,746	83	58	590	543	7,593	1,898	9,491
35	2,267	372	1,700	1,746	83	58	506	465	7,197	1,799	8,996
40	2,103	345	1,700	1,746	83	58	443	407	6,884	1,721	8,605
45	2,011	330	1,700	1,746	83	58	394	362	6,683	1,671	8,354
50	1,920	315	1,700	1,746	83	58	354	326	6,501	1,625	8,126
55	1,865	306	1,700	1,746	83	58	322	296	6,375	1,594	7,969
60	1,829	300	1,700	1,746	83	58	295	271	6,281	1,570	7,852
65	1,865	306	1,700	1,746	83	58	272	250	6,280	1,570	7,850
70	1,957	321	1,700	1,746	83	58	253	233	6,349	1,587	7,937
75	2,048	336	1,700	1,746	83	58	236	217	6,424	1,606	8,029
80	2,213	363	1,700	1,746	83	58	221	203	6,587	1,647	8,233
85	2,395	393	1,700	1,746	83	58	208	191	6,775	1,694	8,468
							17.71	16.28			

(NRs/1000km)

(17) Vehicle Operating Cost : Truck

Speed Level (km/h)	Fuel	Oil	Tire	Maintenance		Depreciation	Crew	Capital	Subtotal	Overhead (25%)	Total
				Parts	Labor						
5	4,708	927	1,700	1,422	83	47	3,542	2,652	15,081	3,770	18,851
10	3,598	708	1,700	1,422	83	47	1,771	1,326	10,656	2,664	13,320
15	2,916	574	1,700	1,422	83	47	1,181	884	8,807	2,202	11,008
20	2,446	482	1,700	1,422	83	47	885	663	7,729	1,932	9,661
25	2,105	414	1,700	1,422	83	47	708	530	7,011	1,753	8,763
30	1,906	375	1,700	1,422	83	47	590	442	6,566	1,641	8,207
35	1,692	333	1,700	1,422	83	47	506	379	6,163	1,541	7,704
40	1,607	316	1,700	1,422	83	47	443	332	5,950	1,488	7,438
45	1,493	294	1,700	1,422	83	47	394	295	5,728	1,432	7,160
50	1,451	286	1,700	1,422	83	47	354	265	5,608	1,402	7,010
55	1,422	280	1,700	1,422	83	47	322	241	5,518	1,379	6,897
60	1,436	283	1,700	1,422	83	47	295	221	5,488	1,372	6,860
65	1,451	286	1,700	1,422	83	47	272	204	5,465	1,366	6,831
70	1,493	294	1,700	1,422	83	47	253	189	5,482	1,371	6,853
75	1,564	308	1,700	1,422	83	47	236	177	5,538	1,384	6,922
80	1,692	333	1,700	1,422	83	47	221	166	5,665	1,416	7,081
85	1,835	361	1,700	1,422	83	47	208	156	5,813	1,453	7,266
							17.71	13.26			

(18) Unit Time Cost by Type of Vehicles

Vehicle Type	Hourly Per capita Income (NRs.) (1)	Average Number of Passengers*1 (Person) (2)	Share of Business Trip*2 (3)	Probability of income-yielding activity*3 (4)	Unit Time Cost (NRs./hr.) (5) = (1) × (2) × (3) × (4)
Motorcycle	21.4	1.5	0.37	0.5	5.9
Passenger Car	21.4	2.7	0.27	0.5	7.8
Truck	21.4	3.2	0.37	0.5	12.7
Bus	21.4	45.8	0.20	0.5	98.0

*1, 2 : Result of traffic survey conducted by the Study Team.
(Ref. Table A-6-3 of Appendix 6 and Article 4.2.2)

*3 : One-half of opportunity for selecting productive activity was assumed.

APPENDIX 9-2 RESULT OF ECONOMIC EVALUATION (MASTER PLAN)

(1) VOC Cost

		Motorcycle	Taxi	Bus	Passenger Car	Truck	Total
VOC Cost (1,000NRs/year)	1997-without	262,466	1,016,572	407,625	747,787	808,013	3,242,463
	1997-with	243,939	938,922	389,249	693,882	789,033	3,055,025
	2015-without	624,611	1,325,552	849,501	2,700,810	2,936,141	8,436,615
	2015-with	488,573	1,000,821	574,662	2,107,705	2,533,856	6,705,617
	1997(without-with)	18,527	77,650	18,376	53,905	18,980	187,438
	2015(without-with)	136,038	324,731	274,839	593,105	402,285	1,730,998

(2) Time Cost

		Motorcycle	Taxi	Bus	Passenger Car	Truck	Total
Vehicle x Time (Vehicle*hr/day)	1997-without	18,276	17,367	3,610	12,136	7,698	59,087
	1997-with	15,977	15,117	3,257	10,511	7,300	52,162
	2015-without	57,077	28,962	8,042	56,884	36,191	187,156
	2015-with	33,307	16,288	5,270	33,926	24,688	113,479
Unit Time Cost (NRs/hr)		5.9	7.8	98.0	7.8	12.7	
Time Cost (1,000NRs/year)	1997-without	39,357	49,444	129,130	34,551	35,684	288,166
	1997-with	34,406	43,038	116,503	29,925	33,839	257,711
	2015-without	122,915	82,455	287,662	161,949	167,763	822,745
	2015-with	71,727	46,372	188,508	96,587	114,441	517,635
	1997(without-with)	4,951	6,406	12,627	4,626	1,845	30,455
	2015(without-with)	51,189	36,083	99,154	65,361	53,322	305,110

(3) IRR

Benefit	VOC Saving	1997	187	
		2015	1,731	
Time Cost Saving		1997	30	
		2015	-305	
		1993	342	380
		1994	779	865
Cost	Construction Cost	1995	725	805
		1996	531	590
		1997	459	510
		1998-2005	3,501	3,890
		2006-2015	4,104	4,560
		Maintenance Cost		Construction Cost*0.05

Project Life 25 year

IRR= 13.6

(1,000,000NRs)

Year	Cost						Benefit						Benefit-Cost
	Construction		Maintenance		Total	VOC Saving		Time Cost Saving		Bridge Maint. Cost Saving	Total		
	Short	Long	Short	Long		Short	Long	Short	Long				
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	342	0	1	0	343	26	0	4	0	0	0	30	-313
1994	779	0	2	0	780	54	0	9	0	0	0	62	-718
1995	725	0	3	0	727	84	0	13	0	0	0	97	-630
1996	531	0	4	0	535	116	0	19	0	0	0	134	-401
1997	459	0	5	0	464	150	0	24	0	0	0	174	-290
1998	0	438	6	1	444	187	40	30	7	32	296	-148	
1999	0	438	6	2	445	194	84	31	15	0	324	-121	
2000	0	438	6	3	446	201	130	32	23	32	419	-27	
2001	0	438	6	3	447	209	180	34	32	0	455	8	
2002	0	438	6	4	448	217	234	35	42	32	560	112	
2003	0	438	6	5	448	225	291	36	52	0	605	156	
2004	0	438	6	6	449	234	352	38	64	32	719	270	
2005	0	438	6	7	450	243	418	39	75	0	775	325	
2006	0	410	6	8	424	252	488	40	88	32	960	477	
2007	0	410	6	8	425	262	563	42	102	0	968	543	
2008	0	410	6	9	425	272	643	44	116	32	1,106	680	
2009	0	410	6	10	426	282	728	45	131	0	1,186	760	
2010	0	410	6	11	427	293	818	47	148	32	1,337	910	
2011	0	410	6	12	428	304	915	49	165	0	1,432	1,004	
2012	0	410	6	13	429	315	1,017	51	184	32	1,598	1,170	
2013	0	410	6	14	430	327	1,126	52	203	0	1,709	1,279	
2014	0	410	6	14	430	340	1,242	54	224	32	1,892	1,462	
2015	0	410	6	15	431	353	1,365	57	246	0	2,020	1,589	
2016	0	0	6	15	21	366	1,365	59	246	32	2,068	2,047	
2017	0	0	6	15	21	380	1,417	61	256	0	2,113	2,092	
2018	0	0	5	15	20	329	1,471	53	265	32	2,149	2,129	
2019	0	0	4	15	19	273	1,527	44	275	0	2,119	2,100	
2020	0	0	3	15	18	212	1,585	34	286	32	2,149	2,131	
2021	0	0	2	15	17	147	1,645	24	297	0	2,112	2,095	
2022	0	0	1	15	16	76	1,707	12	308	32	2,136	2,120	
2023	0	0	0	14	14	0	1,674	0	302	0	1,976	1,961	
2024	0	0	0	14	14	0	1,635	0	295	0	1,930	1,917	
2025	0	0	0	13	13	0	1,591	0	287	0	1,878	1,866	
2026	0	0	0	12	12	0	1,542	0	278	0	1,820	1,808	
2027	0	0	0	11	11	0	1,486	0	268	0	1,754	1,743	
2028	0	0	0	10	10	0	1,424	0	257	0	1,681	1,670	
2029	0	0	0	9	9	0	1,355	0	244	0	1,599	1,590	
2030	0	0	0	8	8	0	1,278	0	231	0	1,509	1,501	
2031	0	0	0	8	8	0	1,194	0	215	0	1,410	1,402	
2032	0	0	0	7	7	0	1,102	0	199	0	1,301	1,294	
2033	0	0	0	6	6	0	1,001	0	181	0	1,181	1,175	
2034	0	0	0	5	5	0	890	0	161	0	1,051	1,046	
2035	0	0	0	4	4	0	770	0	139	0	909	905	
2036	0	0	0	3	3	0	640	0	115	0	755	752	
2037	0	0	0	3	3	0	498	0	90	0	588	585	
2038	0	0	0	2	2	0	345	0	62	0	407	405	
2039	0	0	0	1	1	0	179	0	32	0	211	210	
2040	0	0	0	0	0	0	0	0	0	0	0	0	0

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