Chapter 7

Transportation Demand Forecast

Chapter 7 Transportation Demand Forecast

7.1 Objective of the Analysis and Simulation Cases

The objective of the simulation is to quantitatively test the concepts and principles of the transportation system development, such as the foundation of the "Urban Transportation Management Policies and Strategies" mentioned in Chapter 6, the recommendation of the "Long Term Development Plan" mentioned in Chapter 8, several traffic management schemes to be discussed in the "Traffic Control and Management System" mentioned in Chapter 9. Furthermore, based on the projected transportation demand coupled with the corresponding costs, transportation policies and strategies are examined economically and financially in "Economic Analysis" in Chapter 12 and "Financial Analysis on Public Transport Projects" in Chapter 13. Future traffic demand is also the primary input into the environmental air pollution analysis in Chapter 14, thus providing the vital link between the impact of transport policies on the environment.

Several combinations of infrastructure development and transportation demand management schemes are taken into consideration for evaluating the impacts of the various policies and strategies on transportation system development.

Future transportation demand has been predicted for 30 cases as listed in Table 7.1.1. They include simulation runs with and without improved public transportation system (trunk bus system and/or LRT system), highway network development and traffic restraint scheme(area pricing).

Components of the highway network to be added onto the existing highway network for demand projection years 2000, 2010, and 2020 are listed in Table 7.1.2 and the highway network is shown in Figures 7.1.1 through 7.1.3. The composition of the public transport network is summarised in Table 7.1.3 and the public transport networks for simulation cases are illustraed in Figures 7.1.4 through 7.1.8.

Table 7.1.1 Simulation Cases

Year	Simulation Case	Highway Network	Public Transport Network		Area Pricing
			Rail	Trunk Bus	
2000	BASE00	Highway Network 2000	Railway Network 2000	4 routes	Not applied
	WO00	Highway Network 2000	Railway Network 2000	none	
	WOHWY00	Highway Network 2000	Railway Network 2000	4 routes	
	WOTBS00	Highway Network 2000	Railway Network 2000	none	
	WORW00	Highway Network 2000	None	4 routes	
	LRTA00	Highway Network 2000	Railway Network 2000 + LRT(A) Network	None	
	LRTB00	Highway Network 2000	Railway Network 2000 + LRT(B) Network	None	
	APATB00	Highway Network 2000	Railway Network 2000	4 routes	Applied
2010	BASE10	Highway Network 2010	Railway Network 2000	4 routes	Not applied
	WO10	Highway Network 2000	Railway Network 2000	none	
	WOHWY10	Highway Network 2000	Railway Network 2000	4 routes	
	WOTBS10	Highway Network 2010	Railway Network 2000	4 routes	
	WORW10	Highway Network 2010	None	4 routes	
	LRTA10	Highway Network 2010	Railway Network 2000 + LRT(A) Network	none	
	LRTB10	Highway Network 2010	Railway Network 2000 + LRT(B) Network	none	
	APATB10	Highway Network 2010	Railway Network 2000	4 routes	Applied
	APALA10	Highway Network 2010	Railway Network 2000 + LRT(A) Network	none	
	APALB10	Highway Network 2010	LRT(B) Network	none	
	APAFN10	Highway Network 2010	Railway Network + Damansara-Cheras Line	3 routes	
2020	BASE20	Highway Network 2020	Railway Network 2000	4 routes	Not applied
	WO20	Highway Network 2000	Railway Network 2000	none	
	WOHWY20	Highway Network 2000	Railway Network 2000	4 routes	
	WOTBS20	Highway Network 2020	Railway Network 2000	4 routes	
	WORW20	Highway Network 2020	none	4 routes	
	LRTA20	Highway Network 2020	Railway Network 2000 + LRT(A) Network	none	
	LRTB20	Highway Network 2020	Railway Network 2000 + LRT(B) Network	none	
	APATB20	Highway Network 2020	Railway Network 2000	4 routes	Applied
	APALA20	Highway Network 2020	Railway Network 2000 + LRT(A) Network	none	
	APALB20	Highway Network 2020	Railway Network 2000 + LRT(B) Network	none	
	APAFN20	Highway Network 2020	Railway Network + Damansara-Cheras Line	3 routes	

Table 7.1.2 Components of Highway Network 2000, 2010, and 2020

No	Project Name	Highway Network 2000	Highway Network 2010	Highway Network 2020
1	North-South Interurban Toll Expressway	X		
2	North-South Central Link Toll Express way	X		
3	Federal Highway II Extension	X		
4	Shah Alam Toll Expressway Section B	X		
5	KL-Karak Highway	X		
6	Cheras-Kajang Highway	X		
7	Sungai Besi Highway	X		
8	Damansara-Puchong Highway	X		
9	Ampang Elevated Highway Phase 1	X		
10	KL North-East Highway	X		
11	New Pantai Highway	X	X	
12	KLIA Dedicated Highway	X	X	
13	Kajang Traffic Dispersal Ring Road	X	X	
14	Kajang-Seremban Expressway	X	X	
15	Kajang Bypass	X	X	
16	Asam Jawa-Taman Rimba Templer Expressway	X	X	
17	Banting-Taiping Expressway	X	X	
18	Western KL Traffic Dispersal Scheme	X	X	
19	Pandan Corridor Extension	X	X	
20	KL Elevated Inner Ring Road	X	X	
21	KL Transit Route	X	X	
22	Kuala Lumpur-Rawang Expressway	X	X	
23	Shah Alam-Rawang Expressway	X	X	
24	Wangsa-Keramat Expressway	X	X	
25	South Klang Valley Expressway	X	X	
26	East Coast Expressway	X	X	
27	Road A2	X	X	
28	Road C1 & C2	X	X	
29	Road L2 to L8	X	X	
30	KL Outer Ring Road	X	X	X
31	Underground Expressway	X	X	X
32	Road A1(Connecting Link)	X	X	X
33	Road L1	X	X	X

Note : "X" indicates the component is included in the network for a simulation case.

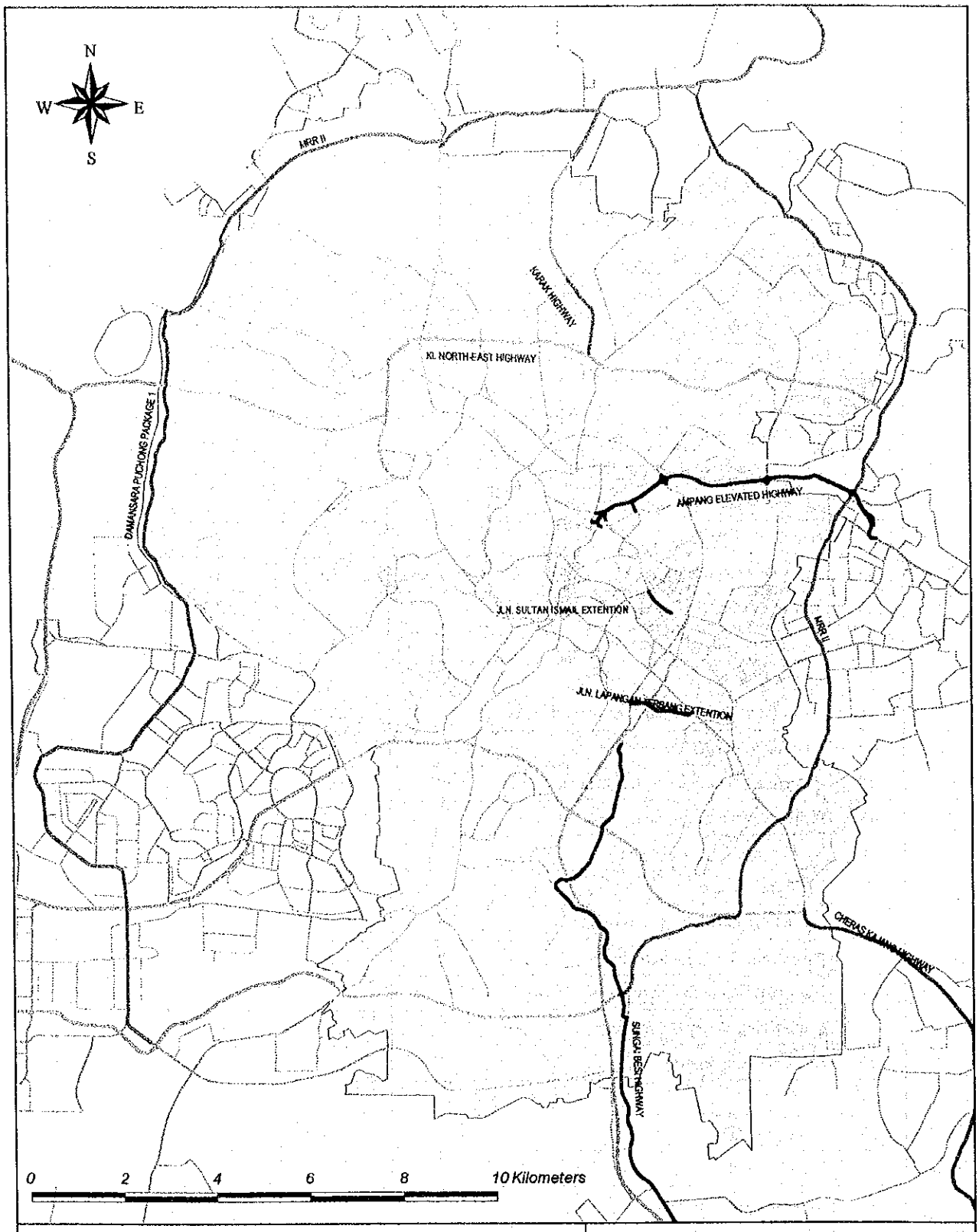

Figure 7.1.1
Highway Network 2000

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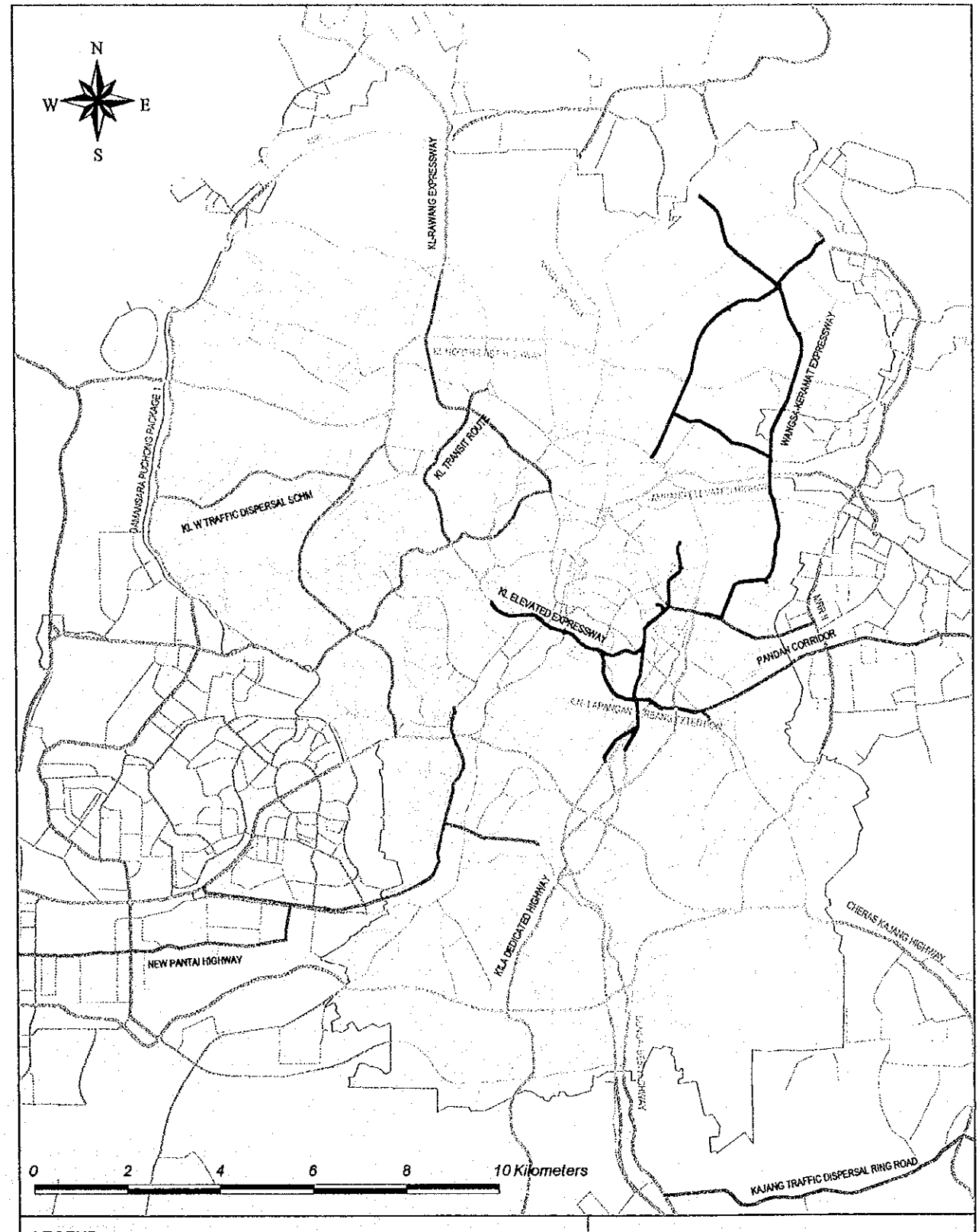

Figure 7.1.2
Highway Network 2010

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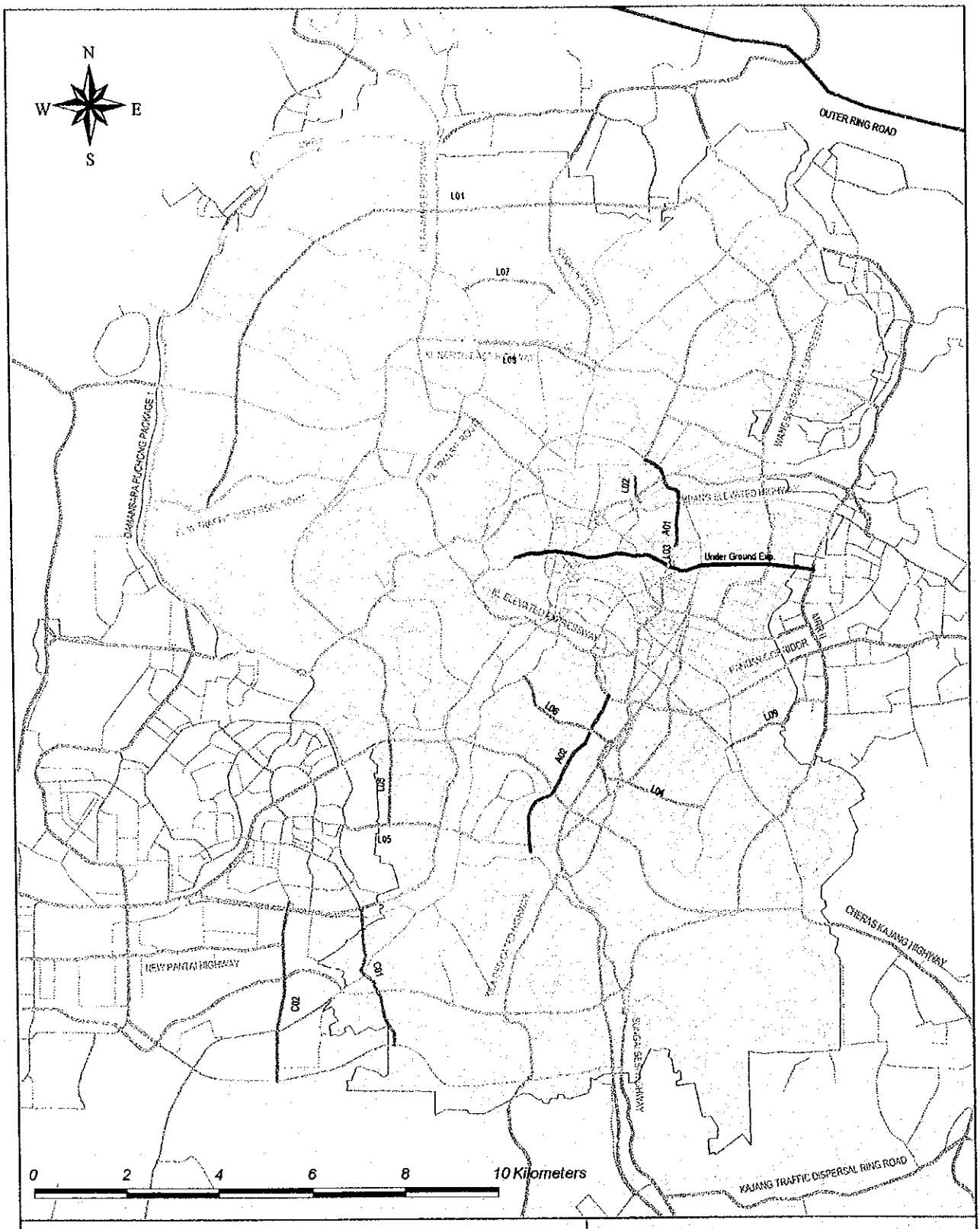

LEGEND

- OUTER RING ROAD
- SMURT Road Development Plan
- Arterial Road
- Connecting Link
- Local Road

Figure 7.1.3
Highway Network 2020

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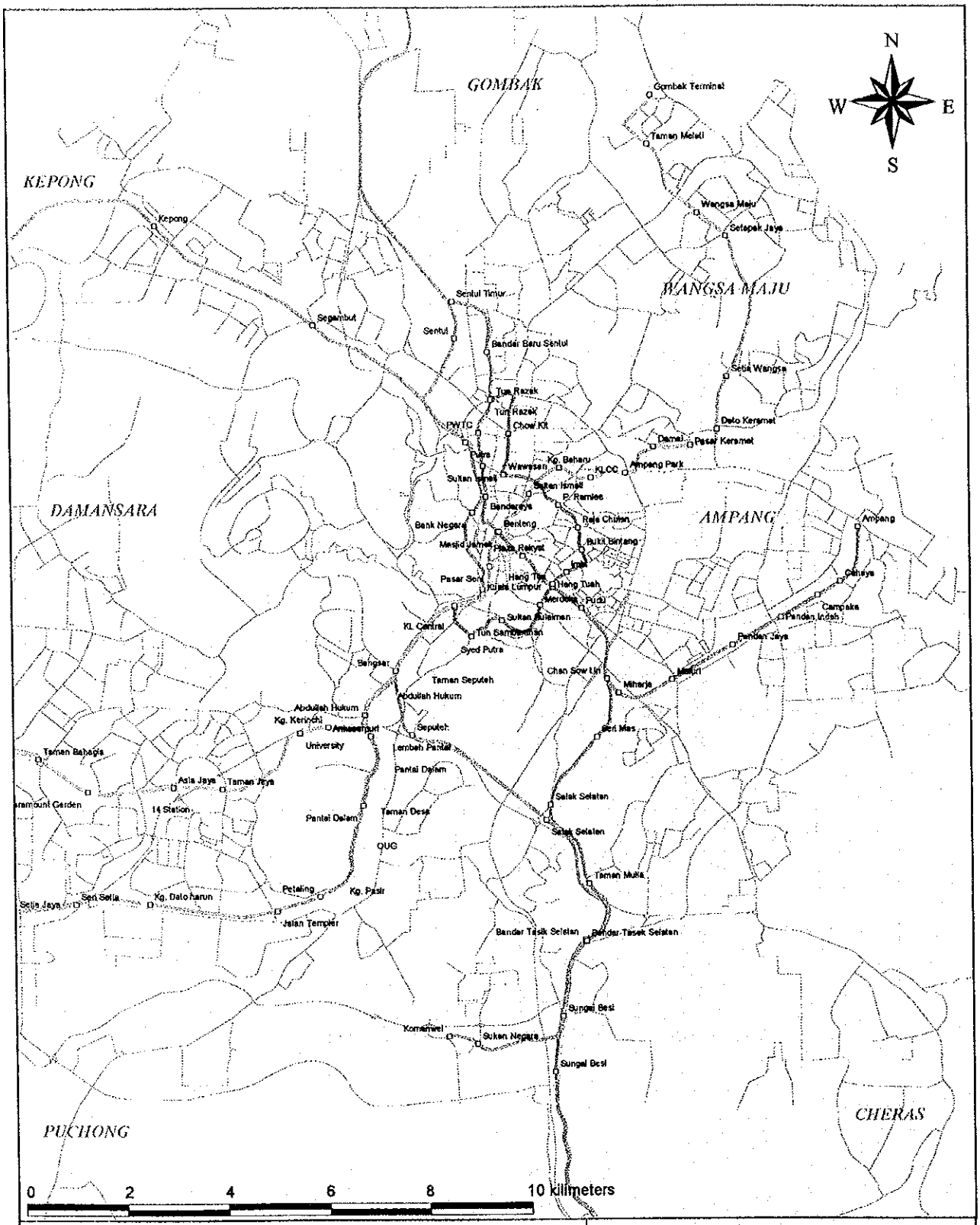
Table 7.1.3 Public Transport Network for Simulation

Mode of Transport	Operator	Line / Section	Simulation Case					
			WORW	BASE / WOHWY APATB	WO / WOTBS	LRTA APALA	LRTB APALB	APAFN
Rail-based Transport System	KTM	Klang – Sentul		X	X	X	X	X
		Seremban – Rawang		X	X	X	X	X
		Batu Caves Extension		X	X	X	X	X
	LRT System(1) (STAR)	Sultan Ismail – Ampang		X	X	X	X	X
		Chan Sow Lin – Komanwel		X	X	X	X	X
		Sultan ismail – Sentul Timur		X	X	X	X	X
	LRT System(2) (PUTRA)	Pasar Seni – Klana Jaya		X	X	X	X	X
		Pasar Seni – Gombak Terminal		X	X	X	X	X
	PRT	Tun Razak – KL Sentral		X	X	X	X	X
		Kl Sentral – Kampung Pasir				X	X	
	LRT(planned)	Kepong Line				X	X	
		Cheras Line				X		
	LRT(test)	Damansara – City Cntre Line				X		
		Damansara – Raja Chulan – Cheras Line					X	X
		Genting Klang /Gombak – City Cntre Line				X	X	
		Ampang Line				X	X	
Trunk Bus System		Cheras - Kepong Line (Cheras Section)	X	X				
		Cheras - Kepong Line (Kepong Section)	X	X				X
		Damansara – City Cntre Line	X	X				
		Ampang Line	X	X				X
		Puchong-Genting Klang/Gombak Line	X	X				X

Note : "X" indicates the component is included in the network for a simulation case.



LEGEND

- KTM
- LRT SYSTEM I (STAR)
- LRT SYSTEM II (PUTRA)
- MONORAIL

Figure 7.1.4 Rail-Based Transport Network 2000 (Without Case)

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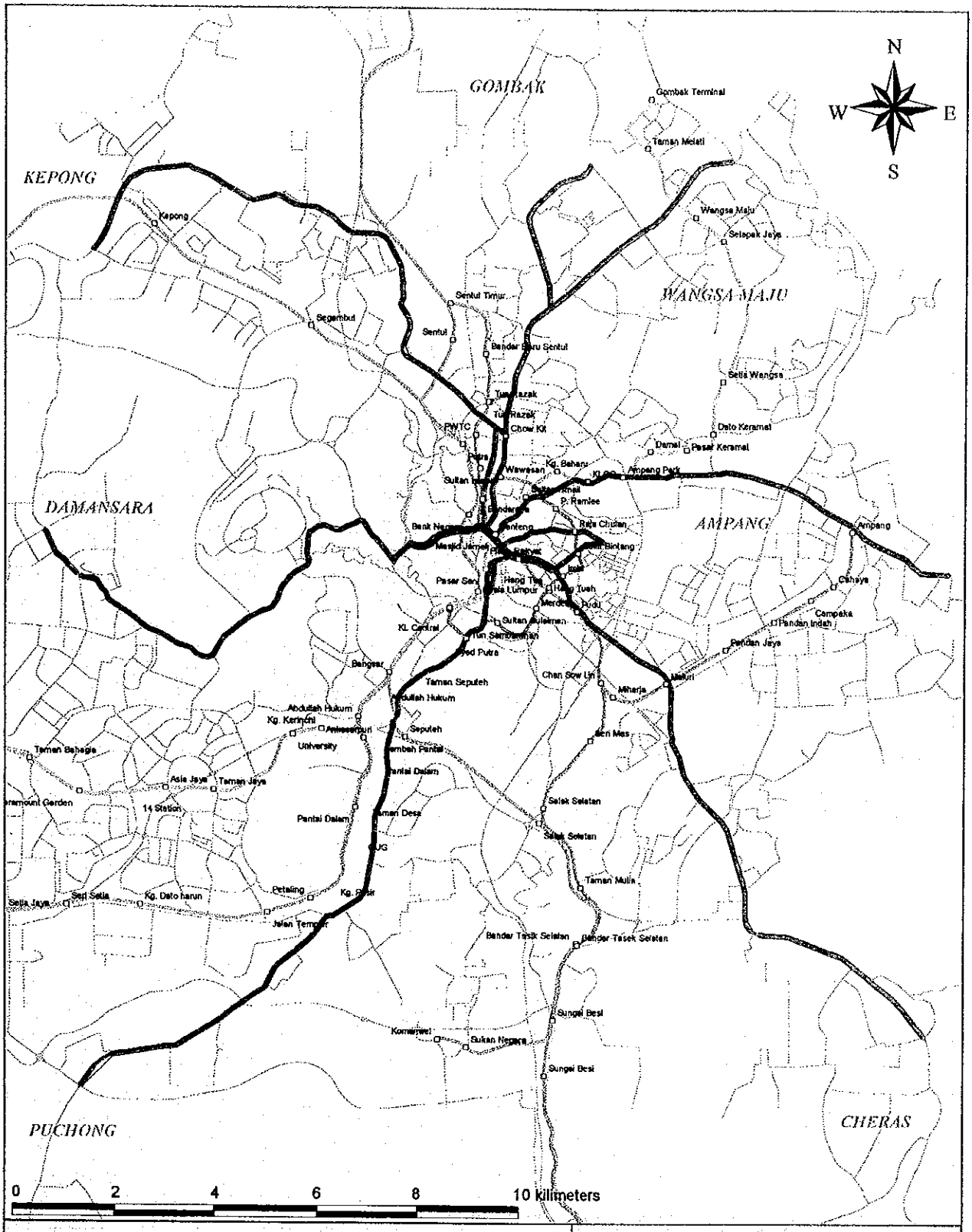

LEGEND

- KTM
- LRT SYSTEM I (STAR)
- LRT SYSTEM II (PUTRA)
- MONORAIL
- TRUNK BUS

Figure 7.1.5 Public Transport Network: Trunk Bus System

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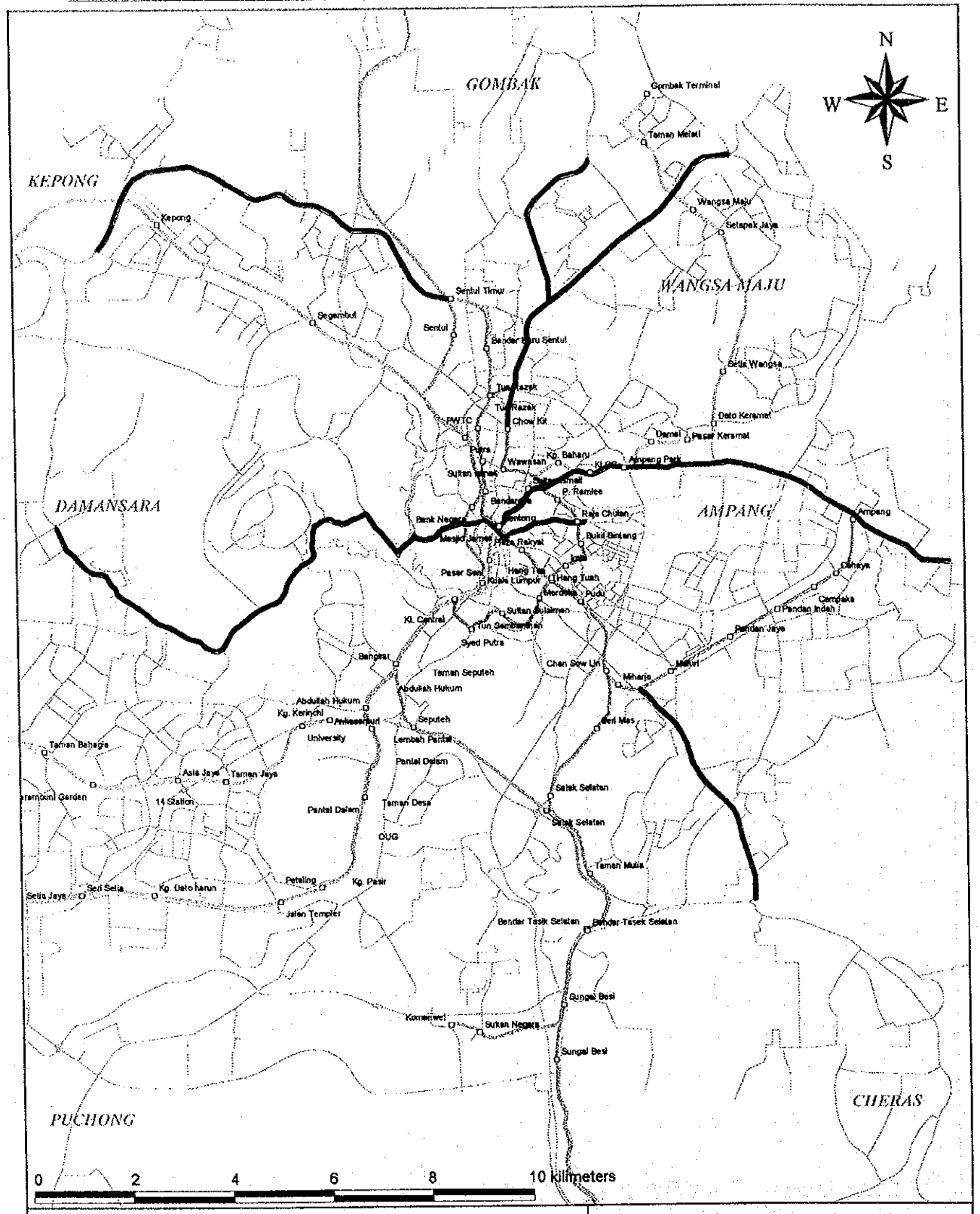

Figure 7.1.6 Public Transport Network: LRT Network (A)

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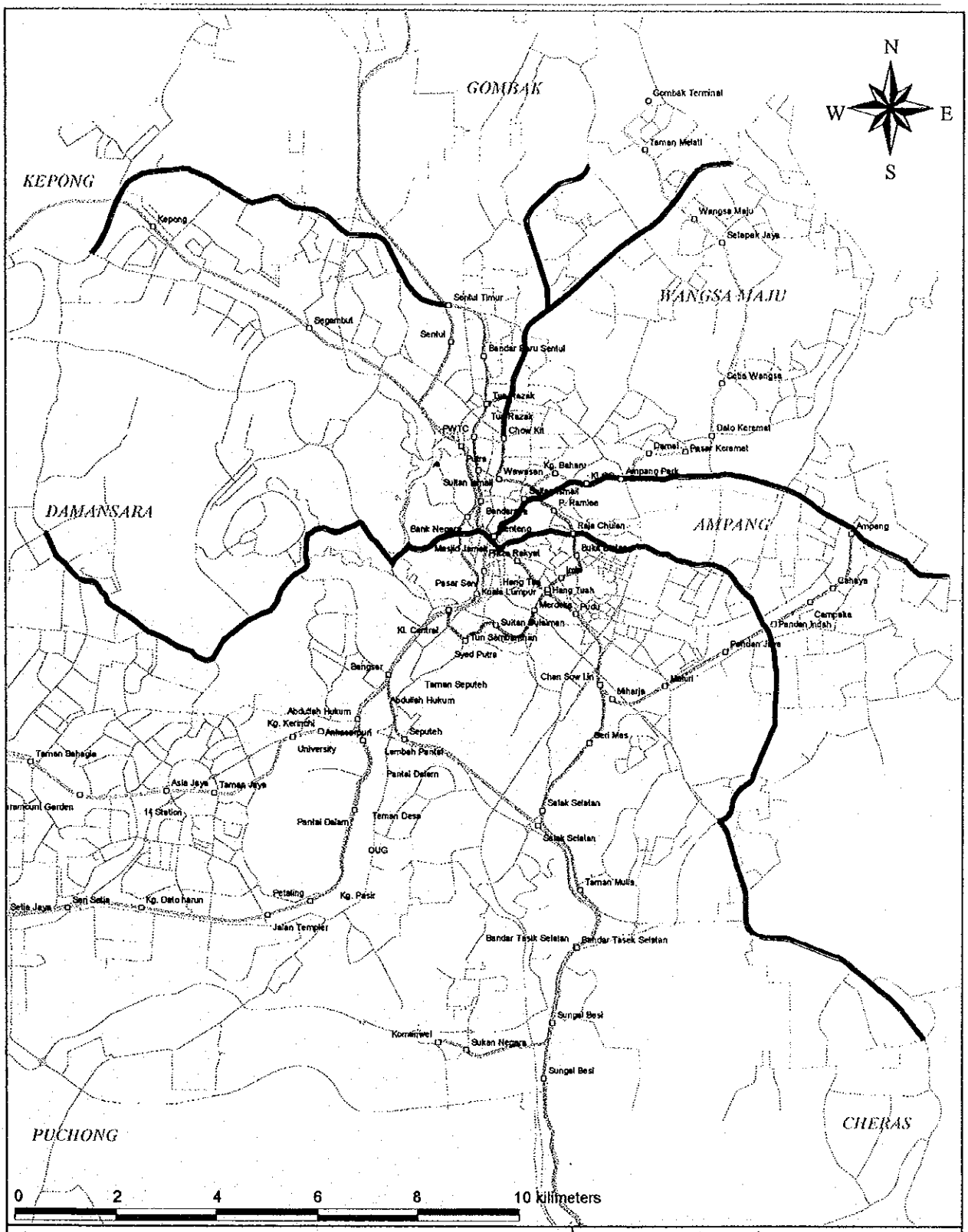

LEGEND

- KTM
- LRT SYSTEM I (STAR)
- LRT SYSTEM II (PUTRA)
- MONORAIL
- NEWLY LRT

Figure 7.1.7 Public Transport Network: LRT Network (B)

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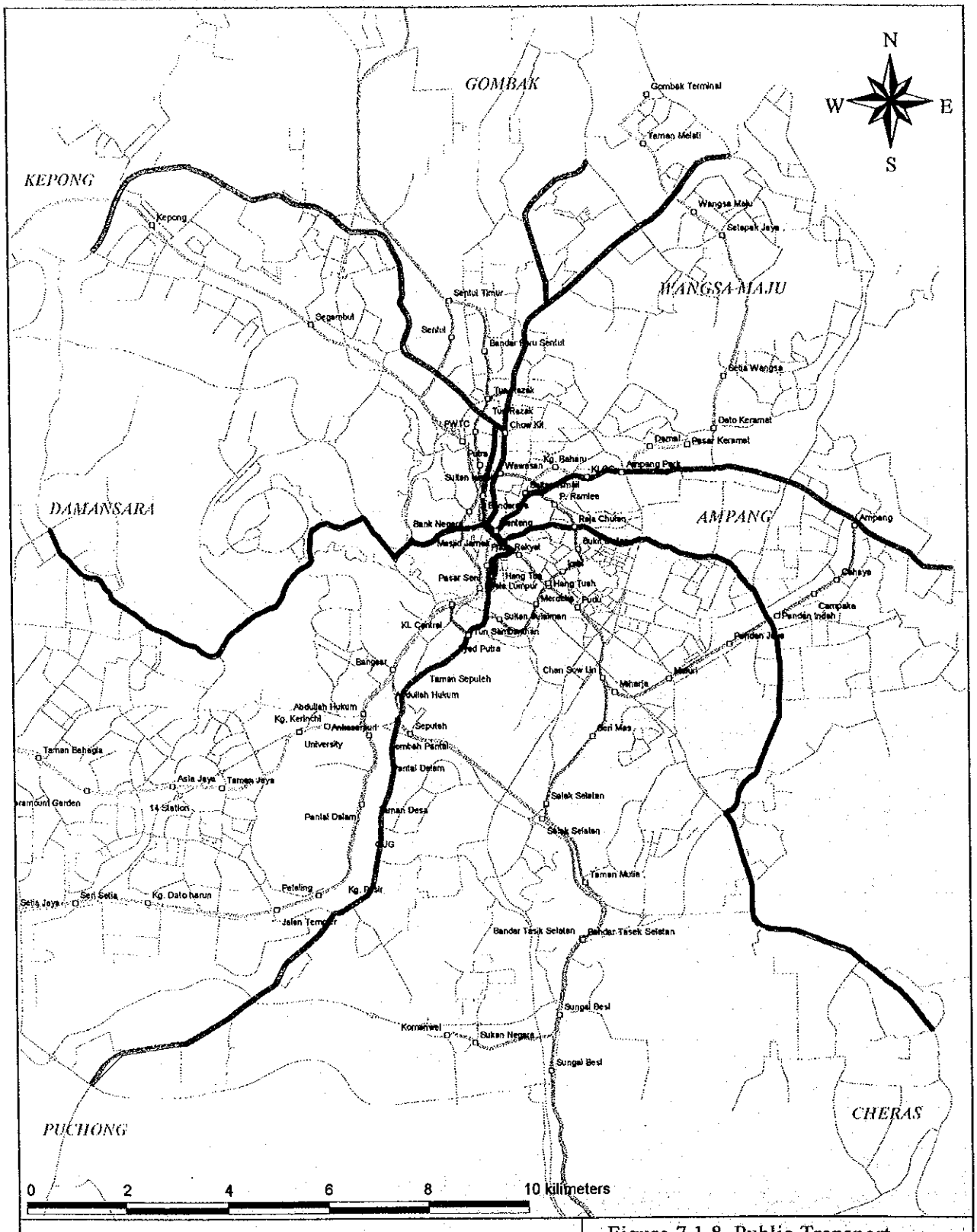

LEGEND

- KTM
- LRT SYSTEM I (STAR)
- LRT SYSTEM II (PUTRA)
- MONORAIL
- NEWLY LRT
- TRUNK BUS

Figure 7.1.8 Public Transport Network: LRT/Trunk Bus Combination

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7.2 Future Trip Production 2000 - 2020

Trip production in the Kuala Lumpur Metropolitan Area will gradually increase at an average annual growth rate of 2.73 percent in the period from 1997 to 2020, while population in the metropolitan area will increase at 1.2 percent per annum, and job opportunity at 2.0 percent per annum. The higher growth rate of the person trip demand compared to population and job opportunity could be attributed to an increase in real household income because members of higher income households make more trips than their lower income counterparts. Since the job opportunity increases more rapidly than the population, NHBB (non-home-based business) trips and NHBO (non-home-based others) trips will increase above the average growth rate of the total person trip production. In contrast, HBS (home-based school) trips will increase more slowly due to the change in age structure.

Table 7.2.1 Trip Production Growth in Kuala Lumpur Metropolitan Area

(unit : 1000 person trips)

Trip Purpose	1997	2000	2010	2020	Average Annual Growth Rate 1997-2020
HBW	2,158	2,461	2,994	3,491	2.11%
HBS	1,290	1,498	1,796	1,954	1.82%
HBO	1,196	1,514	1,734	1,896	2.02%
NHBB	797	1,073	1,787	2,444	4.99%
NHBO	871	1,183	1,582	1,940	3.54%
Total	6,311	7,729	9,893	11,725	2.73%

Source : SMURT-KL Estimate

Table 7.2.2 Population and Job Opportunity in KL Metropolitan Area : 1997 -2020

(unit : 1000 persons)

	1997	2000	2010	2020	Average Annual Growth Rate 1997 –2020
Population	2,522	2,694	3,048	3,355	1.2 %
Job Opportunity	1,120	1,224	1,503	1,766	2.0 %

Source : SMURT-KL Estimate

7. 3 Trip Production and Attraction

Figures 7.3.1 and 7.3.2 show the predicted total trip production and the trip attraction of "Home to Work Place" trips. Due to continuing suburbanisation, trip production will increase more rapidly in the suburban areas as illustrated. On the other hand the primacy of the CBD in the Kuala Lumpur metropolitan area will be strengthened due to the on-going large-scale urban development projects. These urban development projects create an additional 200 ha of office space by the year 2000, of which KL Sentral and KLCC account for 54% (112 ha). These new urban centres will emerged outside the existing CBD, and consequently the trip production and attraction pattern will be changed.

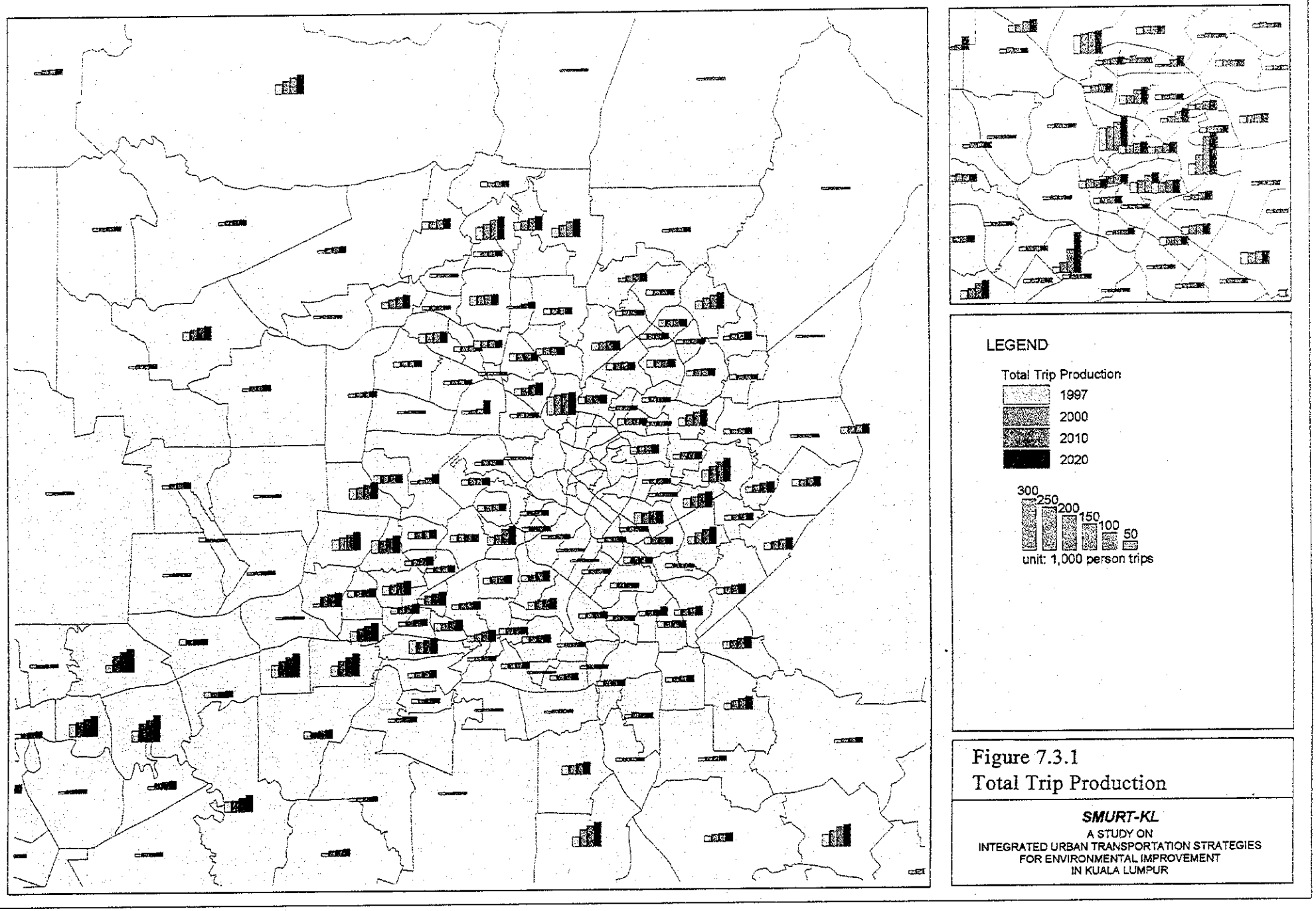

Figure 7.3.1
Total Trip Production

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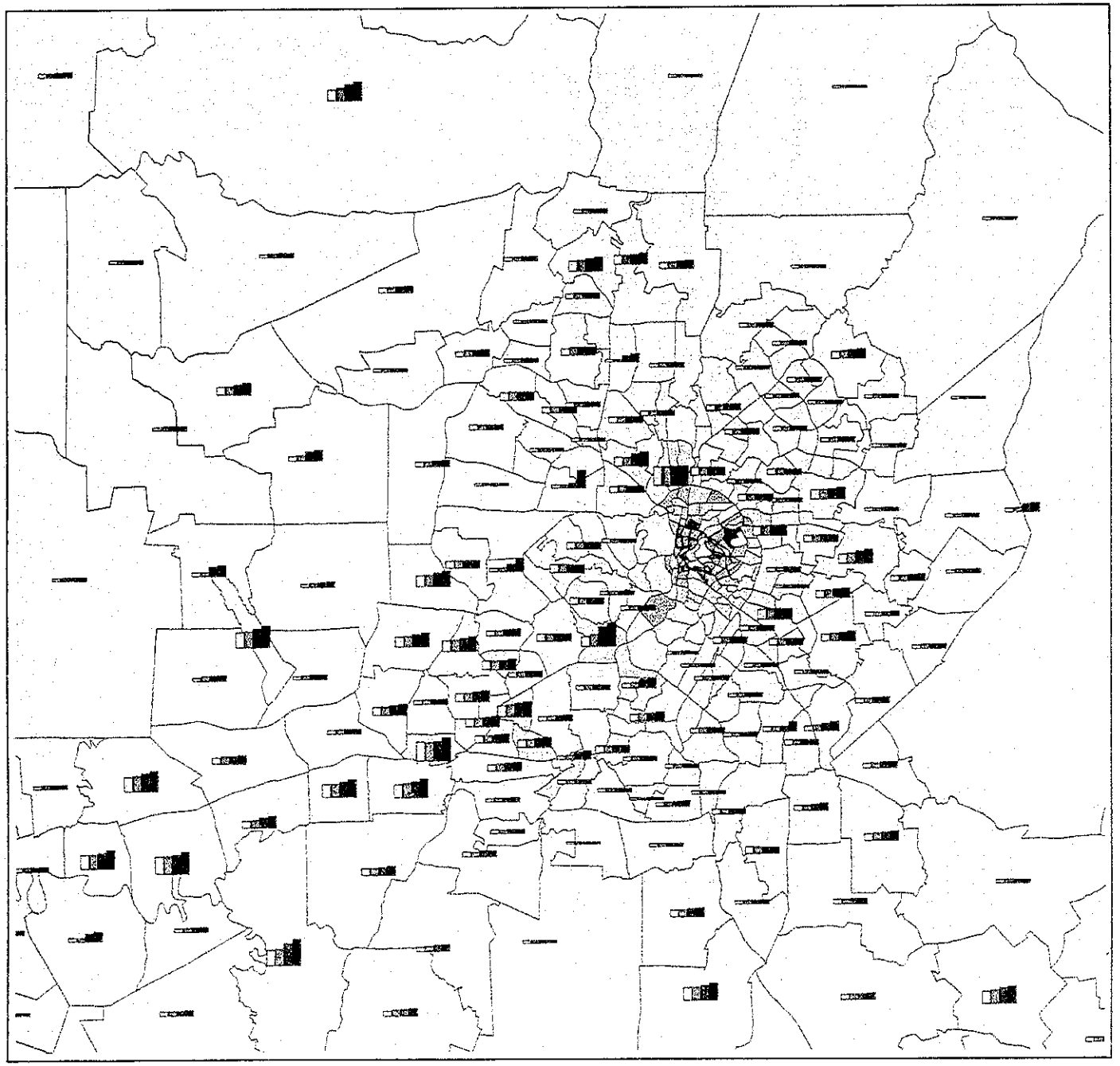

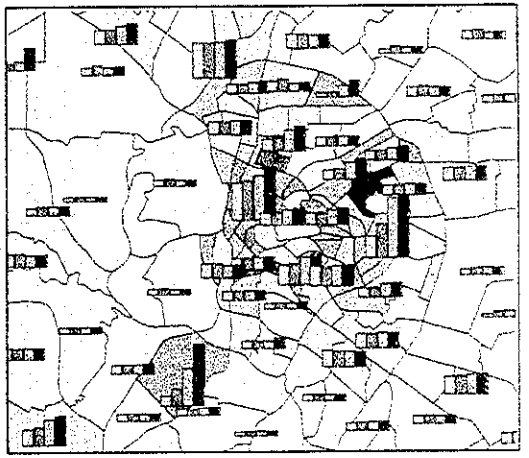

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Trip Attraction

1997
2000
2010
2020

100
75
50
25

unit: 1,000 person trips

JOB Density in 2020
Job / ha

0 - 100
100 - 300
300 - 600
600 - 1000
1000 - 1500
1500 - 2000
2000 - 2500

Figure 7.3.2 Home to Work Place Trip Attraction

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7.4 Future Trip Distribution : 2000 - 2020

(1) All Trip Purpose

Figures 7.4.1 and 7.4.2 show the predicted trip distribution of "all trip purpose" for the years 1997 and 2020.

In 1997, the CPA(Central Planning Area) indicates a strong connection with the surrounding areas, in particular, with Ampang, Wangsa Maju, and Kepong areas. This indicates that CPA is a significant urban centre in the Kuala Lumpur metropolitan area. Another centre is found in Petaling Jaya, and it shows a strong connection with Subang Jaya and Puchong areas.

In 2020 the connection between the CPA and the other zones will be strengthened and the trip demand between those zones will increase significantly. In addition, origin - destination pairs with more than 30,000 trips will be spread out over the metropolitan area. The increase in trip demand in volume coupled with longer trip lengths will be heavy burden on the transportation network in the future.

(2) "Home to Work Place" Trips

Figure 7.4.3. and 7.4.4 illustrate the predicted "Home to Work Place" trip distribution pattern in the years 1997 and 2020.

In 1997 many employees commute to the CPA from the surrounding suburban areas. Since job opportunity will increase due to large scale urban development in the CPA, trip attraction of "home to work place" purpose in the CPA will increase tremendously. Petaling Jaya and Subang Jaya will also see an increased trip attraction from the surrounding areas. It should be noted that the Zone No 6, which includes KL Sentral, will be a new work place centre and attract many employees from many zones in the metropolitan area.

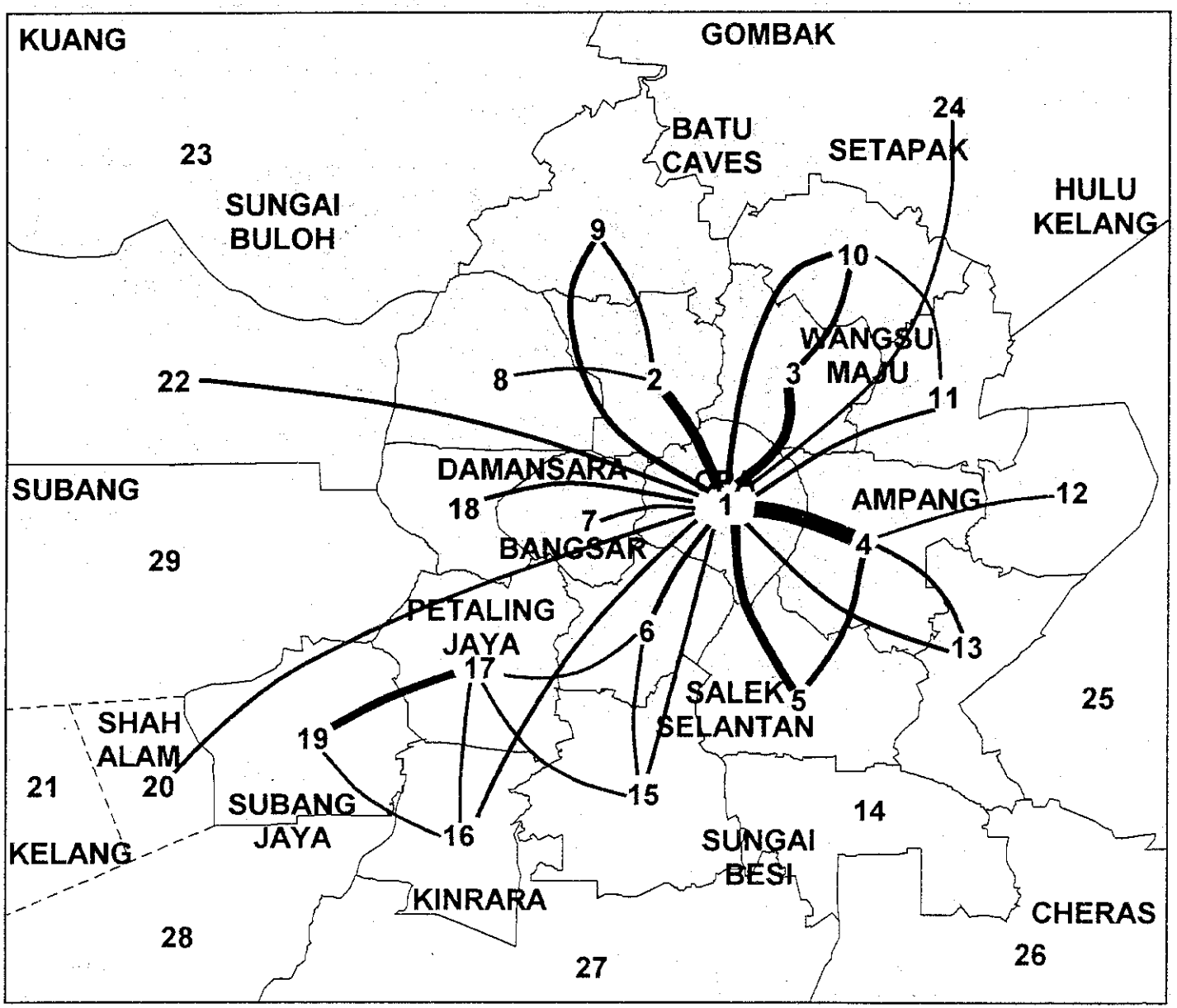

Figure 7.4.1
Person Trip Demand in 1997 (All Purposes)

Legend

(trips / day)

50,000
100,000
150,000
200,000
250,000

Note:
Less than 30,000 trips are omitted.

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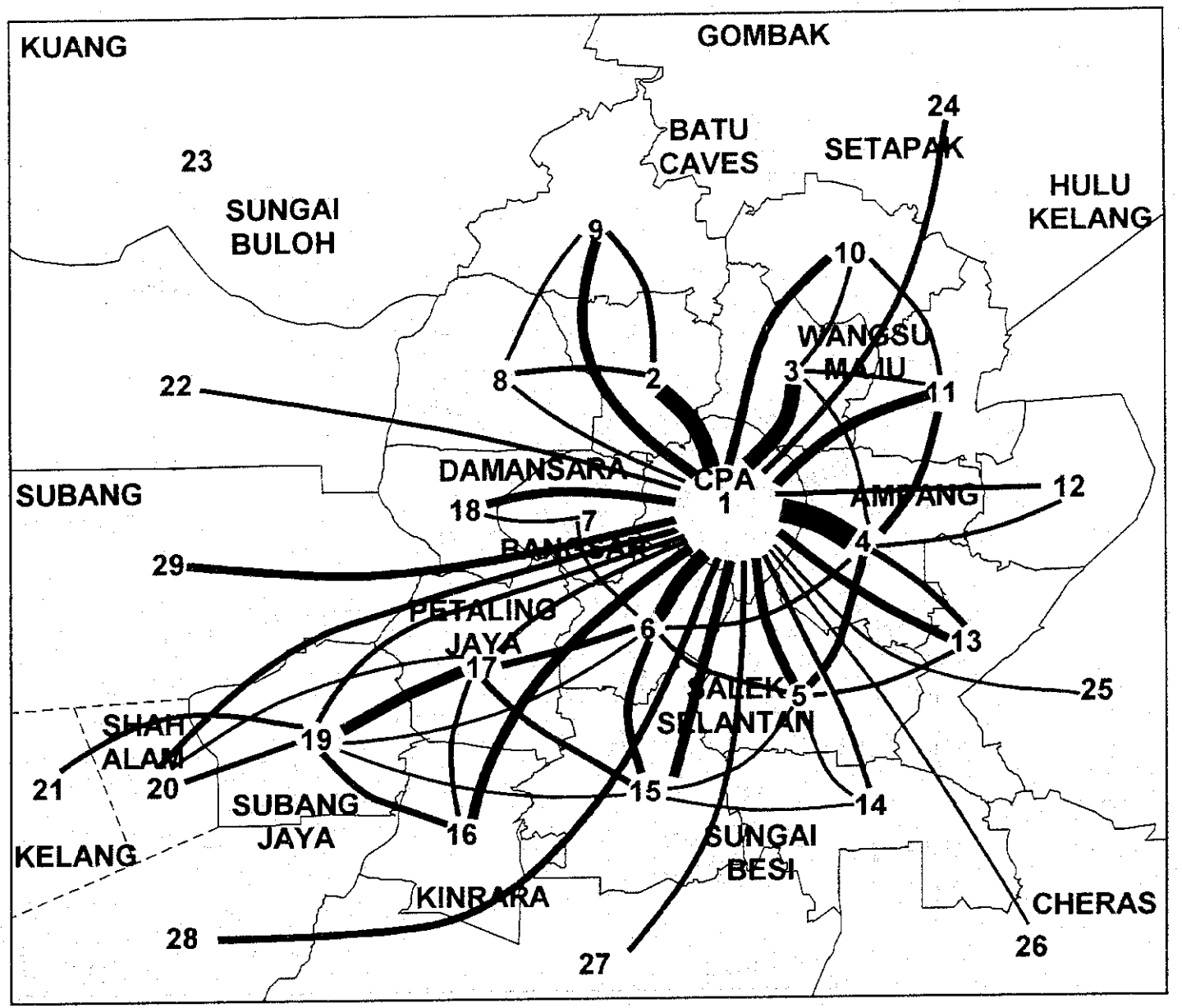

Figure 7.4.2
Person Trip Demand in 2020
(All Purposes)

Legend

(trips / day)

50,000
100,000
150,000
200,000
250,000

Note:
Less than 30,000 trips are omitted.

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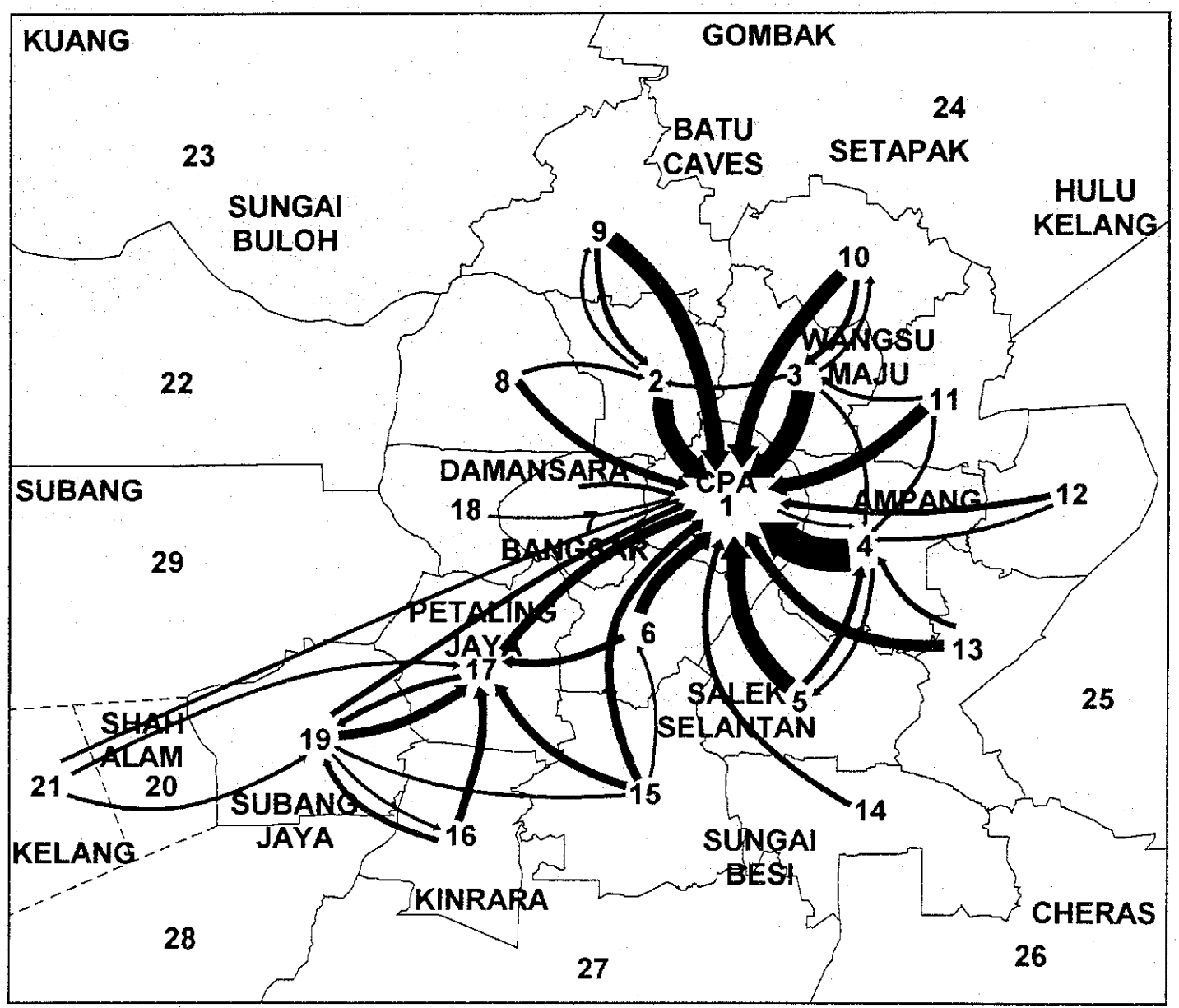

Figure 7.4.3
Person Trip Demand in 1997
(Home to Work)

Legend

(trips / day)

3,000
5,000
10,000
20,000
30,000

Note:
Less than 3,000 trips are omitted.

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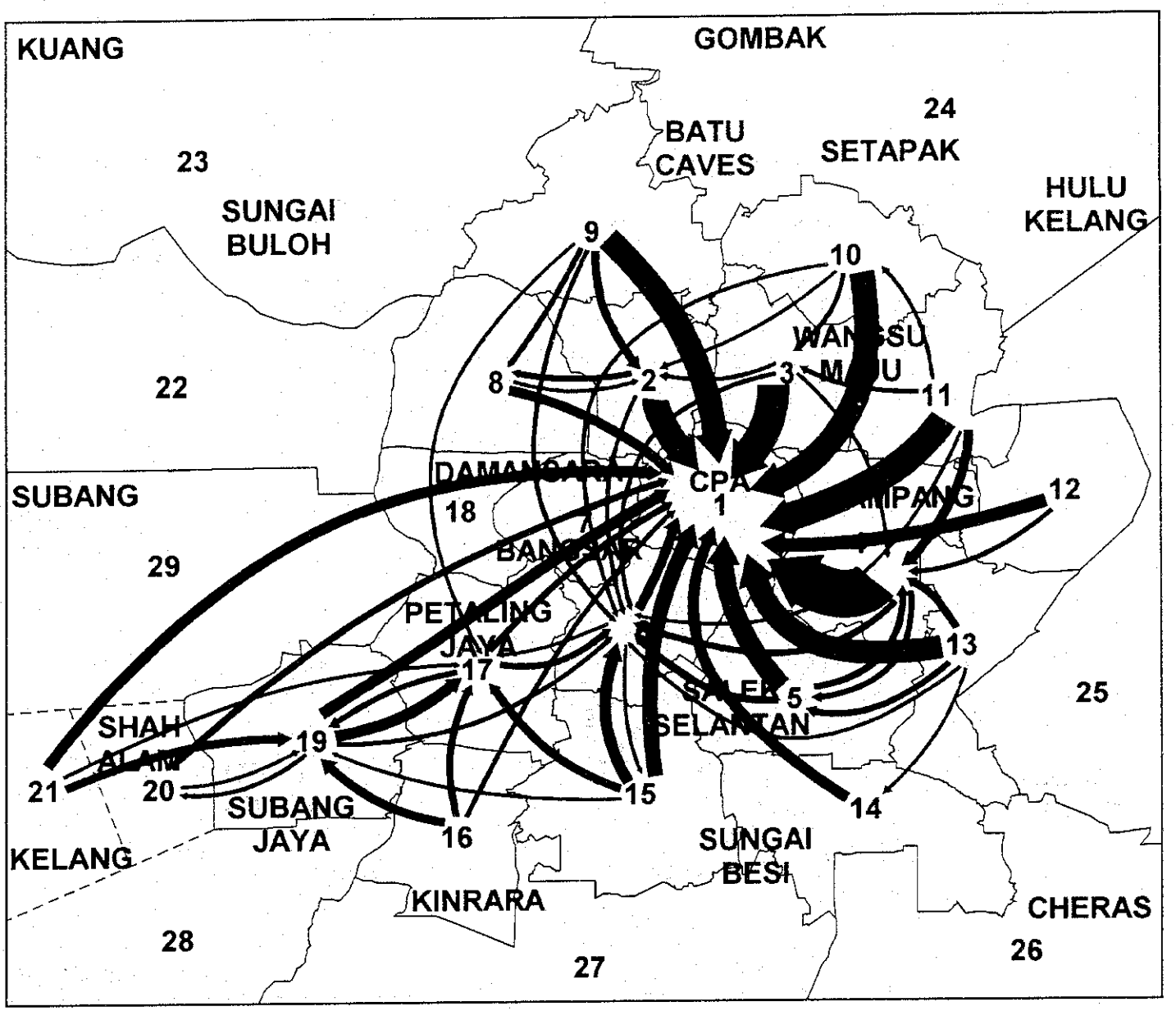

Figure 7.4.4
Person Trip Demand in 2020 (Home to Work)

Legend

(trips / day)

- 3,000
- 5,000
- 10,000
- 20,000
- 30,000

Note:
Less than 3,000 trips are omitted.

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7.5 Modal Share in 2000 -2020

The share of public mode of transport in the Kuala Lumpur Metropolitan Area is estimated to be 24.0 percent in 2000, 23.6 percent in 2010, and 25.6 percent in 2020 under the BASE cases(as shown in Table 7.5.1), in which both highway and public transportation network development is assumed to be completed according to the schedule listed in Tables 7.1.2 and 7.1.3. The drop in public transport share between 2000 and 2010 is attributable to the excessive expressway development planned in the period. When a traffic restraint scheme, such as the area pricing is applied and the total number of car trips in the CBD is limited at the level of the year 1997, the share of public transport will slightly increase to 24.2 percent in 2000, 25.4 percent in 2010, and 28.9 percent in the metropolitan area as shown in Table 7.5.1 and Figure 7.5.1.

In the CBD, the share of public transport is 19.1 percent in 2000, 19.3 percent in 2010, and 20.7 percent in 2020 (as listed in Table 7.5.2) under the BASE cases, which include the highway development and public transport system development by trunk bus system. If a traffic restraint scheme is introduced in the CBD, the share of public transport in CBD-related trips will increase sharply to 20.3 percent in 2000, 29.3 percent in 2010, and 40.3 percent in 2020.

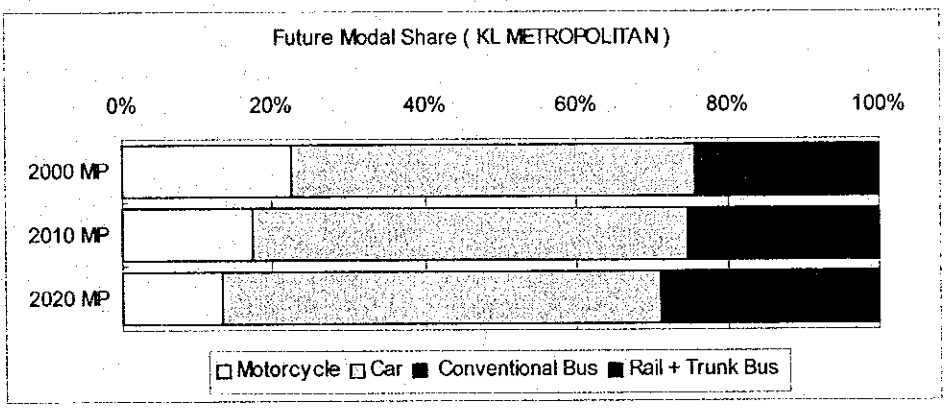

Figure 7.5.1 Modal Share in KL Metropolitan Area

If the rail-based transport system were not provided at all, in other words, only trunk bus system and conventional bus system were available (Without Railway Case), the share of public transport in the Kuala Lumpur metropolitan area is estimated at 20.5 percent in 2000, 20.9% in 2010, and 21.9% in 2020, respectively. With regard to the trips related to the CBD, the share of public transportation is estimated at 16.8 percent in 2000, 24.6 percent in 2010, and 30.1 percent in 2020, respectively.

Table 7.5.1 Modal Share in Kuala Lumpur Metropolitan Area

(unit 1000 person trips)

Year	Case	Motor-cycle	Car	Conven-tional Bus	Trunk Bus + Rail	Private Mode of Transport	Public Mode of Transport	Total
1997	HIS	1,162 (23.2%)	2,876 (57.4%)	943 (18.8%)	28 (0.6%)	4,038 (80.6%)	971 (19.4%)	5,009 (100.0%)
2000	WO	1,464 (22.4%)	3,520 (53.8%)	1,075 (16.4%)	486 (7.4%)	4,984 (76.1%)	1,561 (23.9%)	6,545 (100.0%)
	WORW	1,467 (22.4%)	3,740 (57.1%)	1,208 (18.5%)	130 (2.0%)	5,207 (79.6%)	1,338 (20.4%)	6,545 (100.0%)
	BASE	1,461 (22.3%)	3,514 (53.7%)	1,084 (16.6%)	487 (7.4%)	4,975 (76.0%)	1,570 (24.0%)	6,545 (100.0%)
	MP	1,467 (22.4%)	3,490 (53.3%)	1,094 (16.7%)	494 (7.5%)	4,957 (75.7%)	1,587 (24.2%)	6,545 (100.0%)
2010	WO	1,391 (17.2%)	4,722 (58.4%)	1,346 (16.7%)	622 (7.7%)	6,113 (75.7%)	1,968 (24.4%)	8,080 (100.0%)
	WORW	1,411 (17.5%)	4,985 (61.7%)	1,527 (18.9%)	161 (2.0%)	6,396 (79.1%)	1,688 (20.9%)	8,084 (100.0%)
	WOTBS	1,414 (17.5%)	4,777 (59.1%)	1,300 (16.1%)	593 (7.3%)	6,191 (76.6%)	1,893 (23.4%)	8,084 (100.0%)
	WOHWY	1,386 (17.2%)	4,712 (58.3%)	1,360 (16.8%)	623 (7.7%)	6,098 (75.5%)	1,982 (24.5%)	8,080 (100.0%)
	BASE	1,411 (17.5%)	4,770 (59.0%)	1,312 (16.2%)	592 (7.3%)	6,181 (76.5%)	1,904 (23.6%)	8,084 (100.0%)
	MP	1,411 (17.5%)	4,622 (57.2%)	1,408 (17.4%)	643 (8.0%)	6,033 (74.6%)	2,052 (25.4%)	8,084 (100.0%)
2020	WO	1,307 (13.3%)	5,986 (60.8%)	1,674 (17.0%)	883 (9.0%)	7,292 (74.0%)	2,556 (26.0%)	9,849 (100.0%)
	WORW	1,316 (13.4%)	6,379 (64.7%)	2,055 (20.9%)	102 (1.0%)	7,695 (78.1%)	2,157 (21.9%)	9,852 (100.0%)
	WOTBS	1,337 (13.6%)	6,082 (61.7%)	1,600 (16.2%)	833 (8.5%)	7,419 (75.3%)	2,433 (24.7%)	9,852 (100.0%)
	WOHWY	1,287 (13.1%)	5,918 (60.1%)	1,706 (17.3%)	938 (9.5%)	7,205 (73.2%)	2,643 (26.8%)	9,848 (100.0%)
	BASE	1,316 (13.4%)	6,013 (61.0%)	1,632 (16.6%)	891 (9.0%)	7,329 (74.4%)	2,523 (25.6%)	9,852 (100.0%)
	MP	1,316 (13.4%)	5,686 (57.7%)	1,837 (18.6%)	1,013 (10.3%)	7,002 (71.1%)	2,850 (28.9%)	9,852 (100.0%)

Source : SMURT-KL Estimate

Table 7.5.2 Predicted Modal Share in CBD

Year	Case	Motor-cycle	Car	Conven-tional Bus	Trunk Bus + Rail	Private Mode of Transport	Public Mode of Transport	Total
1997	HIS	218 (20.4%)	674 (63.1%)	162 (15.2%)	14 (1.3%)	892 (83.5%)	177 (16.6%)	1,068 (100.0%)
2000	WO	305 (21.8%)	834 (59.5%)	148 (10.6%)	114 (8.1%)	1,139 (81.3%)	262 (18.7%)	1,401 (100.0%)
	WORW	310 (22.1%)	856 (61.1%)	181 (12.9%)	54 (3.9%)	1,166 (83.2%)	235 (16.8%)	1,401 (100.0%)
	BASE	303 (21.6%)	830 (59.2%)	151 (10.8%)	117 (8.4%)	1,133 (80.9%)	268 (19.1%)	1,401 (100.0%)
	MP	310 (22.1%)	806 (57.5%)	161 (11.5%)	124 (8.9%)	1,116 (79.7%)	285 (20.3%)	1,401 (100.0%)
2010	WO	269 (18.3%)	901 (61.3%)	171 (11.6%)	130 (8.8%)	1,170 (79.6%)	300 (20.4%)	1,470 (100.0%)
	WORW	275 (18.7%)	836 (56.8%)	285 (19.4%)	77 (5.2%)	1,110 (75.4%)	362 (24.6%)	1,472 (100.0%)
	WOTBS	275 (18.7%)	914 (62.1%)	161 (10.9%)	122 (8.3%)	1,189 (80.8%)	283 (19.2%)	1,472 (100.0%)
	WOHWY	269 (18.3%)	899 (61.2%)	172 (11.7%)	130 (8.8%)	1,168 (79.5%)	302 (20.5%)	1,470 (100.0%)
	BASE	275 (18.7%)	913 (62.0%)	162 (11.0%)	122 (8.3%)	1,188 (80.7%)	284 (19.3%)	1,472 (100.0%)
	MP	275 (18.7%)	765 (52.0%)	257 (17.5%)	175 (11.9%)	1,040 (70.7%)	432 (29.3%)	1,472 (100.0%)
2020	WO	235 (14.1%)	1,078 (64.6%)	193 (11.6%)	163 (9.8%)	1,313 (78.7%)	356 (21.3%)	1,669 (100.0%)
	WORW	238 (14.2%)	930 (55.7%)	457 (27.3%)	46 (2.8%)	1,168 (69.9%)	503 (30.1%)	1,671 (100.0%)
	WOTBS	241 (14.4%)	1,096 (65.6%)	181 (10.8%)	153 (9.2%)	1,337 (80.0%)	334 (20.0%)	1,671 (100.0%)
	WOHWY	232 (13.9%)	1,069 (64.1%)	192 (11.5%)	175 (10.5%)	1,302 (78.0%)	367 (22.0%)	1,669 (100.0%)
	BASE	238 (14.2%)	1,086 (65.0%)	181 (10.8%)	165 (9.9%)	1,324 (79.2%)	346 (20.7%)	1,671 (100.0%)
	MP	238 (14.2%)	759 (45.4%)	385 (23.0%)	288 (17.2%)	997 (59.7%)	673 (40.3%)	1,671 (100.0%)

Source : SMURT-KL Estimate

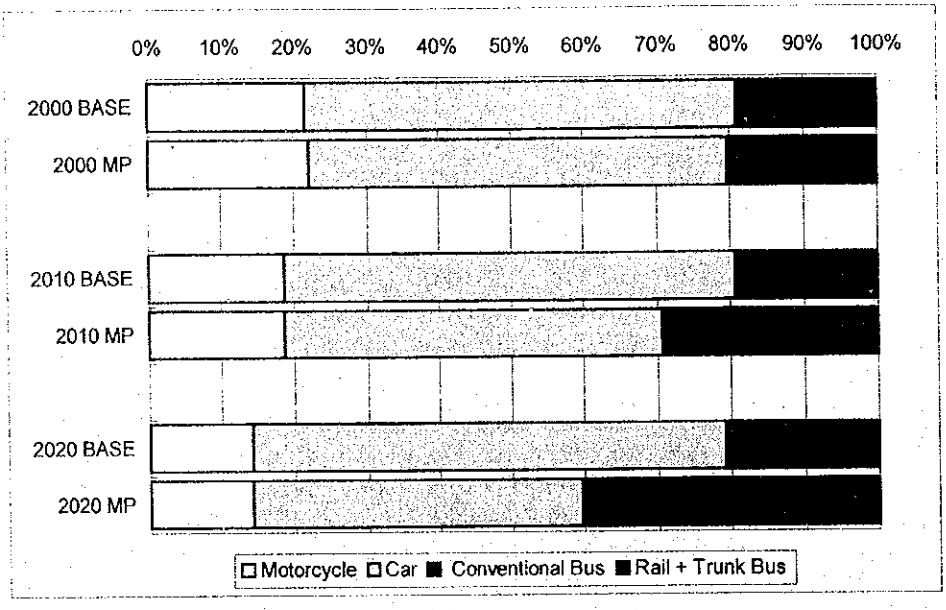

Figure 7.5.2 Modal Share in CBD

The trip production by mode of transport in 2000, 2010, and 2020 is depicted in Figures 7.5.3 through 7.5.5.

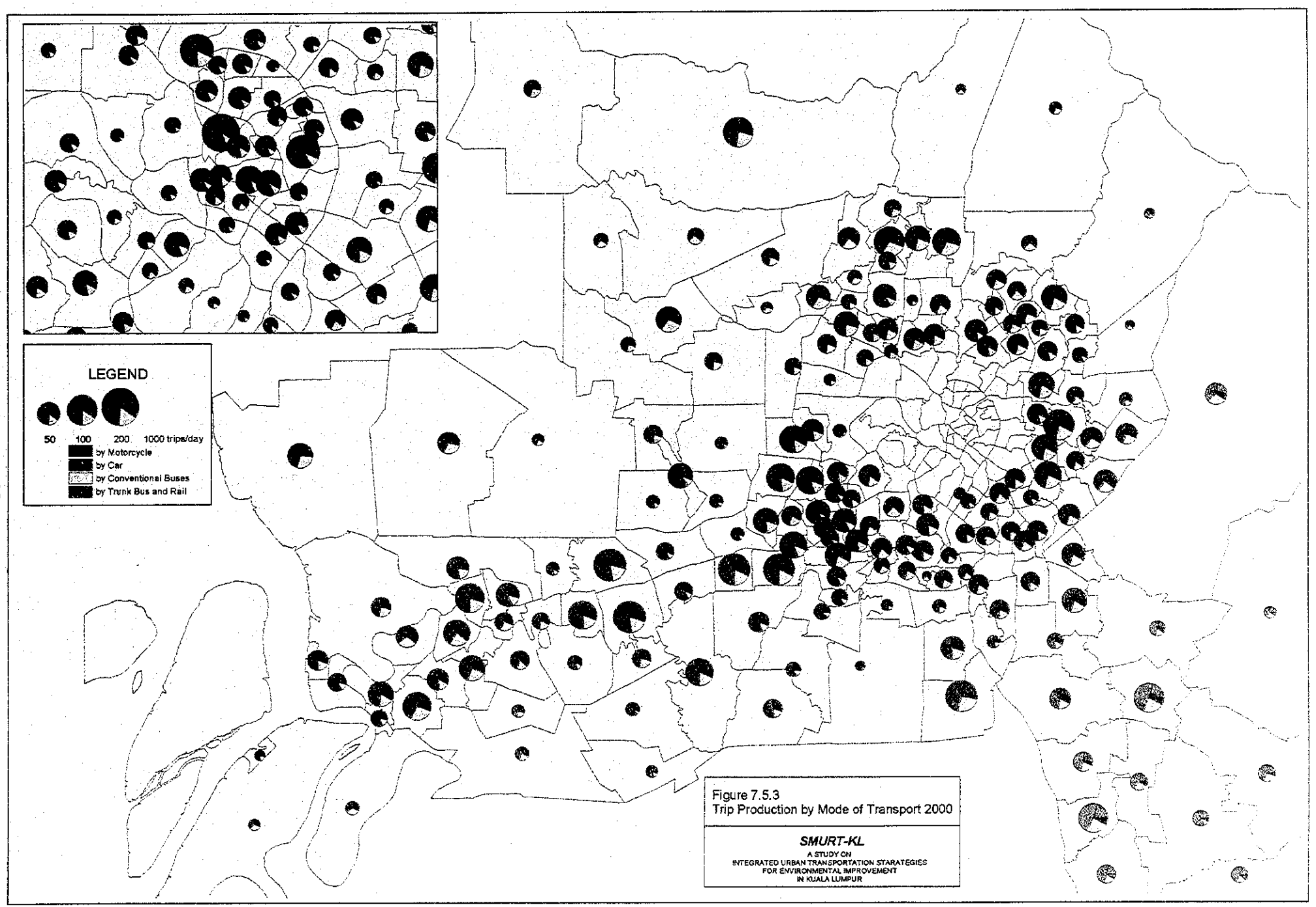

Figure 7.5.3
Trip Production by Mode of Transport 2000

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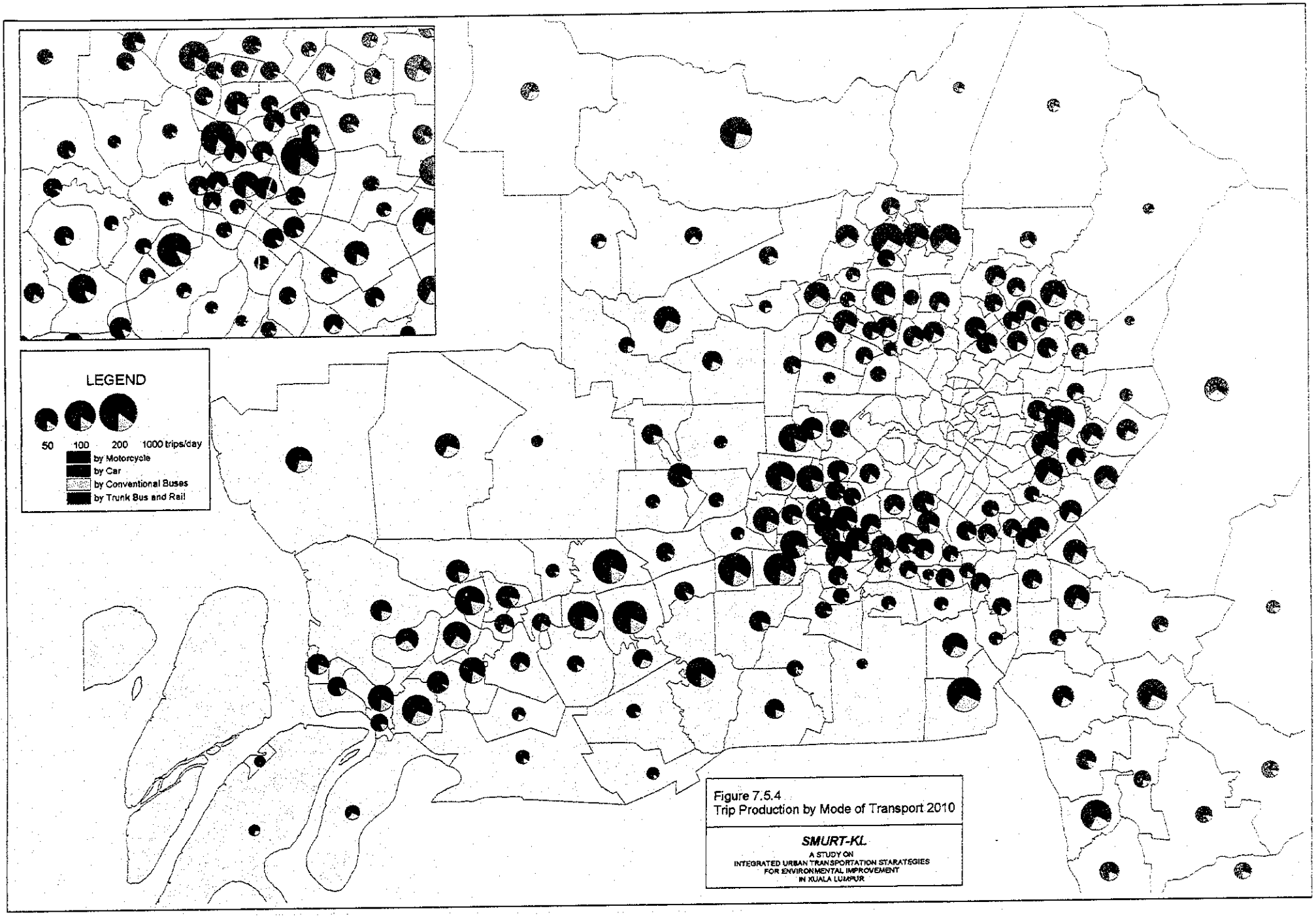
LEGEND
50 100 200 1000 trips/day
by Motorcycle
by Car
by Conventional Buses
by Trunk Bus and Rail
Figure 7.5.4
Trip Production by Mode of Transport 2010
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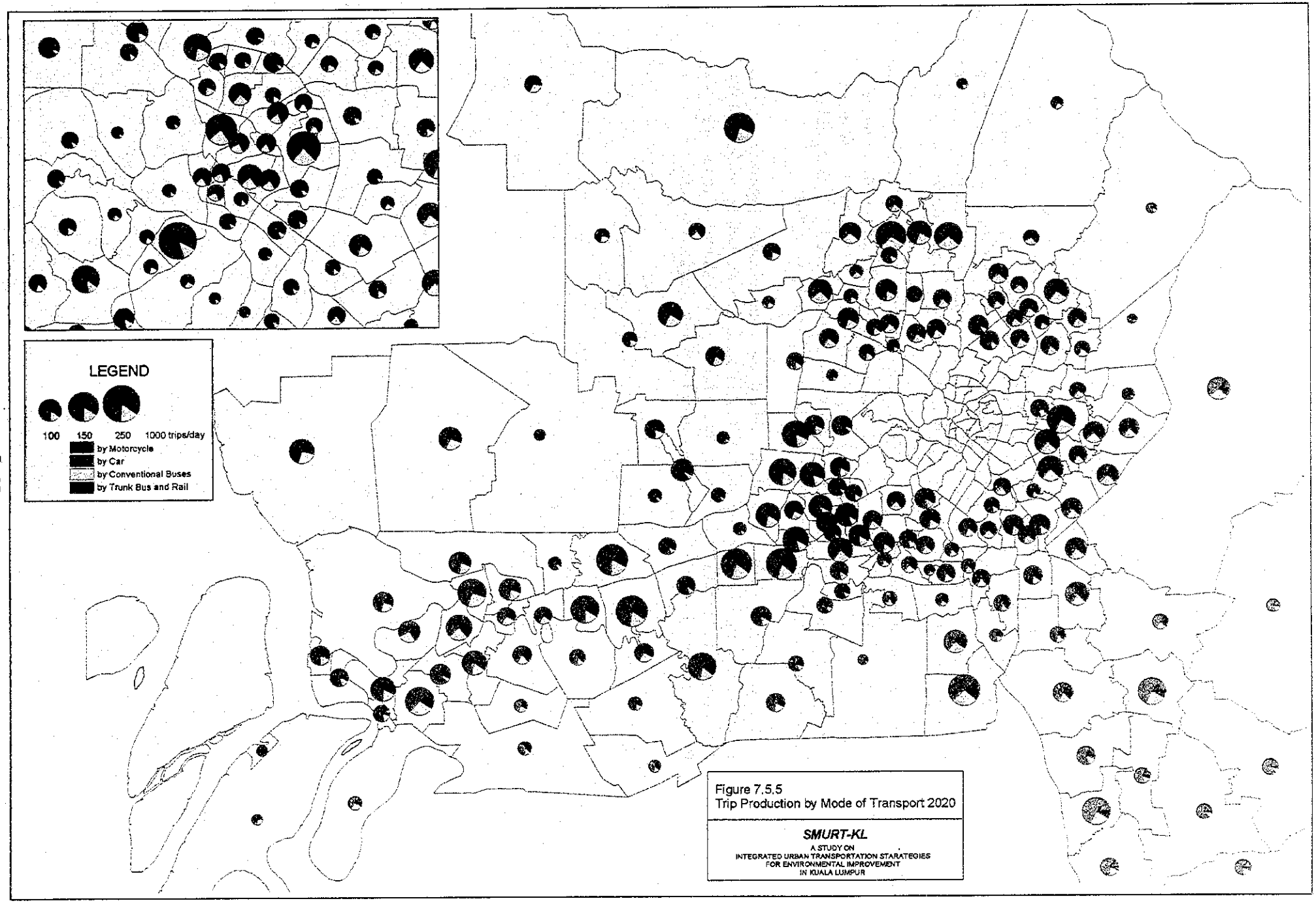

Figure 7.5.5
Trip Production by Mode of Transport 2020

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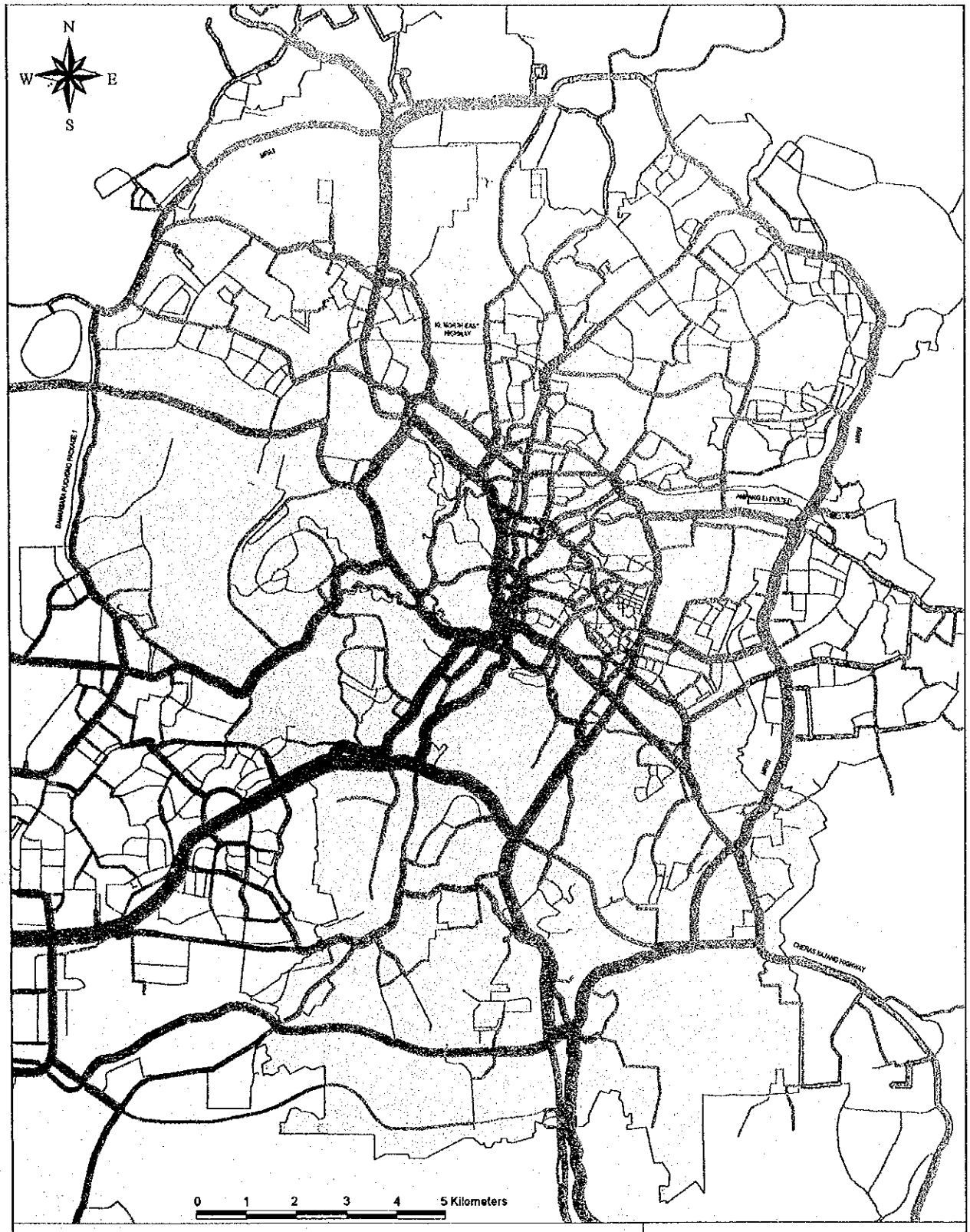
7.6 Future Traffic Demand on Highway Network

Figures 7.6.1, 7.6.2, and 7.6.3 show the predicted highway traffic volume for the years 2000, 2010, and 2020 for Master Plan cases (both highway development and trunk bus system development, and with an area pricing scheme).

In the year 2000, the eleven highway projects including new construction and improvements will be completed. Among them, the eastern part of the Middle Ring Road II, with a traffic volume 100,000 p.c.u. per day, will be effective in alleviating the congestion in the inner city area. On the contrary, the Ampang Elevated Highway and the North East Highway will carry less traffic due to the high toll rate.

In the year 2010, more road space will be provided outside the CPA mostly by the expressway projects, but little road space will be augmented within the CPA. Furthermore, many new expressway development projects such as Wangsa – Keramat, KL Transit, start from or end at the Middle Ring Road I. This would result in further worsened traffic congestion within the CPA in the year 2010.

In the year 2020, traffic is well distributed over the planned highway network. However it should be noted again that limited arterial roads will be added onto the road network in the CBD, thus traffic demand in the CBD should be reduced by both traffic restraint measures and enhancement of the public transport system.



LEGEND

0 - 10,000	100,001 - 150,000
10,001 - 20,000	150,001 - 200,000
20,001 - 40,000	200,001 - 250,000
40,001 - 60,000	250,001 - 300,000
60,001 - 80,000	300,001 - 350,000
80,001 - 100,000	PCU / day

Figure 7.6.1 Traffic Demand on Highway Network 2000 (Master Plan Case)

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Figure 7.6.2 Traffic Demand on Highway Network 2010 (Master Plan Case)

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LEGEND

0 - 10,000	100,001 - 150,000
10,001 - 20,000	150,001 - 200,000
20,001 - 40,000	200,001 - 250,000
40,001 - 60,000	250,001 - 300,000
60,001 - 80,000	300,001 - 350,000
80,001 - 100,000	PCU / day

Figure 7.6.3 Traffic Demand on Highway Network 2020 (Master Plan Case)

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7.7 Future Passenger Demand on Public Transport Network

(1) Alternatives for future public transport network

Alternatives for future public transport network were established based on the understanding of the following items,

- Existing public transport passenger demand (Figure 7.7.1)

- Existing railway services and feeder bus services (Figure 7.7.2)

- Existing bus operation (Figure 7.7.3)

- Rail-based transport network development plan

First of all, the areas left out by the railway services were extracted and the corridors which need an enhanced public transport system were identified. These corridors include a) Kepong, b) Damansara, c) Puchong, d) Cheras, e) Ampang, f) Genting Klang/ Gombak.

To examine the magnitude of the passenger demand on the selected corridors, a trunk bus system was applied for all the corridors. Figure 7.7.4, Figure 7.7.5, and Figure 7.7.6 shows the predicted trunk bus and railway passenger demand for the years 2000, 2010, and 2020 for the BASE cases. The predicted passenger demand on each line will increase gradually as indicated in Table 7.7.1, and the average number of passengers per distance is also listed in Table 7.7.2.

In the year 2000, although it is assumed that the northern part of the LRT System(I) SATR from Sultan Ismail to Sentul Timur, the LRT System (II) Putra Phase(II) section between Pasar Seni and Gombak Terminal, the circular part of PRT Monorail in CBD, and the KTM Batu Caves extension are all completed in addition to the existing railway network, moderate passenger demand is predicted.

In the year 2010, the passenger demand will continue to increase, however the growth of passenger demand vary from line to line. In particular the PUTRA Phase(II) line, Genting Klang line, Damansara line will have a moderate increase compared to the passenger demand in 2000. This small increase in passenger demand can be attributed to the expressway development in these areas. The Wangsa-Keramat expressway will attract people to use cars rather than the PUTRA Phase(II) and Trunk bus Genting Klang line, while the development of the KL Transit Route and KL Western Traffic Dispersal Scheme will derive potential passenger demand from the Trunk bus Damansara line.

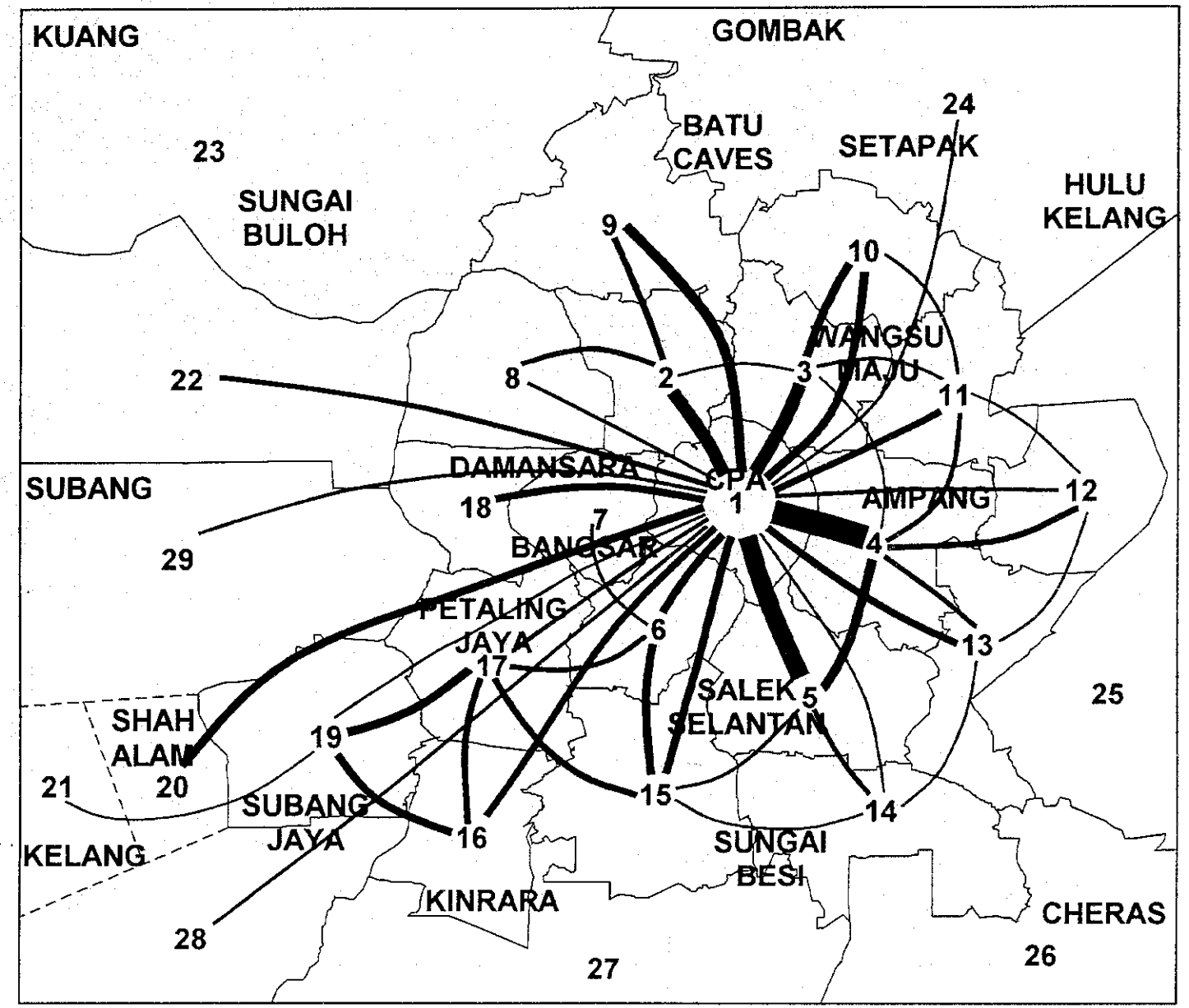

Figure 7.7.1
Existing Public Transport Passenger Demand

Legend

(trips / day)

5,000
10,000
15,000
20,000
25,000

Note:
Less than 3,000 trips are omitted.

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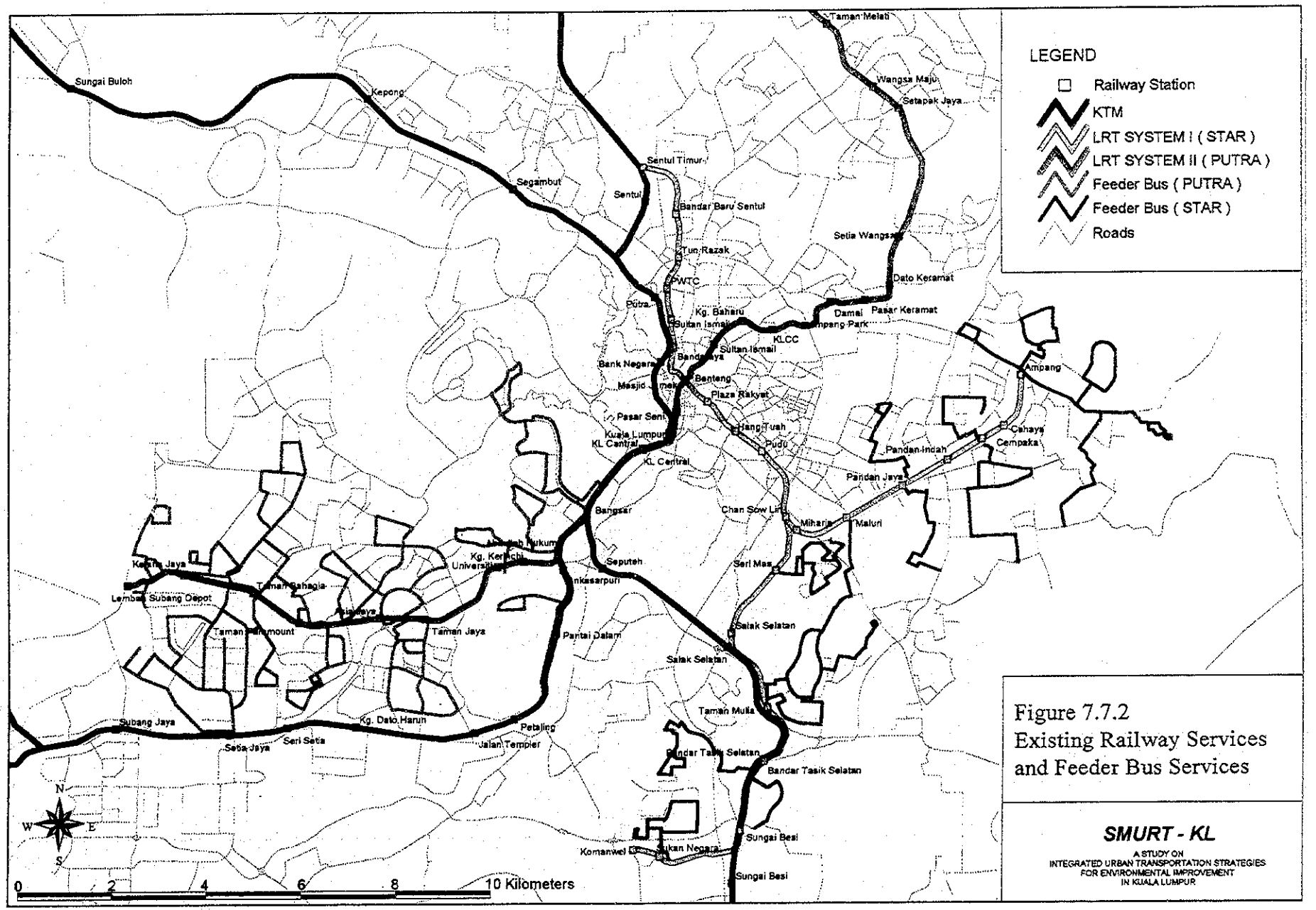

Figure 7.7.2
Existing Railway Services and Feeder Bus Services

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LEGEND

Bus350m radius

10 - 100
101 - 200
201 - 400
401 - 600
601 - 800
801 - 1000
1001 - 1500
1501 - 2500
2501 - 3500
3501 -
vehicle / day

Figure 7.7.3 Existing Bus Operation

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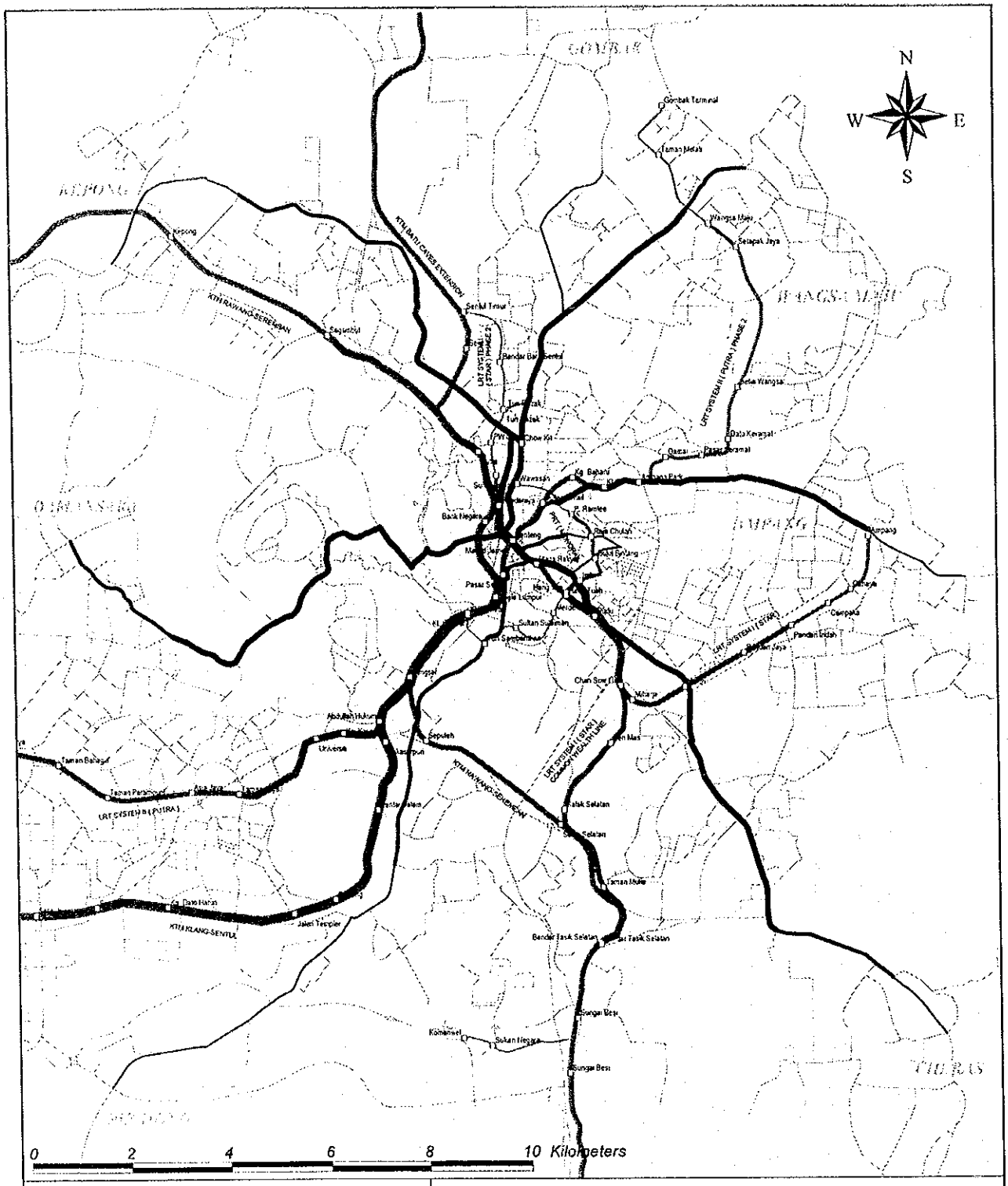

Figure 7.7.4
Predicted Passenger Demand 2000

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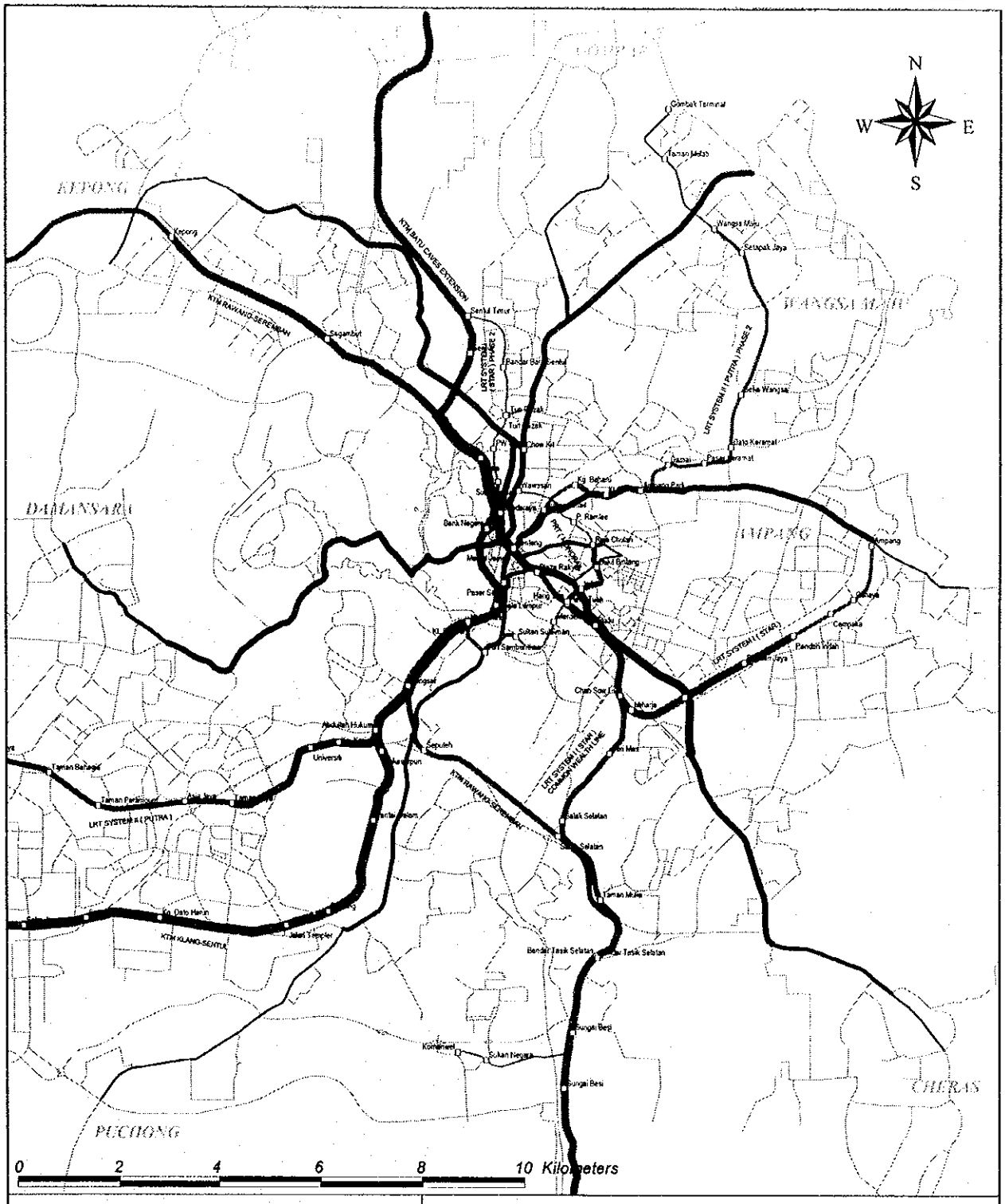

LEGEND

0 - 10000	60001 - 80000
10001 - 20000	80001 - 100000
20001 - 40000	100001 - 150000
40001 - 60000	150001 - 200000
	passengers / day
Trunk Bus	
Railway	

Figure 7.7.5
Predicted Passenger Demand 2010

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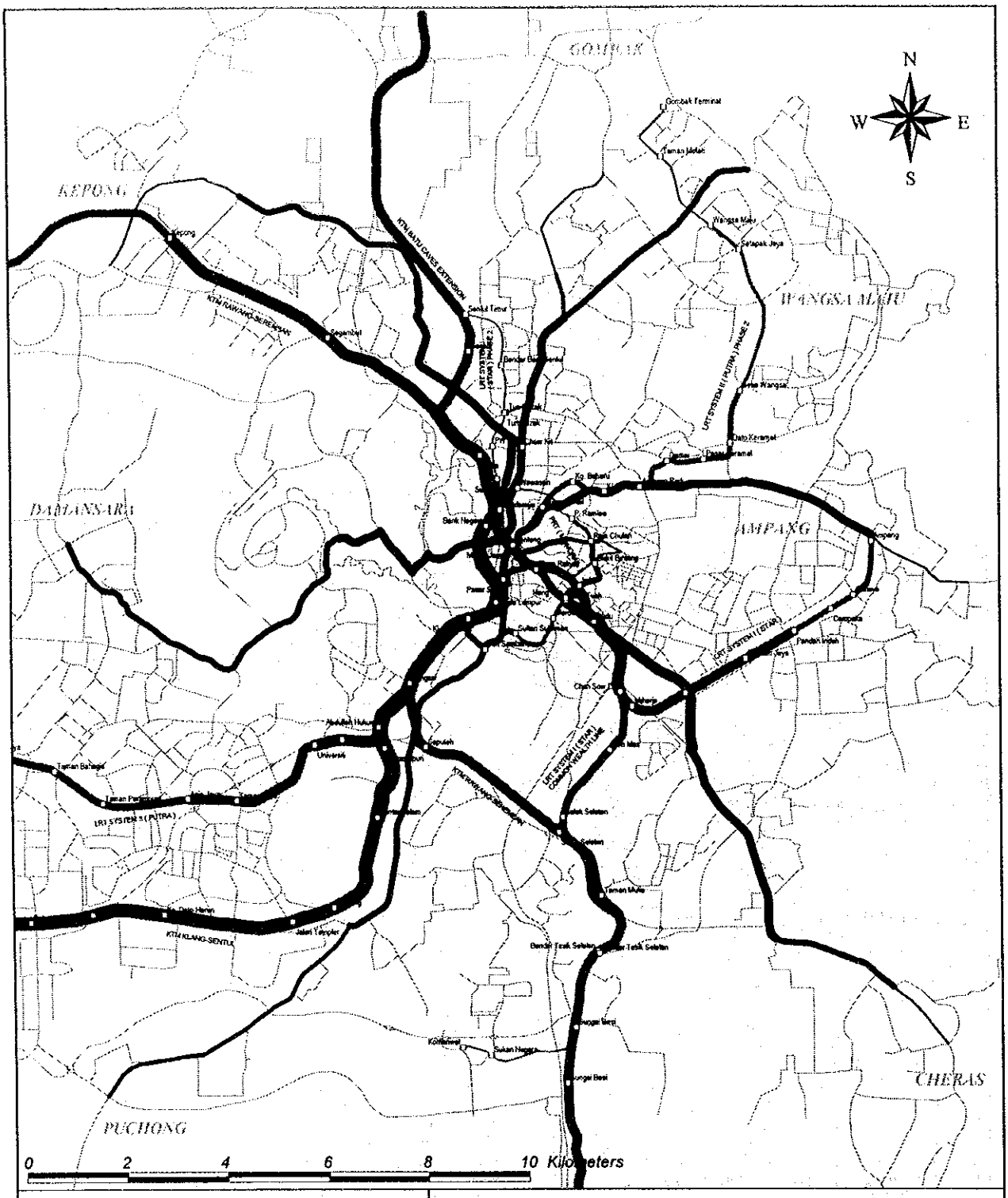

LEGEND

0 - 10000	60001 - 80000
10001 - 20000	80001 - 100000
20001 - 40000	100001 - 150000
40001 - 60000	150001 - 200000
	passengers / day
Trunk Bus	
Railway	

Figure 7.7.6
Predicted Passenger Demand 2020

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Table 7.7.1 Number of Passengers by Railway and Trunk Bus Line (BASE Case)

(unit : persons per day)

	2000	2010	2020
KTM Klang-Sentul	162,800	219,900	347,500
KTM Rawang-Seremban	114,900	156,800	241,900
KTM Batu Caves	14,900	26,800	35,800
STAR Phase (1)	105,800	141,200	211,800
STAR Phase (2)	23,900	33,200	46,800
PUTRA Phase (1)	63,500	72,500	114,500
PUTRA Phase (2)	41,700	46,600	71,200
Monorail North	58,600	71,500	104,900
Trunk Bus Ampang	33,400	41,100	62,100
Trunk Bus Cheras	58,700	67,400	93,500
Trunk Bus Damansara	52,900	55,400	77,000
Trunk Bus Genting Kelang	41,400	43,600	61,000
Trunk Bus Gombak	5,700	6,100	8,200
Trunk Bus Kepong	41,800	47,500	65,800
Trunk Bus Puchong	29,300	33,200	50,700

Source : SMURT-KL Estimate

Table 7.7.2 Average Number of Passengers by Line (without Area pricing)

Line	Distance (km)	Average Number of Passengers		
		2000	2010	2020
KTM Klang-Sentul	48.0	44,700	49,200	94,000
KTM Rawang-Seremban	105.0	15,500	18,000	31,300
KTM Batu Caves	7.6	29,900	54,000	71,900
STAR Phase (1)	12.0	25,800	35,500	53,000
STAR Phase (2)	15.0	11,900	15,900	23,200
PUTRA Phase (1)	14.1	37,200	39,600	63,100
PUTRA Phase (2)	14.9	13,500	14,500	23,900
Monorail North	8.0	9,200	11,200	18,000
Trunk Bus Ampang	10.1	19,100	23,200	35,400
Trunk Bus Cheras	13.7	28,700	34,500	51,400
Trunk Bus Damansara	11.9	25,200	25,900	36,500
Trunk Bus Genting Kelang	9.4	25,800	27,800	39,100
Trunk Bus Gombak	3.5	5,200	7,000	9,600
Trunk Bus Kepong	14.0	15,100	20,100	27,700
Trunk Bus Puchong	14.2	12,500	15,600	27,500

Source : SMURT-KL Estimate

Among the seven corridors, the Cheras corridor has the highest average number of passengers in 2020, followed by Genting Klang, Damansara, and Ampang. However these predicted demands will not meet the required passenger demand for LRT operation. (Details will be argued in the Financial Analysis on Public Transport in Chapter 13).

If the traffic restraint scheme is applied and the traffic demand in CBD is limited at the 1997 level, person trips related to the CBD will increase by 148,000 in 2010 and 237,000 trips in compared to the cases without traffic restraint. In the year 2020, the modal share of public transport in the CBD would increase to 40 percent from 17 percent in 1997 as described in Section 7.2. Under such a car use restraint scheme, the passenger demand on the railway as well as the trunk bus system were predicted as shown in Table 7.7.3. The most significant impact of the area pricing scheme on passenger demand can be seen in the number of passengers of PRT (Monorail) North Line. In the year 2020, the number of passengers on the PRT North Line will increase from 105,000 to 154,000 due to the traffic restraint scheme.

Table 7.7.3 Comparison of Passenger Demand by With and Without Area Pricing and by Railway and Trunk Bus Line, 2000, 2010, and 2020

Line	2000		2010		2020	
	W/O Area Pricing	With Area Pricing	W/O Area Pricing	With Area Pricing	W/O Area Pricing	With Area Pricing
	BASE	APATB	BASE	APATB	BASE	APATB
KTM Klang-Sentul	162,800	163,500	219,900	226,200	347,500	364,500
KTM Rawang-Seremban	114,900	115,800	156,800	164,200	241,900	260,100
KTM Batu Caves	14,900	15,200	26,800	28,200	35,800	38,300
STAR Phase(1)	105,800	107,700	141,200	153,000	211,800	242,800
STAR Phase(2)	23,900	24,200	33,200	34,600	46,800	49,900
PUTRA Phase(1)	63,500	64,000	72,500	76,400	114,500	125,000
PUTRA Phase(2)	41,700	42,700	46,600	55,400	71,200	90,800
Monorail North	58,600	60,800	71,500	91,200	104,900	153,500
Trunk Bus Ampang	33,400	34,200	41,100	47,600	62,100	75,200
Trunk Bus Cheras	58,700	59,600	67,400	74,300	93,500	107,100
Trunk Bus Damansara	52,900	54,300	55,400	65,700	77,000	100,000
Trunk Bus Genting Kelang	41,400	42,100	43,600	47,200	61,000	68,400
Trunk Bus Gombak	5,700	5,800	6,100	6,600	8,200	9,000
Trunk Bus Kepong	41,800	42,500	47,500	53,400	65,800	74,500
Trunk Bus Puchong	29,300	29,900	33,200	37,100	50,700	59,000

To explore the possibility of conversion from a trunk bus to LRT, three alternatives for public transport network, shown in Table 7.7.4, were examined.

Table 7.7.4 Alternatives of LRT Network

Network	Description
LRT Network (A)	The planned LRT lines, Kepong line and Cheras line, as well as PRT south section are included and the corresponding lines are eliminated. Other trunk bus routes, Ampang, Genting Klang, are converted into LRT.
LRT Network (B)	Compared to the LRT Network (A), LRT Cheras line and LRT Damansara line are cross-linked via Jalan Raja Chulan.
Combination of LRT and Trunk Bus	Only one LRT line Damansara – Raja Chulan – Cheras line is included, and other lines are operated as truck bus system.

Table 7.7.5 Average Number of Passengers (With Area Pricing)

Line	LRT (A)	LRT (B)	Combination
LRT Ampang / Trunk Bus	32,200	27,200	21,700 *
LRT Cheras (A)	42,200	-	-
LRT Raja Chulan-Cheras (B)	-	45,800	50,200
LRT Damansara	38,300	43,800	46,400
LRT Genting Klang	11,800	27,900	30,000 *
Monorail South/ Trunk Bus Puchong	20,700	22,900	31,000 *
LRT Kepong / Trunk Bus	41,200	41,500	22,300 *

Note: * indicates the trunk bus operation rather than LRT on the lines.

The Combination of LRT Raja Chulan – Cheras and LRT Damansara in LRT Network (B) will carry more passengers than the combination of LRT Cheras and LRT Damansara in LRT Network (A) because the LRT network (B) passes through the Golden Triangle area. Since the other lines have less passenger demand and competitiveness against the existing and on-going railway/LRT system, a trunk bus system would be more suitable for these lines. In the case of the combination of LRT Damansara- Cheras (via Raja Chulan) and trunk bus system on the other routes, the average number of passengers on both Raja Chulan- Cheras and Damansara sections will be greater than those on the LRT Network (B).

Consequently, the combination of LRT and Trunk Bus System is the most suitable public transportation system among the three alternatives.