4.5.5 RAILWAY NETWORK SYSTEM

A rail transit system is expected to become an important mode for the Jakarta Metropolitan Area in the future because the system is originally a highly reliable and efficient transportation mode with high capacity and rapid transportation service on a separated right-of-way.

Unfortunately however, since the existing railway facilities were constructed for regional and goods transportation and not for urban and suburban railway services, the urban structure has been established independently of the railway alignment. Therefore the on-going rehabilitation program of the existing railway facilities cannot induce enough demand to fill the capacity supplied by the investment without changing landuse along the railway lines. This implies that the recommended railway network system, based on the on-going rehabilitation and the expected modernization of the existing facilities and systems, is placed as a distant future plan at least beyond the next twenty years.

Even when the on-going rehabilitation and modernization program of the existing railway facilities and system is completed, the improved railway network system cannot have enough coverage over the major development zones in the Jakarta Metropolitan Area. Therefore, the railway network system should be integrated with other new mass transportation modes, particularly with the Medium/Mass Transportation Corridors, which will first be introduced as busways and later converted to another transit system with higher capacity. In this sense the following railway network system is recommended.

RECOMMENDED RAILWAY NETWORK SYSTEM

1) The loop operation in the Central Area should be conducted using the Eastern and Western Railway Lines to upgrade the urban railway services.

2) The Tanah Abang Station should be the terminal station of the Merak Railway Line, where commuter, middle distance and cargo trains should be operated. Accessibility to the Manggarai Station should be secured from the Merak Railway Line.

3) The New Kota Station should be the terminal station of the Bogor Railway Line, where commuter and middle distance trains should be operated. However, middle distance trains should be terminated at the Manggarai Station.

4) The Manggarai Station should be the terminal station of the Bekasi Railway Line, where long distance, middle distance and commuter trains should be operated. However, due to the transportation capacity of this line, commuter train operations should be limited. Instead, the Medium/Mass Transportation Corridors should be provided for commuter services.

5) The Duri Station should be the terminal station of the Tangerang Railway Line, where commuter trains should be operated.

6) The Manggarai Station should be the Central Station of Jakarta, where all of the long distance and middle distance trains are available. The New Kota Station is no longer suitable as the Central Station because its location is too far north in relation to the preferred coverage area of a central station.

7) The new cargo railway line should serve the Tanjung Priok Port and the Marunda Port and connect with the Bekasi Railway Line. With the provision of this new line the cargo from the two ports can lead to the Bekasi Railway Line and the Merak Railway Line without passing through the Central Area with the provision of this new line.

8) Interchange facilities and systems between medium/mass transportation modes, such as rail-rail, rail-medium capacity mass transportation and rail-bus, should be properly provided. Especially, the rail-bus interchange should be provided at the railway station plaza.

Table 4.5.3 SUMMARY OF RECOMMENDED RAILWAY SYSTEM

Name of Railway Line	Operation	
Eastern/Western Line	1. Urban Loop Train	
Central/Bogor Line	1. Commuter Train	2. Middle Distance Train
Bekasi Line	1. Long Distance Train	2. Middle Distance Train
	3. Commuter Train	4. Cargo Train
Tangerang Line	1. Commuter Train	
Merak Line	1. Commuter Train	2. Middle Distance Train
	3. Cargo Train	

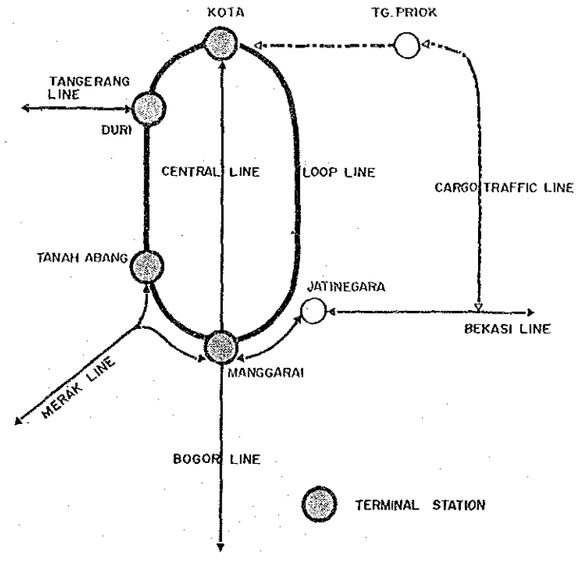


Fig. 4.5.4 RECOMMENDED RAILWAY NETWORK SYSTEM

4.5.6 PARKING SYSTEM

The objective of a parking system is to provide enough parking space for essential trips to fulfill the automobile's "door to door" advantage. However, as similar to roads and streets, it is the basic understanding that enough parking space cannot be provided to meet the potential demand in the future under the limited budget. That is, the parking system should be closely related to the restraint policy of private automobile use, because private automobile use demands not only road and street space but also parking space. In particular, commuter trips by private automobiles generate long term parking in the specified areas, and occupy parking spaces for other essential purposes such as business, shopping and so on.

RECOMMENDED PARKING SYSTEM

The parking system is composed of several important measures. The recommended parking system is as follows:

1) Supply public parking lots to accommodate the automobiles for essential trips, which at present use parking space on arterial streets.

2) Supply public parking lots in the areas where parking space for essential trips is in severe shortage.

3) Regulate that a certain number of parking lots for government offices and business offices should be used for business trips, not for long term parking of commuters in specified areas, and moreover, regulate the upper limit of equipped parking lots of new offices to restrain long term parking of commuters in specified areas.

4) Introduce high parking charges for public parking lots in specified areas to restrain long term parking of commuters.

Different levels of parking regulations and high parking charges are recommended to be adopted in the respective areas as shown in Fig. 4.5.5. The details of the parking regulation and high parking charges must be studied and examined before implementation.

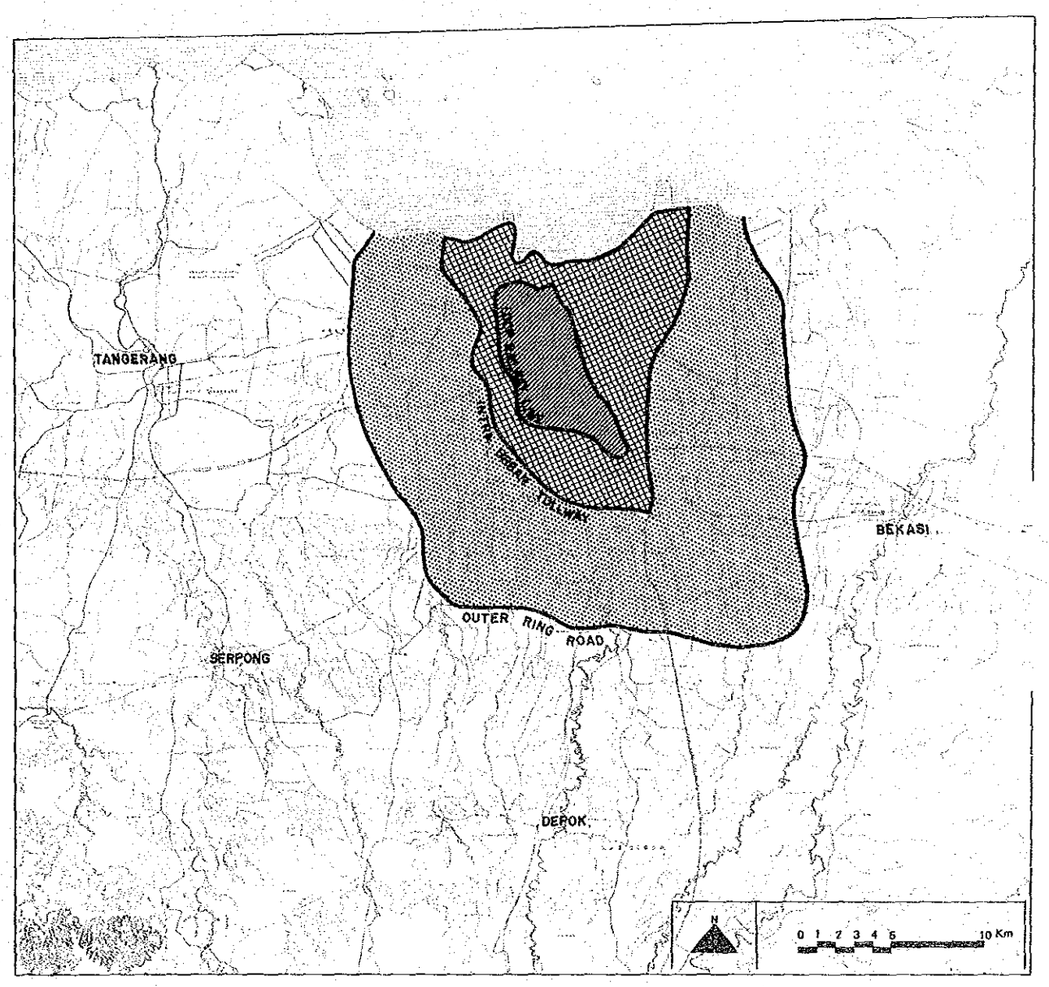


Fig. 4.5.5 ZONING FOR PARKING SYSTEM

4.5.7 PEDESTRIAN SYSTEM

Because the proportion of trips by medium/mass transportation is expected to increase in the next 20 years, not only will trips by motorized transportation increase, but also walking trips will increase in great numbers. People will always have to walk to access to and egress from medium/mass transportation. Because of this, the pedestrian system, in both the transportation system and urban system, should be given full consideration to in the following ways.

PEDESTRIAN FACILITIES ON ARTERIAL STREETS

Arterial streets accommodate both vehicles and pedestrians, and the design should include sidewalks, crosswalks and sometimes grade separation for pedestrians. However, except for large streets located around the Central Area, new streets have been constructed without adequate provision for pedestrians. A policy standard of street design should be established for rational use of street space. The typical cross section of arterial streets for new construction and improvement will be recommended in Section 6.2.

The major conflict between pedestrians and vehicles usually occurs at intersections and in the general area of bus stops and other loading areas. At intersections with cross streets, and according to the situation, pedestrian facilities should include crosswalks, pedestrian traffic signals, refuge islands, fixed-source lighting and pedestrian footbridges. On the other hand, at areas around bus stops and bus terminals, the conflicts between pedestrians and vehicle, which are expected to increase, should be eliminated and bus users' convenience should be increased and preserved to achieve high ridership of bus transportation. To achieve this end, the provision of pedestrian footbridges located at bus stops, as well as sidewalks with adequate width, are essential in major arterial streets.

PEDESTRIAN FACILITIES IN URBAN UNIT

Within an urban unit which is enclosed by arterial roads and streets, the roles of walking and para-transits such modes with capacity and size of bemos and bajajs, are more important than those of other motorized transportation modes. The trips related to an urban unit are intra-unit trips and trips for access to arterial streets. It is very important to pay careful attention to these walking or para-transit trips, and collector and local streets should be properly located and developed according to the urban unit development plan, which is discussed and presented for typical cases in Section 6.4.3.

PEDESTRIAN FACILITIES AROUND ACTIVITY CENTER

As described in detail in Sections 3.4 and 6.4, activity centers are expected to play important roles as nuclei in achieving a multi nucleus urban pattern in the future. The Medium/Mass Transportation Corridors or railway lines are recommended to be located at the recommended activity centers, both to provide medium/mass transportation services to activity centers and to promote ridership of medium/mass transportation. The many people who come and go from these activity centers are expected to use medium/mass transportation. To achieve this end, center functions should be physically concentrated within walking distance, and moreover, more attention should be given to pedestrians from the viewpoints of human scale of the physical environment.

It is not only essential to provide pedestrian facilities such as sidewalks, crosswalks and pedestrian footbridges, but also a proper physical environment scale composed of buildings, houses and transportation facilities. The existing building code, which regulates open space within one building lot, does not form a building pattern with human scale, but with automobile scale, such as on Jl. M.H. Thamrin and Jl. Sudirman. This existing building code may become a crucial obstacle for development of activity centers where people should be able to walk to work, business and shopping, etc.

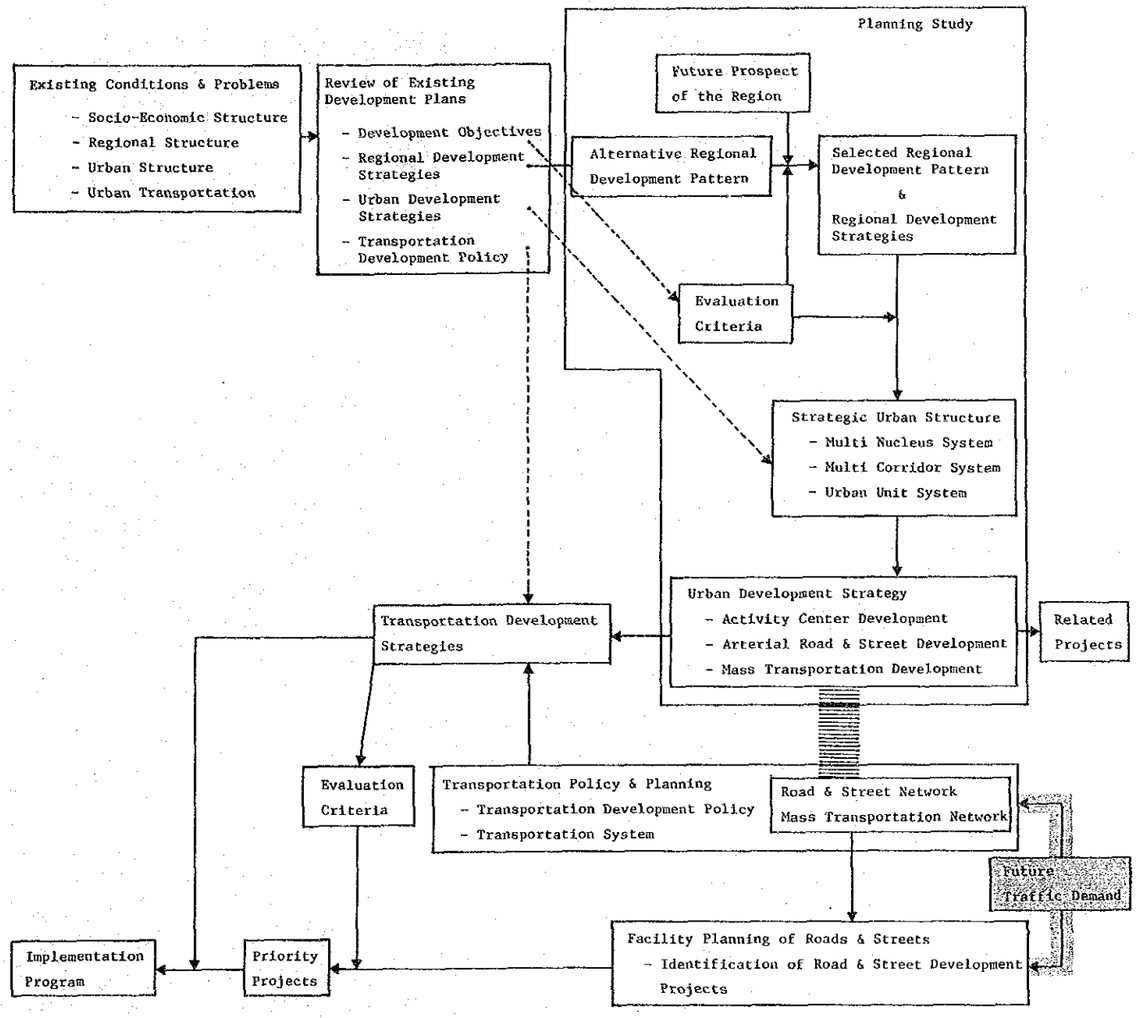
CHAPTER 5

FUTURE TRAFFIC DEMAND

In this chapter the future quantitative prospects of the urban structure will be examined based on the selected development strategy studied in Chapter 3. Furthermore, the future traffic demand will be estimated based on the level of service in the proposed future transportation system studied in Chapter 4.

The growth of the socio-economic framework and the change of urban structure will be mentioned in Sections 5.3.1 and 5.4.1. Reflecting this growth and change, the future person trip demand related to the Jakarta Metropolitan Area will grow drastically as will be shown in Sections 5.3.2 and 5.4.2. In order to meet this huge person trip demand, development of vast amounts of transportation facilities would be necessary.

The forecasted future traffic demand is significant information for establishment of the road and street network, for the facility planning of the roads and streets in Chapter 6 and for the implementation program in Chapter 7.



Future prospects concerning urban structure and traffic demand were clarified quantitatively in the two following steps at the regional and urban levels as shown in Fig. 5.2.1.

In the first stage, the regional development pattern was understood by the socio-economic framework in the case that the regional development will be conducted according to the regional development scenario. At the same time regional-wide person trip movement was analyzed.

In the second stage, the urban structure developed according to the selected urban development strategy was studied through the zonal planning parameters, such as the distribution of population and jobs. At the same time the future traffic demand in the urban area based on the selected urban structure was forecasted. The proposed future transportation system was analyzed quantitatively by this estimated future traffic demand.

The traffic demand forecast was carried out by the conventional four staged sequential method as shown in Fig. 5.2.2. The traffic demand model for estimating the future demand was obtained by analyzing the mechanism of the existing demand. The data for this analysis was mainly obtained from the ARSDS Person Trip Survey executed in 1985.

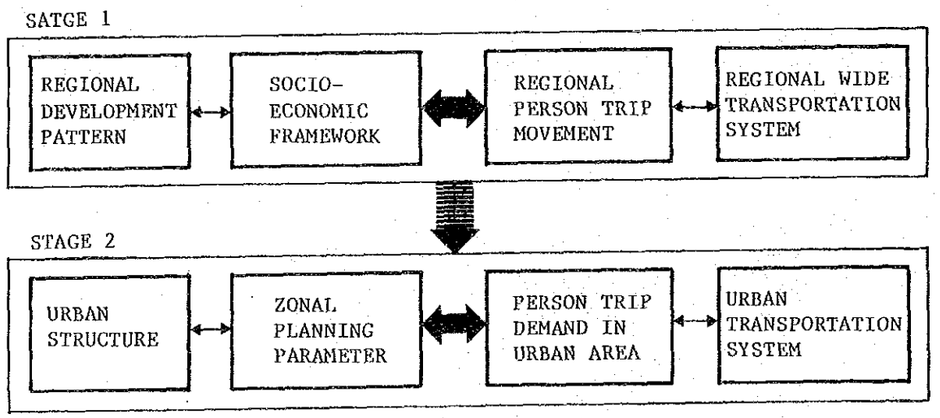


Fig. 5.2.1 FUTURE PROSPECTS

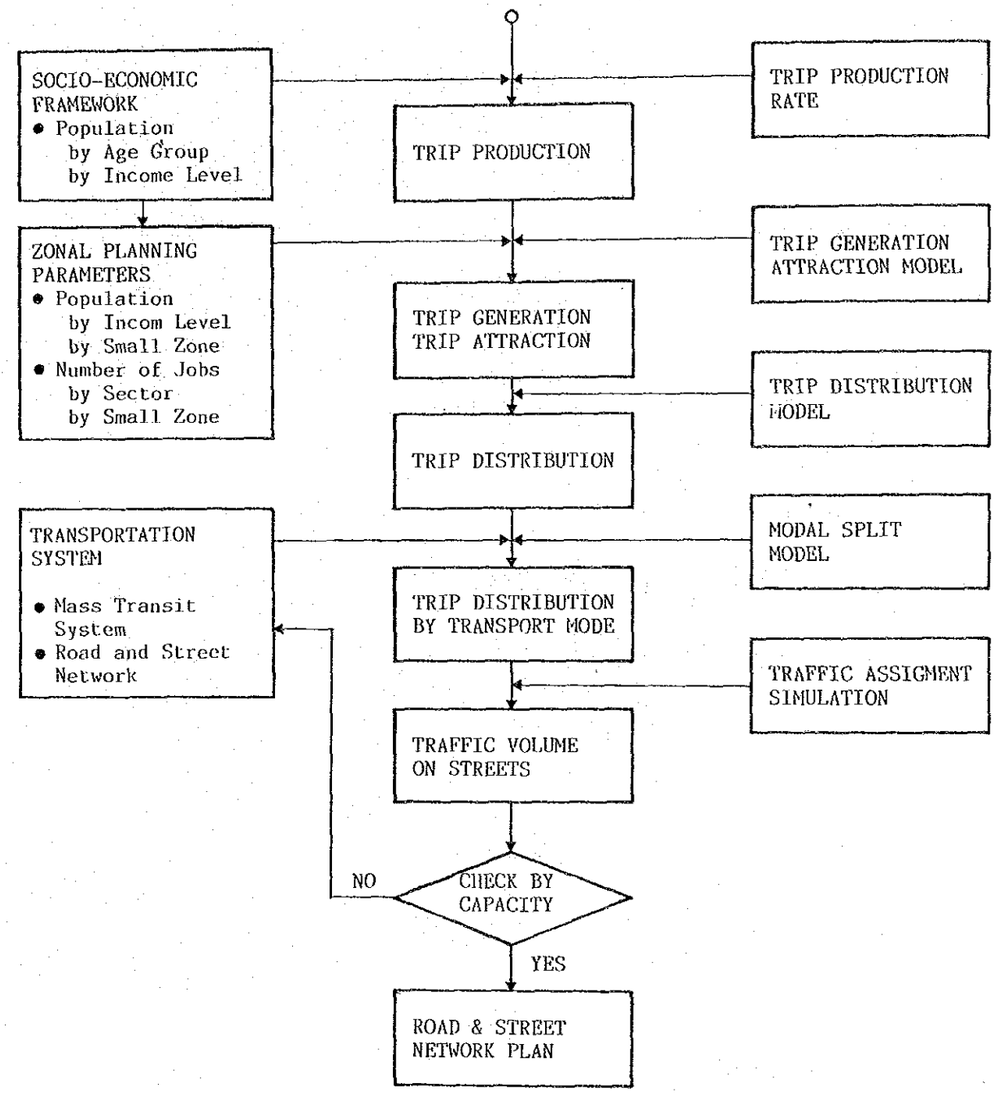


Fig. 5.2.2 FLOW CHART FOR FORECASTING OF FUTURE TRAFFIC DEMAND

5.3.1 CHANGE IN SOCIO-ECONOMIC FRAMEWORK

GROWTH OF POPULATION AND JOBS

The total population in the Jakarta Metropolitan Area will amount to more than 15 million persons in 2005. As the decentralization of population advances, the composition of population in three surrounding areas, of the total population in the metropolitan area, will grow drastically from 8.6% in 1980 to 23.2% in 2005 as shown in Fig. 5.3.1. Tangerang, Bekasi and Depok will account for 11.9%, 6.1% and 5.2% respectively.

Even though the internal employment rate in the three surrounding areas will increase as a result of the decentralization of jobs, the commuter movement between Jakarta and these areas will increse drastically as shown in Fig. 5.3.2 and their mutual relation will be strengthened.

GROWTH IN INCOME AND CHANGE IN AGE STRUCTURE

In accordance with the economic growth, the composition of income groups will change remarkably as shown in Table 5.3.1. Although the low income group accounted for 47.5% in 1985, its composition will drop to 6.2% in 2005 and the composition of the upper and lower middle income group will increase to 34.0% and 52.5% respectively.

The composition of the young generation aged 24 years and below will decrease from 59.7% in 1985 to 51.1% in 2005 as shown in Table 5.3.2.

Table 5.3.1 POPULATION CHANGE IN DKI JAKARTA BY INCOME GROUP, 1985 – 2005

Income Level	1985 ('000)	(%)	2005 ('000)	(%)	Growth Rate 1985 – 2005
High Income Group	305	(3.9%)	876	(7.3%)	2.87
Upper Middle Income Group	955	(12.2%)	4,080	(34.0%)	4.27
Lower Middle Income Group	2,850	(36.4%)	6,300	(52.5%)	2.21
Low Income Group	3,719	(47.5%)	744	(6.2%)	0.20
Total	7,829	(100.0%)	12,000	(100.0%)	1.53

Note: This is the case of the selected strategy with high economic growth

Table 5.3.2 CHANGE IN AGE STRUCTURE, 1985 – 2005

Age Group	1985 1,000 Persons		2005 1,000 Persons		Growth Rate 1985 – 2005
0 – 4	957	(12.2%)	1,200	(10.0%)	1.25
5 – 9	947	(12.1%)	1,236	(10.3%)	1.31
10 – 14	869	(11.1%)	1,212	(10.1%)	1.39
15 – 24	1,900	(24.3%)	2,484	(20.7%)	1.31
25 – 49	2,563	(32.7%)	4,404	(36.7%)	1.72
50 –	593	(7.6%)	1,464	(12.2%)	2.47
Total	7,829	(100.0%)	12,000	(100.0%)	1.53

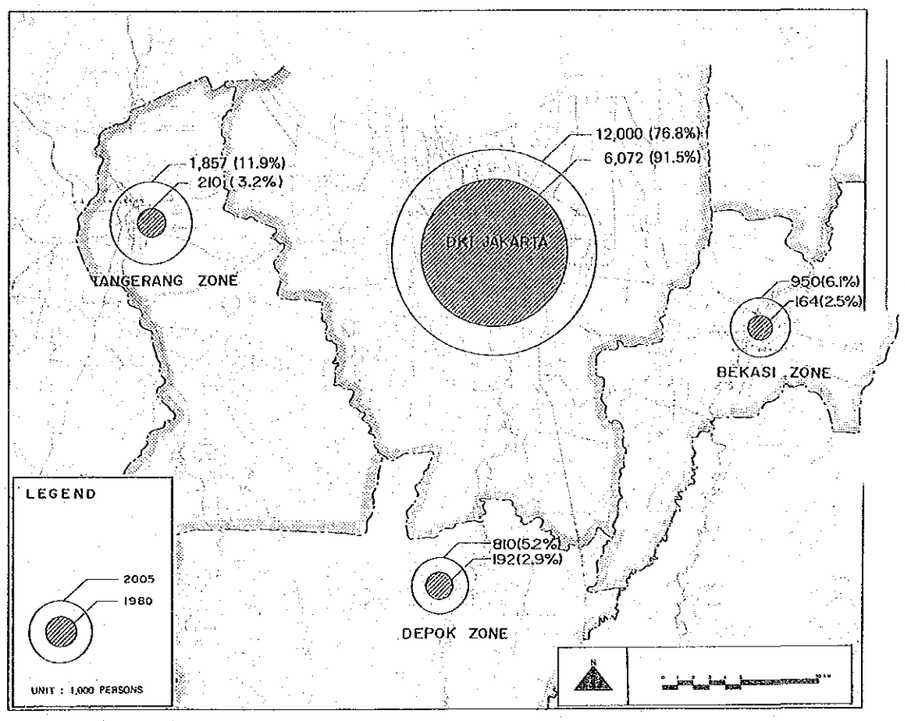


Fig. 5.3.1 POPULATION GROWTH IN JAKARTA METROPOLITAN AREA, 1980–2005

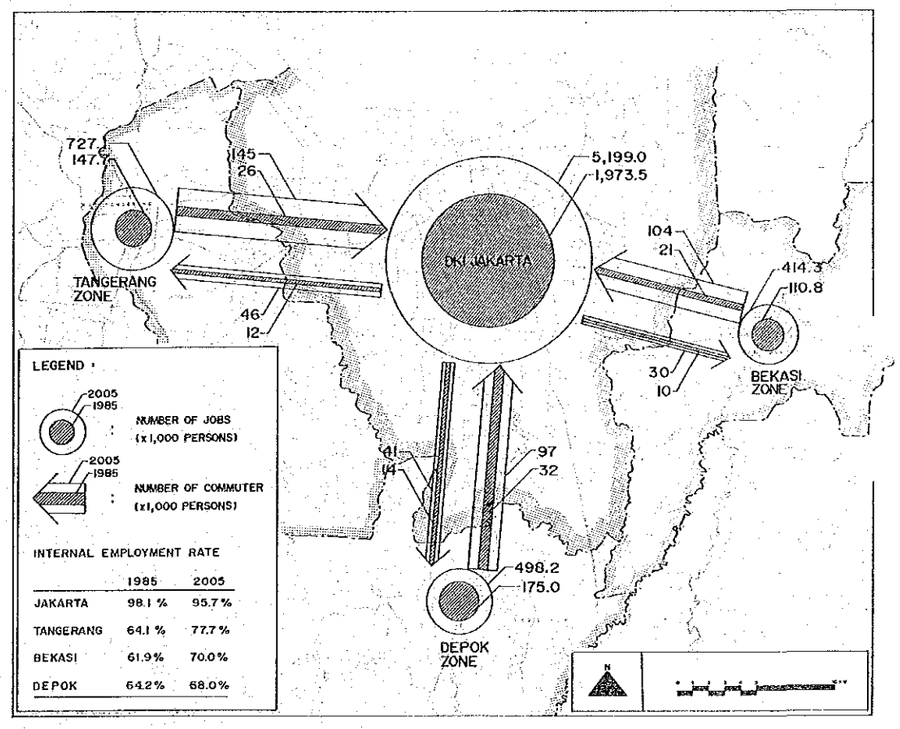


Fig. 5.3.2 GROWTH OF JOBS AND COMMUTER FLOWS IN JAKARTA METROPOLITAN AREA, 1985 – 2005

5.3.2 REGIONAL PERSON TRIP DEMAND

HUGE INCREASE IN PERSON TRIP DEMAND

The population of DKI Jakarta in 2005 is expected to be about 1.53 times larger than that in 1985, even though the population increase potential is dispersed around the Jakarta Metropolitan Area. The total person trips produced by the population of DKI Jakarta in 2005 is predicted to become about 1.73 times more than that in 1985 as shown in Table 5.3.3, because the average number of trips per person will increase in accordance with growth in incomes and changes in population composition by age. In addition, due to urban expansion in the Jakarta Metropolitan Area, the person trips related to Jakarta made by Jakarta non residents in 2005 are forecasted to grow to about 2.51 times more than that in 1985. Consequently, the total person trips related to DKI Jakarta will increase to about 1.78 times more than that in 1985.

The external person trip flows between Jakarta and outside of Jakarta will grow more than the internal person trips in Jakarta as shown in Fig. 5.3.3. The zones included in the Jakarta Metropolitan Area within the 30 km radius from Jakarta indicate a stronger connection with DKI Jakarta than the other zones as shown in Fig. 5.3.4.

CHANGE IN TRIP PURPOSE COMPOSITION

The composition of person trips by trip purpose will change as shown in Table 5.3.4 in accordance with the change in life-style resulting from growth in incomes and changes in age structure. The percentage of "to school" trips will decrease due to the decrease in the composition of the young generation. To the contrary, the percentage of "to work" trips will increase because of the increase in the composition of the labor force population. The increase of private matters and business trips will be caused by an increase in the income level. However, the predominant trip purposes, which cause peak traffic, are predicted to remain as trips for work and school.

Table 5.3.3 PERSON TRIPS RELATED TO JAKARTA, 1985 – 2005

	Person Trip Volume ('000)		Growth Rate 1985 - 2005
	1985	2005*	
Jakarta Resident's Trips	13,120 (93.7%)	22,677 (91.0%)	1.73
Non-Residents' Trips	888 (6.3%)	2,233 (9.0%)	2.51
Total	14,008 (100.0%)	24,910 (100.0%)	1.78

Note: * Person trip volume for the selected development strategy

Table 5.3.4 CHANGE IN TRIP PURPOSE COMPOSITION, 1985 – 2005

Trip Purpose	Person Trip Volume* ('000)				Growth Rate 1985 - 2005
	1985		2005		
To Work	2,147	(16.4%)	4,531	(20.0%)	2.11
To School	2,163	(16.5%)	2,925	(12.9%)	1.35
Business	575	(4.4%)	1,101	(4.9%)	1.91
Private Matters	1,374	(10.5%)	2,754	(12.1%)	2.00
Shopping	859	(6.5%)	1,406	(6.2%)	1.64
To Home	6,002	(45.7%)	9,960	(43.9%)	1.66
Total	13,120	(100.0%)	22,677	(100.0%)	1.73

Note: * Person trips made by the Jakarta residents

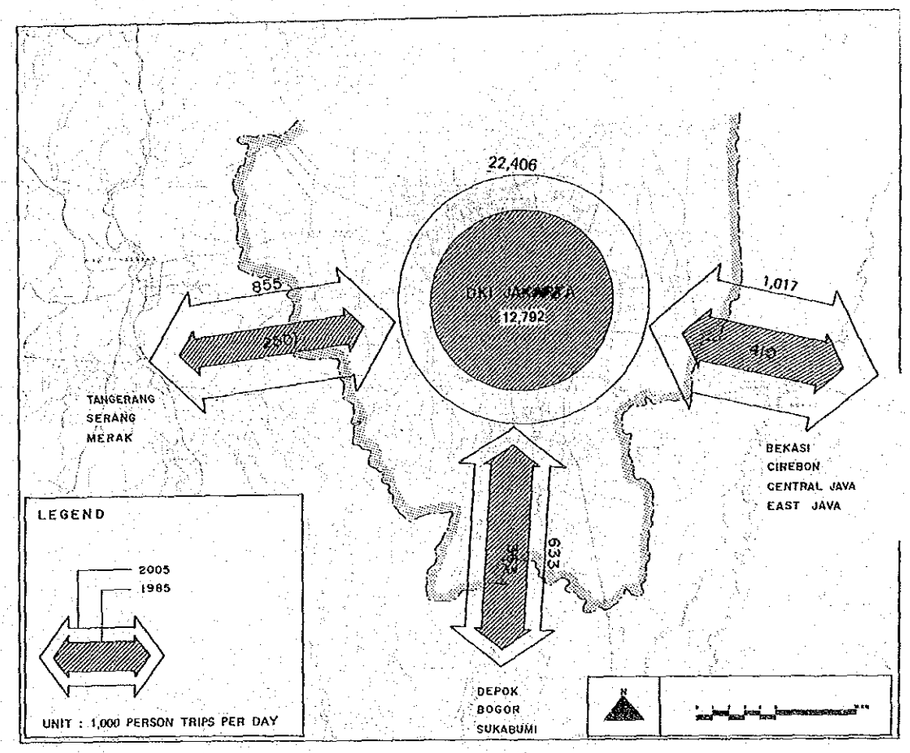


Fig. 5.3.3 MAJOR PERSON TRIP FLOWS RELATED TO DKI JAKARTA

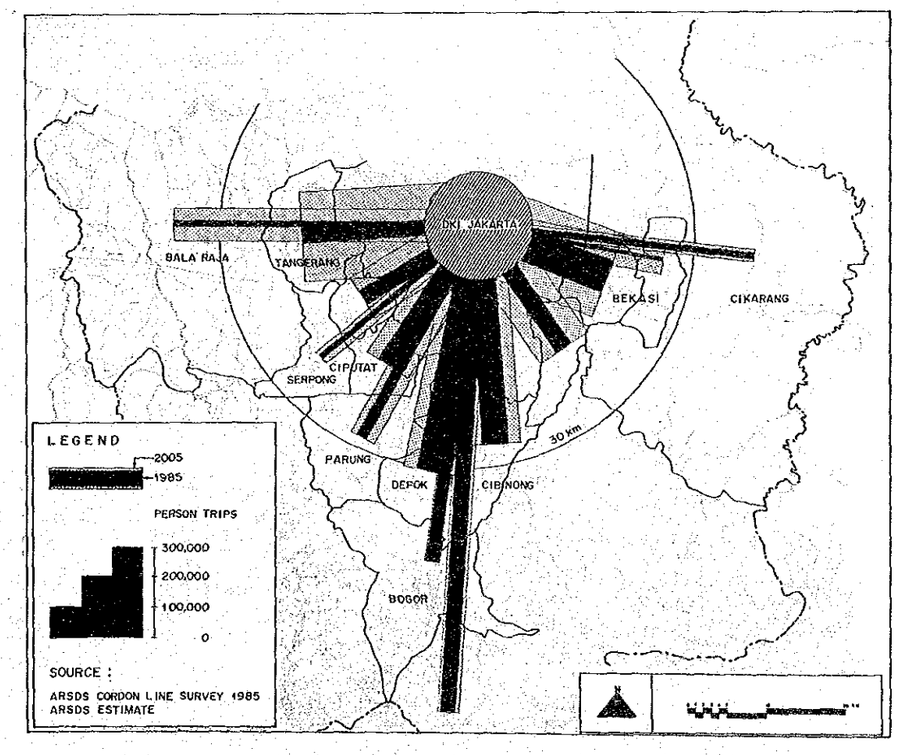


Fig. 5.3.4 MAJOR PERSON TRIP FLOWS BETWEEN JAKARTA AND JABOTABEK, 1985 – 2005

CHANGE IN MODAL COMPOSITION

The higher motorization in the future will be due to growth in incomes. In the next twenty years the growth in income is projected to change the population composition by income group. The projection shows that the population of the upper middle income group, who presently are firstly oriented to automobile use and secondly to motorcycle use, will increase the most, and the population of the lower middle income group, who presently are oriented to motorcycle use, if affordable, rather than public transportation, will increase second most. The change in population by income group implies that higher levels of urban transportation services will be demanded by the people in the future.

Futhermore, the expansion of the urbanized area will cause an increase in the average trip length. These changes will bring about more utilization of motorized transportation. The composition of the motorized transport mode will grow from 57.0% in 1985 to 62.2% in 2005 as shown in Table 5.3.5.

Two cases of future person trip demand by mode of transport were set as follows:

CASE 1 : The railway system will not be well improved and will not function as an urban railway

CASE 2 : The railway system will be well improved and will function as an urban railway

The modal composition of person trips related to Jakarta varies by the classification of person trip flows as shown in Table 5.3.6. In Case 1, the 51.4% share of private transport will be more than the 48.6% share of public transport. Even in Case 2 with the well improved railway, the share of public transport is estimated to account for 55.5% of all the motorized transport. The growth of the share of public transport is not large.

Consequently an increase in the number of person trips by private transport mode cannot be avoided. The growth of person trips by private transport in Case 2 will be 1.8 times and 2.9 times respectively, in the internal person trips flows in Jakarta and the person trip flows between Jakarta and Botabek.

This increase of person trips by private transport, such as private cars and motorcycles, will directly increase the burden on roads and streets. It can be easily postulated that the development progress of the road and street network will not be able to catch up with this drastically increasing motor traffic demand.

Table 5.3.5 PERSON TRIPS RELATED TO JAKARTA BY TRANSPORT MODE, 1985 – 2005

Mode of Transport	Person Trip Volume ('000) 1985		2005*		Growth Rate 1985 – 2005
Non-Motorized Transport	6,023	(43.0%)	9,425	(37.8%)	1.56
Motorized Transport	7,095	(57.0%)	15,485	(62.2%)	1.94
Total	14,008	(100.0%)	24,910	(100.0%)	1.78

Note: * Person trips volume for the selected development strategy

Table 5.3.6 CHANGE IN MODAL COMPOSITION, 1985 – 2005

Unit : %

CLASSIFICATION OF PERSON TRIP FLOWS	MODE OF TRANSPORT	1985	2005 (CASE 1)	2005 (CASE 2)
Jakarta – Jakarta	Railway	0.4 (0.5)	0.4 (0.5)	2.7 (2.8)
	Bus	49.8 (50.8)	48.6 (50.2)	50.1 (52.4)
	Private Car	29.9 (29.6)	30.9 (31.0)	28.2 (27.6)
	Motorcycle	19.9 (19.1)	20.1 (18.3)	19.0 (17.1)
	Total	100.0 (100.0)	100.0 (100.0)	100.0 (100.0)
Jakarta – Botabek	Railway	7.7	11.2	24.3
	Bus	56.0	44.0	37.1
	Private Car	25.1	29.6	25.3
	Motorcycle	11.2	15.2	13.3
	Total	100.0	100.0	100.0
Jakarta – Outside of Jabotabek	Railway	10.6	11.0	14.8
	Bus	84.5	83.5	81.0
	Private Car	4.7	5.3	4.1
	Motorcycle	0.2	0.2	0.1
	Total	100.0	100.0	100.0
Total of Person Trips related to Jakarta	Railway	1.7 (2.2)	2.1 (2.7)	5.9 (6.9)
	Bus	52.2 (53.8)	49.3 (50.8)	49.6 (51.3)
	Private Car	28.1 (27.2)	29.8 (29.5)	26.9 (26.1)
	Motorcycle	18.0 (16.7)	18.8 (17.0)	17.6 (15.7)
	Total	100.0 (100.0)	100.0 (100.0)	100.0 (100.0)

Note: Percent indicates the modal composition of all the person trips made by mode of motorized transport

Percent in parentheses shows the modal composition of all the person trips without intra-zonal trips (medium zone)

5.4.1 CHANGE IN DISTRIBUTION OF POPULATION AND JOBS IN DKI JAKARTA

The changes in various kinds of economic and social activities, in accordance with the change in urban structure, are expressed by the distribution of population and jobs. According to the selected development strategy, urban development in the east and west direction will be executed. The population and jobs in the surrounding areas of the east and west activity centers will increase drastically as shown in Fig. 5.4.1 and Fig. 5.4.2. On the other hand, the accumulation of jobs in the Central Area will increase to a level higher than the present level.

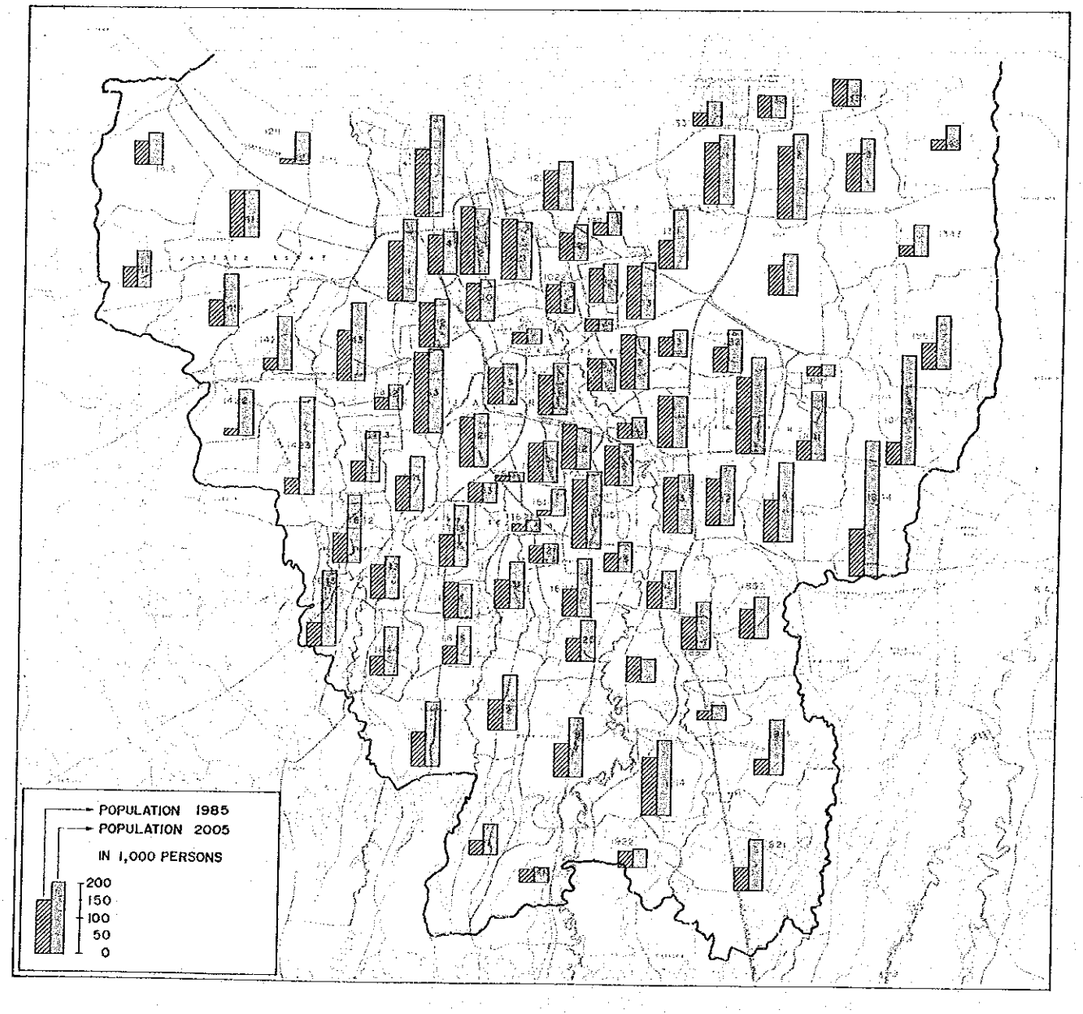


Fig. 5.4.1 CHANGE IN DISTRIBUTION OF POPULATION IN DKI JAKARTA, 1985 – 2005

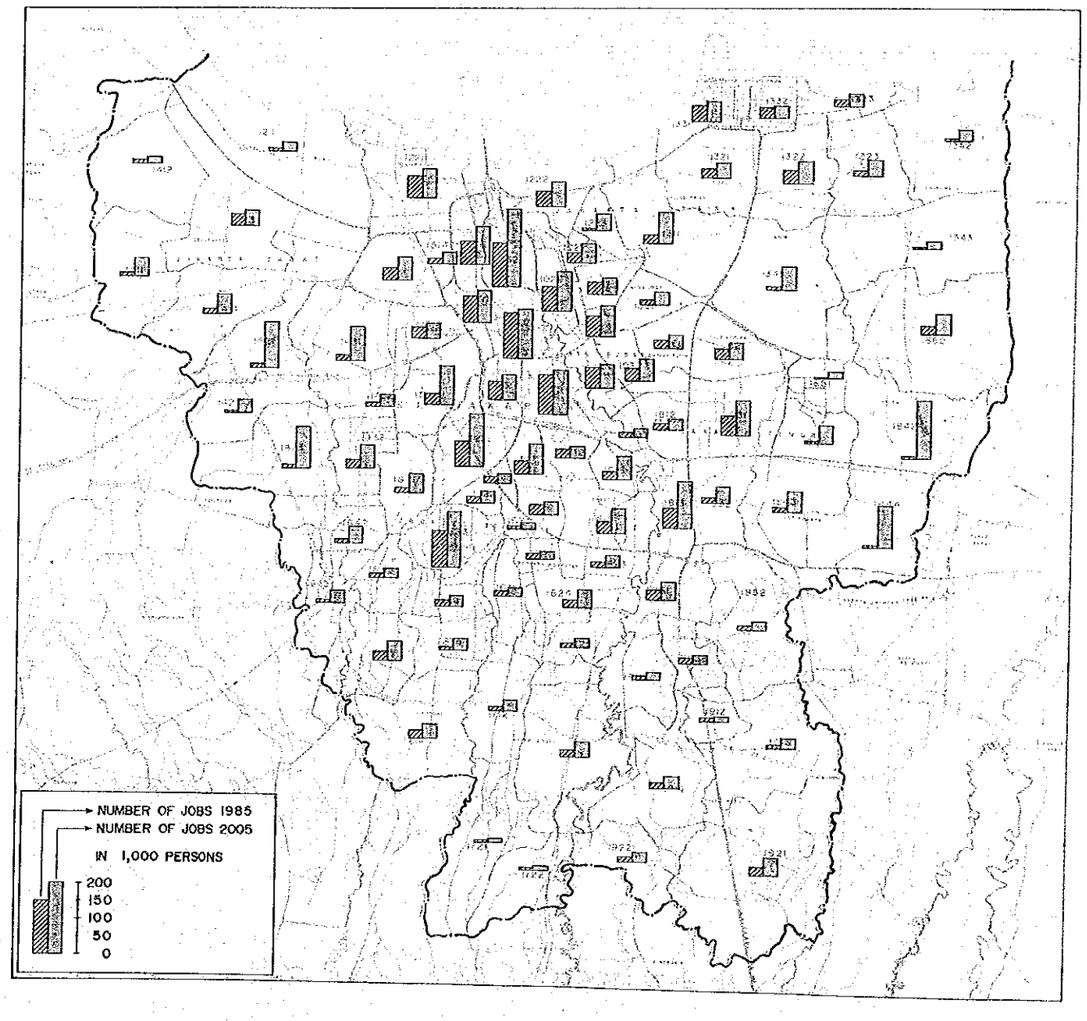


Fig. 5.4.2 CHANGE IN DISTRIBUTION OF JOBS IN DKI JAKARTA, 1985 – 2005

5.4.2 CHANGE IN THE PATTERN OF PERSON TRIP FLOWS IN THE JAKARTA METROPOLITAN AREA

GROWTH OF TRIP ATTRACTION

The growth of trip attraction will be high in the suburban area as shown in Fig. 5.4.3, and this growth will be remarkably high in the areas surrounding the east and west activity centers. In addition, the trip attraction in the Central Area will still continue to grow.

CHANGE OF PERSON TRIP FLOWS

In the case that the decentralized multi nucleus urban pattern is established in the future, the person trip desires will change as shown in Figures. 5.4.4 and 5.4.5 from 1985 to 2005. Huge person trip desires will be spread throughout DKI Jakarta in 2005. Even though decentralization may be achieved, the person trip desires attracted to the Central Area will increase as shown in Fig. 5.4.6.

When the person trip desires attracted in the Central Area are analyzed from the viewpoint of modal composition, the share of public transportation in the person trip flows between the Central Area and east/west areas will increase as shown in Fig. 5.4.7. This will be due to the improvement of the railway system and the introduction of the Medium/Mass Transportation Corridor with a busway. However, the person trip volume by private transportation is estimated to increase by 1.75 times more than that of 1985. Consequently, in consideration of the difficulty in transportation facility development in the Central Area, these increasing person trip desires by private transportation attracted to the Central Area will cause further aggravation and worsen the condition on the roads and streets.

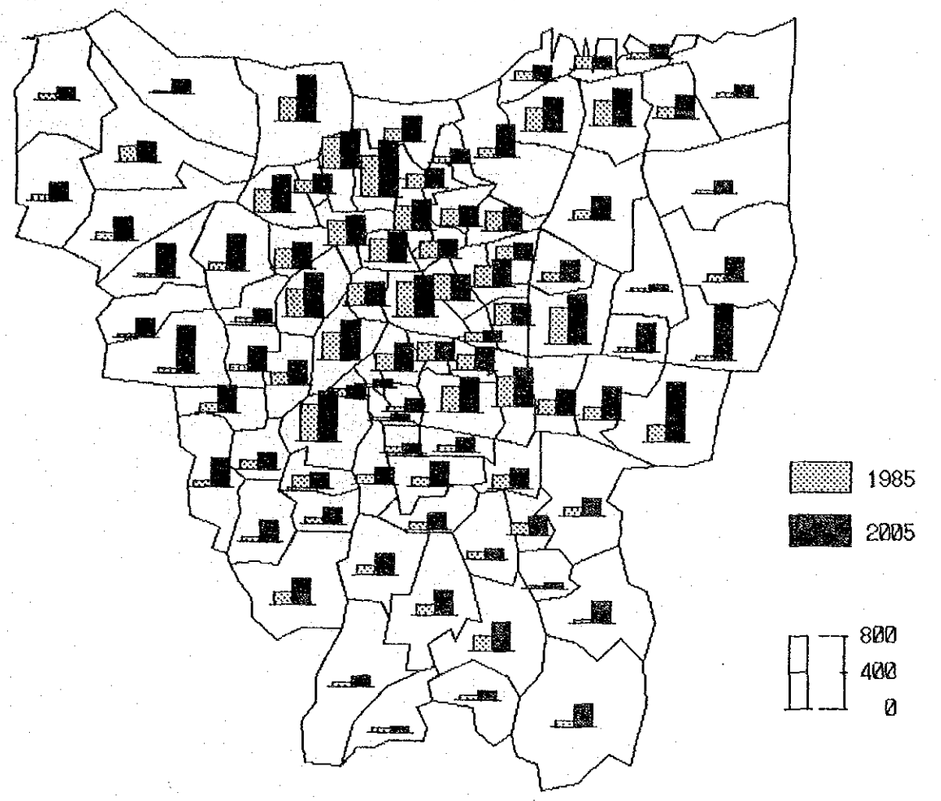


Fig. 5.4.3 GROWTH OF TRIP ATTRACTION IN DKI JAKARTA

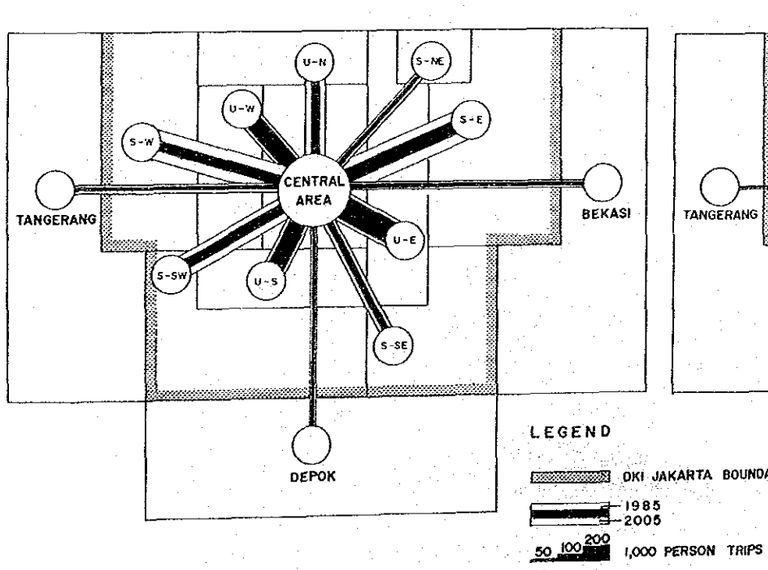


Fig. 5.4.6 PERSON TRIP FLOWS FROM/TO THE CENTRAL AREA, 1985 & 2005

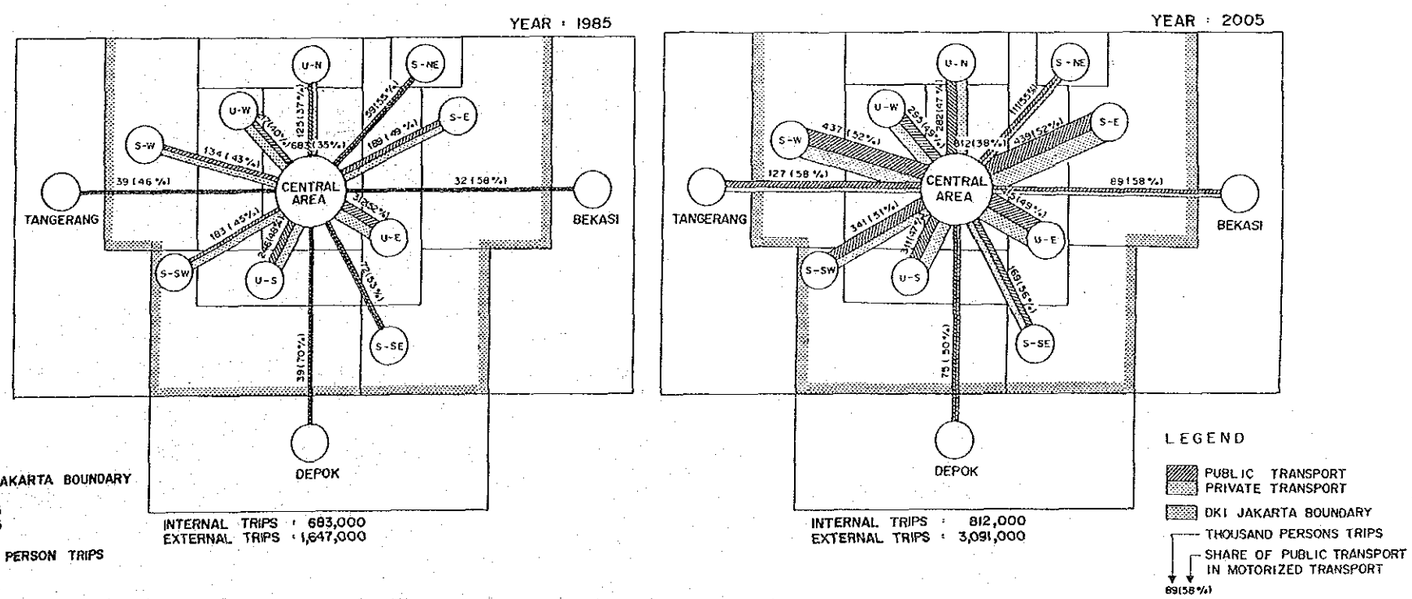
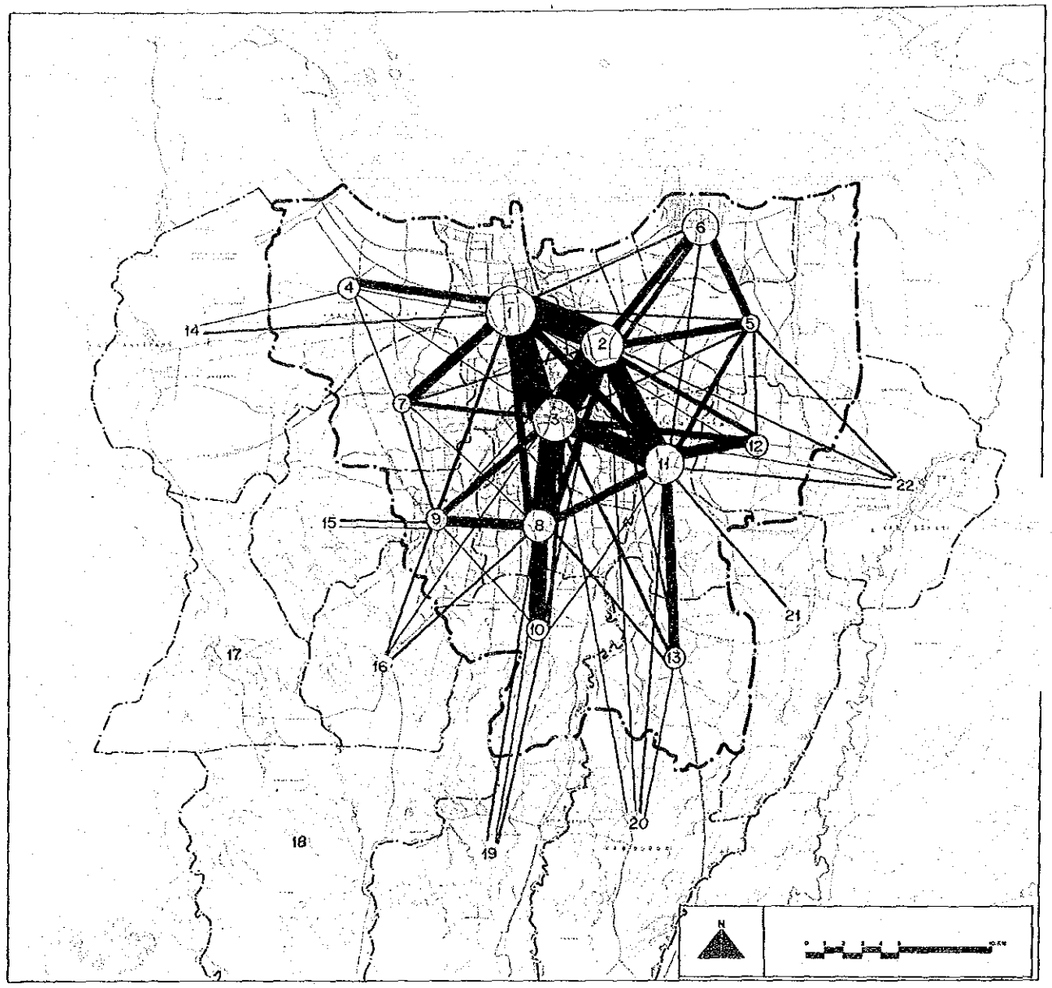


Fig. 5.4.7 PERSON TRIP FLOWS BY TRANSPORT MODE FROM/TO THE CENTRAL AREA, 1985 & 2005



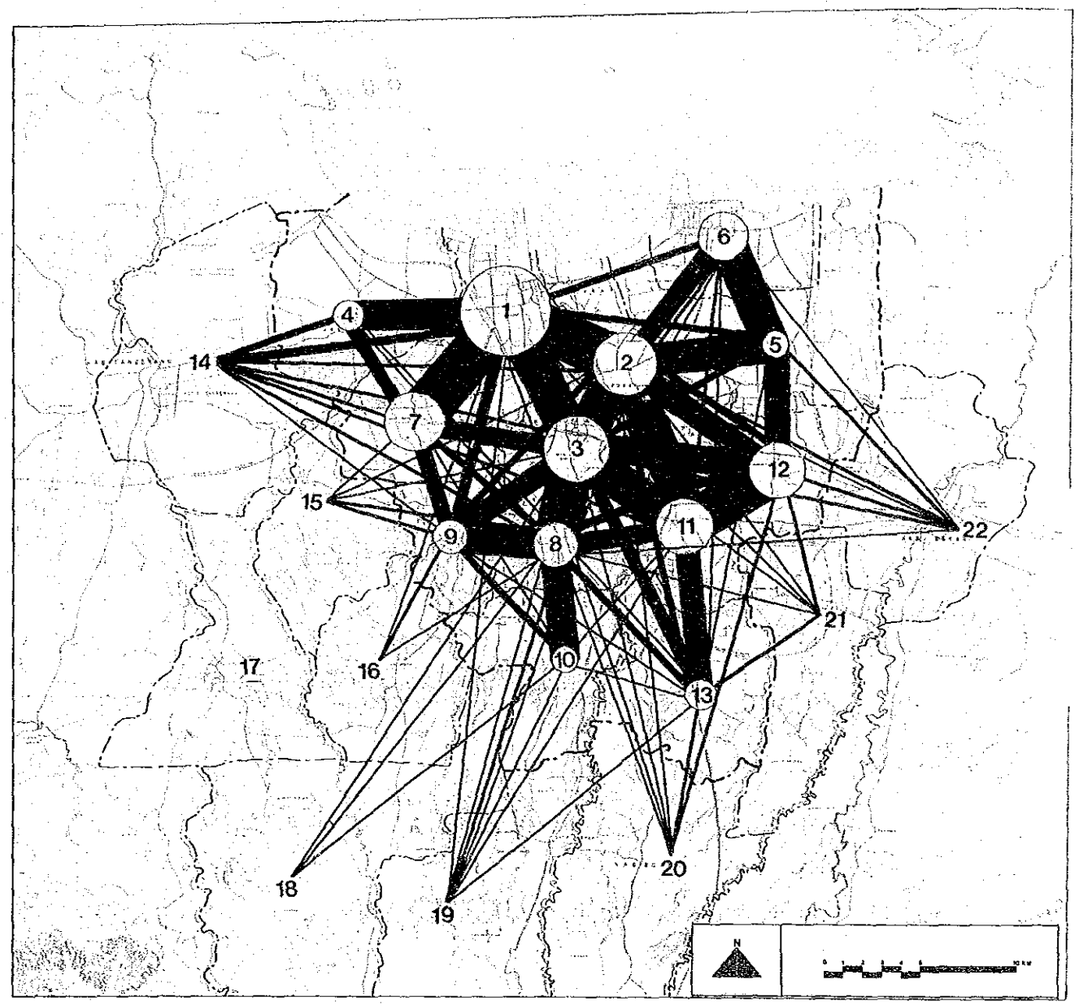
100,000 4,000,000
INTRA-ZONAL TRIPS
IN DKI JAKARTA

100,000 200,000 300,000
PERSON TRIPS PER DAY

NOTE : LESS THAN 10,000 TRIPS
ARE OMITTED

SOURCE : ARSDS HOME VISIT SURVEY, 1985.
ARSDS CORDON LINE SURVEY, 1985

Fig. 5.4.4 PERSON TRIP FLOWS IN JAKARTA METROPOLITAN AREA, 1985



100,000 1,000,000 2,000,000
INTRA-ZONAL TRIPS
IN DKI JAKARTA

100,000 300,000 500,000
PERSON TRIPS PER DAY

NOTE : LESS THAN 10,000 TRIPS
ARE OMITTED

SOURCE : ARSDS ESTIMATE

Fig. 5.4.5 PERSON TRIP FLOWS IN JAKARTA METROPOLITAN AREA, 2005

5.4.3 FUTURE TRAFFIC DEMANDS ON ROAD AND STREET NETWORK

Traffic assignment on the proposed road and street network was conducted to check the network from the viewpoint of quantity. Case 1, which has more motor vehicle trips than Case 2, was used as a future traffic demand. The assigned traffic volumes on the roads and streets by road section are shown in Fig. 5.4.8.

The congestion rate by road section is shown in Fig. 5.4.9. This indicates that some road sections on the radial axis arterial roads and streets would still suffer from traffic congestion. Furthermore, in spite of the increase in road density, some road sections in the Central Area would also suffer from excessive motor vehicle traffic. Comparison of the forecasted traffic volumes and road capacity at the following major cross sections are shown in Table 5.4.1.

1) Outer Ring Road
2) Intra Urban Tollway
3) Railway Semi-Loop Line

The major cross sections for checking capacity are illustrated in Fig. 5.4.10.

Table 5.4.1 CAPACITY CHECK AT MAJOR CROSS SECTIONS

Cross Section	Traffic Volume (x 1000 P.C.U.*)	Capacity (x 1000 P.C.U.*)	Traffic Volume /Capacity (%)
Outer Ring Road			
1) West	234	370	63
2) South	256	264	97
3) East	183	306	60
Subtotal	678	940	72
Intra Urban Tollway			
4) West	755	745	101
5) South	453	456	99
6) East	632	620	102
Subtotal	1840	1821	101
Semi-Loop Railway Line			
7) West	569	645	88
8) South	384	384	100
9) East	541	679	80
Subtotal	1494	1708	87

Note: * P.C.U. = Passenger Car Unit

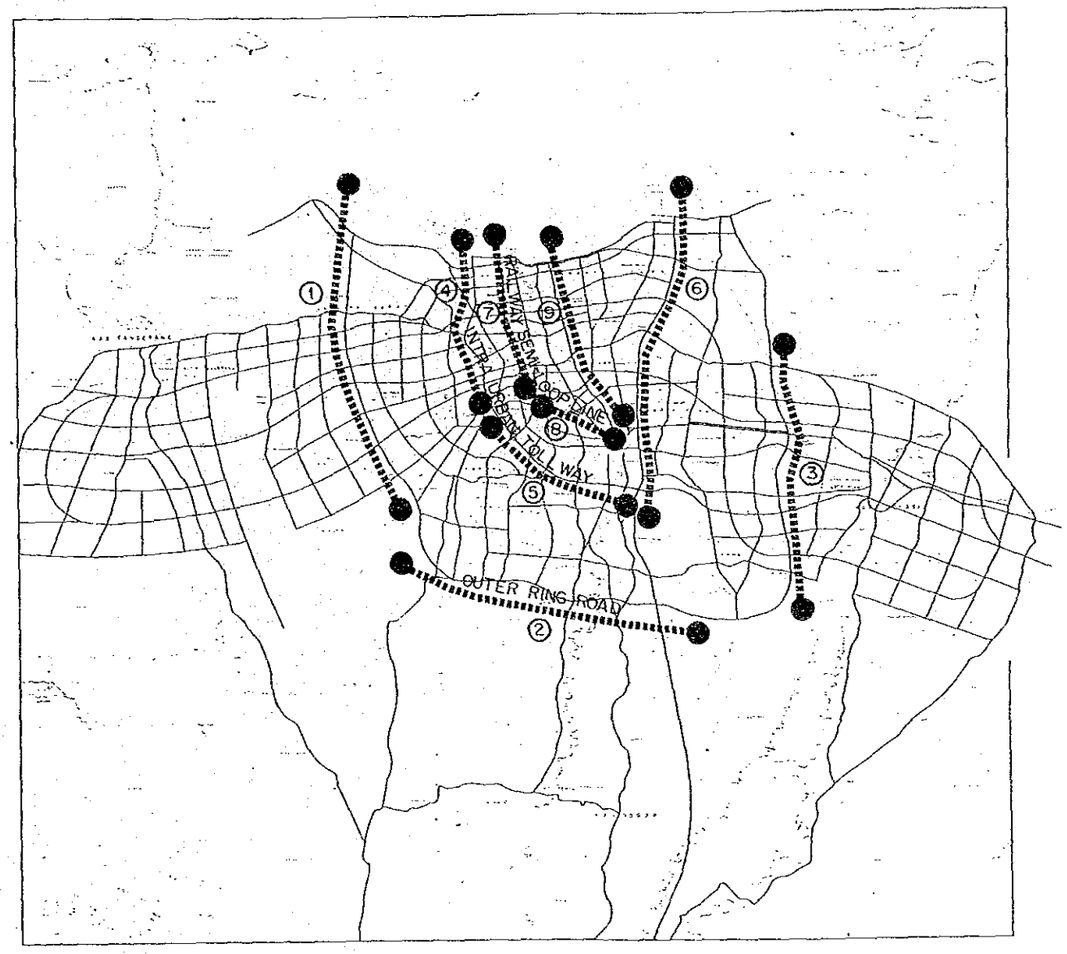


Fig. 5.4.10 MAJOR CROSS SECTION FOR CHECKING CAPACITY

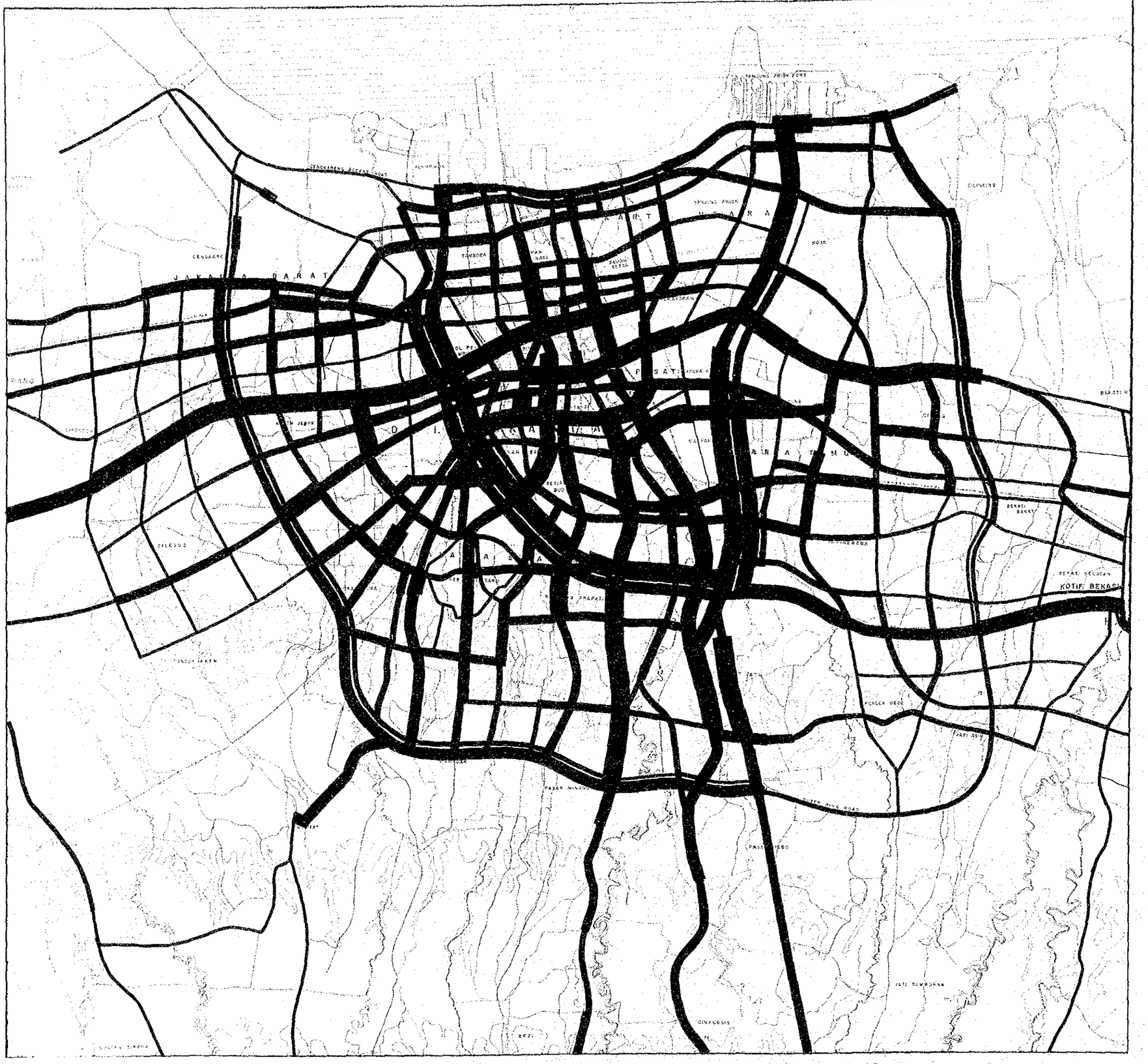


Fig. 5.4.8
MOTOR VEHICLE TRAFFIC ON THE ROAD AND STREET NETWORK, 2005

LEGEND

- 72,000 -
- 60,000 - 72,000
- 48,000 - 60,000
- 36,000 - 48,000
- 24,000 - 36,000
- 12,000 - 24,000
- - 12,000

UNIT : PASSENGER CAR UNIT

N

0 1 2 3 4 5 Km

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

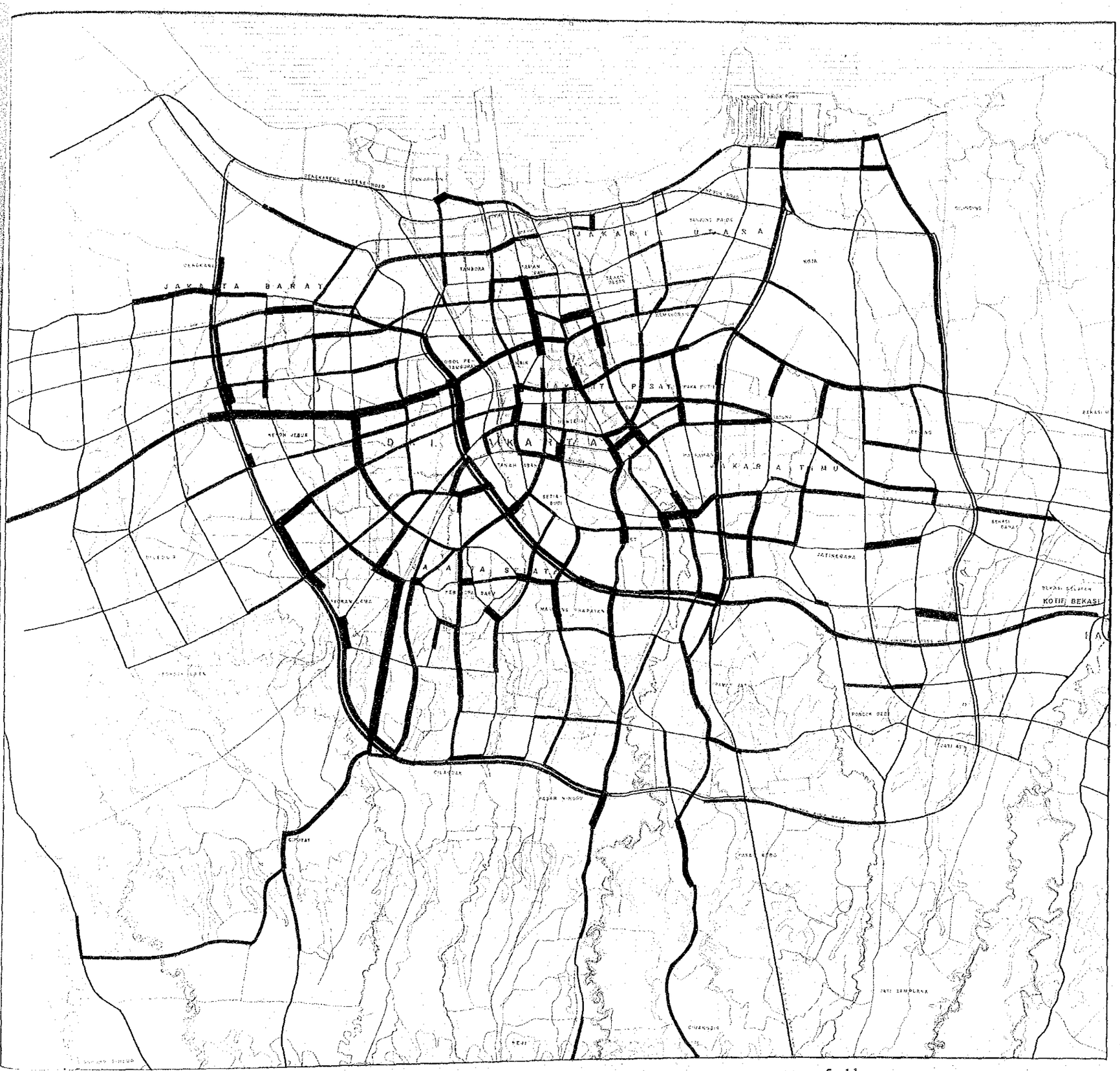


Fig. 5.4.9
CONGESTION RATE BY ROAD SECTION ON THE ROAD AND STREET NETWORK, 2005

LEGEND

- — 80
- — 81 – 100
- — 101 – 120
- — 121 – 140
- — 141 – 160
- — 161 –

UNIT : PERCENT

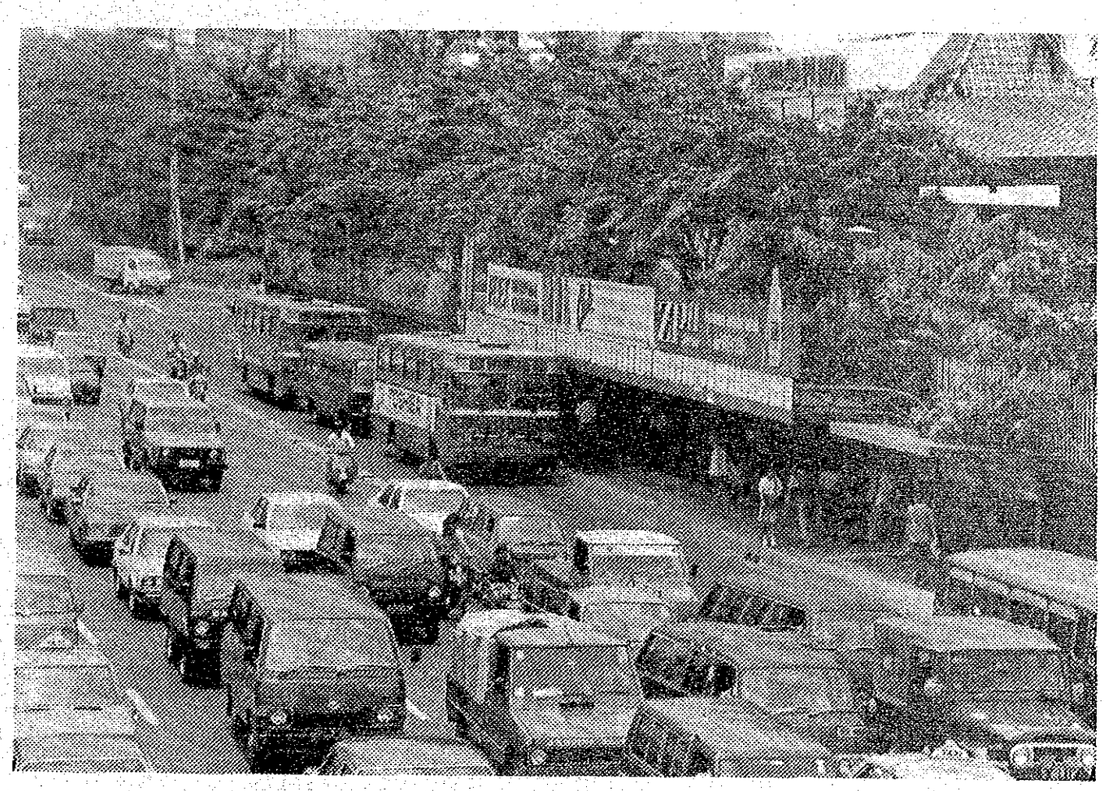
N

0 1 2 3 4 5 Km

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

CHAPTER 6

FACILITY PLANNING OF ROAD AND STREET, AND RELATED DEVELOPMENT

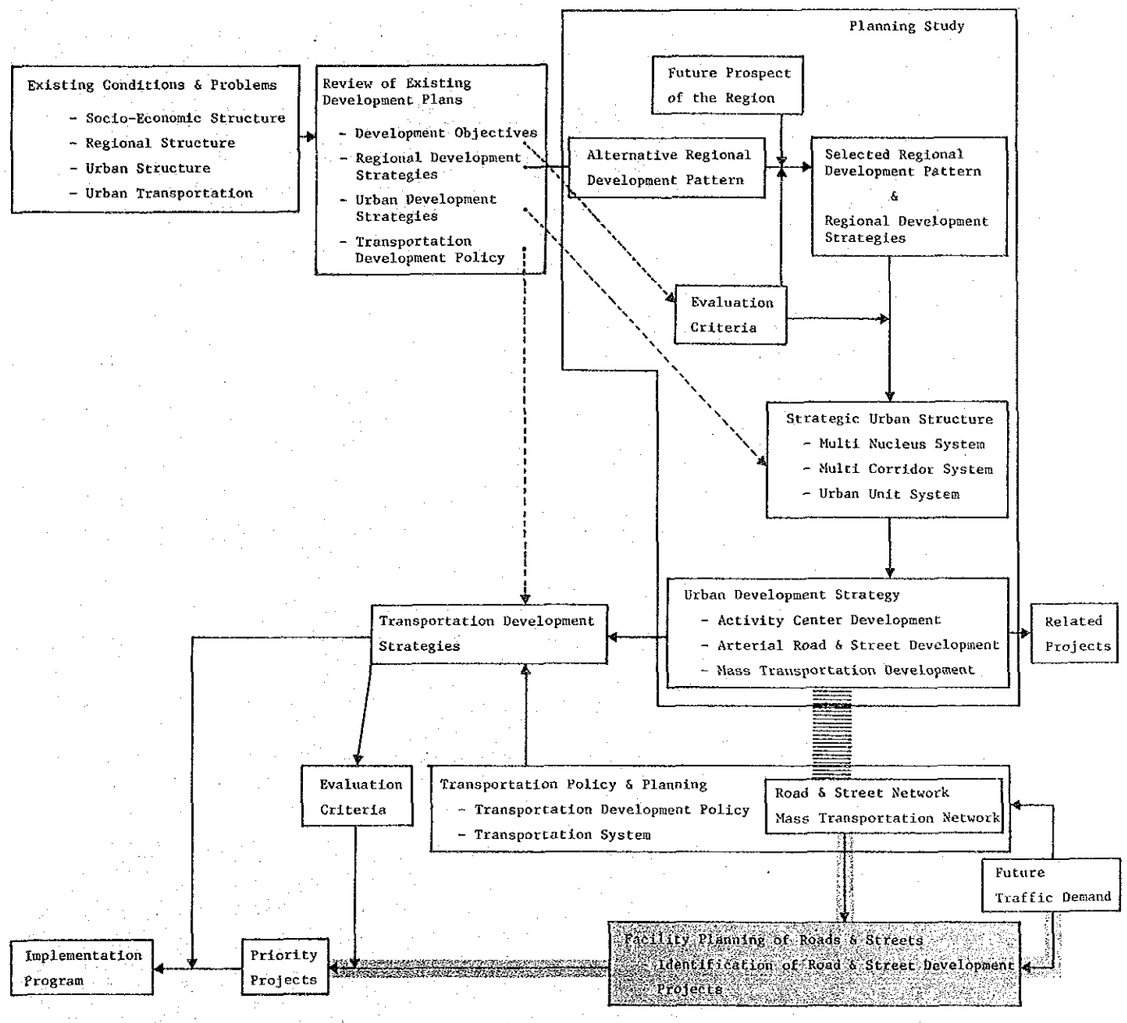


6.1 GENERAL

This chapter deals with two subjects: identification and determination of the proposed roads and streets scale, and exposition of the development guidelines for activity centers, station plazas, urban units and green belts.

The scale of roads and streets is determined in line with the proposed urban formation, transportation policy/system, traffic demand forecast, etc.

Activity centers, station plazas and urban units, as well as the arterial road and street network, are indispensable components for urban formation. These should be planned in good coordination with the road and street planning.



6.2.1 METHODOLOGY

The facility scale of the proposed roads and streets should not only be decided by quantitative aspect such as the future traffic demand, but also by planning and functional aspects such as transportation policy/ system, landuse along roads and streets, multifunctional aspects (utilities, space, etc.), aesthetics, etc.

6.2.2 PROPOSED STANDARD OF ROAD AND STREET

The proposed roads and streets consist of a primary and secondary system, each with sub-classified systems as follows:

Primary System :	Arterial Road	Freeway
		Arterial Road
	Collector Road	Collector Road
Secondary System :	Medium/Mass Transportation Corridor	
	Arterial Street	Major Arterial Street
		Minor Arterial Street

The Indonesian standard, AASHTO and the Japanese standard were referred to as reference standards in the study. To meet local conditions and the premises in this study, some modifications were made to adjust for the differences in landuse, traffic situations, financial situations, etc.

BASIC POLICY ON STREET FACILITY PLANNING

The team proposes the following policies especially on the formation of arterial street cross sections:

- A wide street of more than 8 lanes is not recommendable due to 1) inconvenience of both automobile users and pedestrians in terms of access, crossing and lane crossing by car, and especially 2) difficult land acquisition in the Central Area and center areas. Streets with fewer lanes are preferred.

- The minimum number of lanes is proposed to be 6 lanes for major arterial streets and 4 lanes for minor arterial streets due to their functional differences.

- A simple cross section without frontage roads is basically adopted for streets. The double cross section with frontage roads is for sections of considerable access traffic such as in the Central Area and center areas.

- Sidewalks of 3 meters for minor arterial street and of 5 meters for major arterial street should be provided for walking environments, streets aesthetics, commuters in peak hours, shoppers in daytime, especially in the Central Area and center areas, and space for utility. Greenery of suitable size should be provided along carriageways as a buffer for adjacent environmental areas.

- Roadside parking on arterial streets should be prohibited. This should be covered by parking space outside the street area and the legal obligation of new builders.

The cross section elements are composed of lane,median,shoulder, outer separator, frontage road, green space and sidewalk. The total right-of-way is the sum of the cross section elements, slope, drainage and others. Detailed discussions for each element are given in Supporting Report No. 4. The proposed road and street standards are shown in Tables 6.2.1 and 6.2.2 and in Fig. 6.2.1 through Fig. 6.2.4.

The primary road cross sections shown in Fig. 6.2.1 are adopted for the rural area. In case of passage in the urban area, the cross sections of the major or minor arterial streets should be adopted to meet local needs. Two types of major arterial street cross sections are proposed in Fig. 6.2.3. The cross-section with the frontage roads is applied to the street sections with high levels of access traffic, such as in the Central Area and adjacent to centers.

A four meter width median for major and minor arterial streets was decided upon in consideration of a right turning lane at the at-grade intersections, flyover pier space and aesthetics.

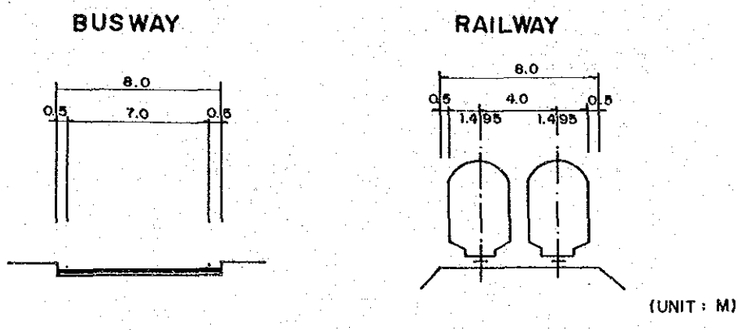
The width of street sidewalks basically depends on pedestrian demand. Aesthetics (the width of sidewalk/green > 1/6 of the total street width) and utility space are other determinants. A minimum three meter width (10,000 pedestrian/hour passable for effective 2.4 m width) for sidewalk/green is proposed for the arterial streets based on the practical maximum size of a common utility box for nearby areas. A minimum width of five meters is applied to all the major arterial streets and minor streets in the Central Area and center areas.

MEDIUM/MASS TRANSPORTATION CORRIDOR

Medium/Mass Transportation Corridors, east-west corridor and north-south corridor (Ps. Jumat - Kota), have different standardization criteria due to the availability of space and their future prospects (new transportation applications and their staging). Exclusive busways are proposed for the east-west corridor which can be converted into railways in the distant future. A busway is proposed on the north - south corridor.

The Mass Transportation Corridor is a joint corridor with parallel streets. A minor arterial street should be chosen for the parallel street. However, a major arterial street is adopted for the north - south corridor due to its original street function.

The mass transit envelope should be dimentioned in consideration of modal phasing. Since the east-west corridor is expected to be converted into a railway in the distant future, it is necessary to plan the mass transit envelope so it is assured to first accommodate the bus, and then the rail, in terms of required width, flyover structure, longitudinal gradient, etc.



The platform width of the east-west corridor is six meters in consideration of the bus bay, rail station, etc. For the north-south corridor, the bus platform will be limited to three meters due to difficult additional land acquisition. The section between Blok M and Kota for the north-south corridor should be constructed up to 2005.

Table 6.2.1 ROAD STANDARD FOR PRIMARY SYSTEM (1)

Road/Street Classification	Design Speed (km/hr.)	Access Control and Intersecting Facilities	Width of Street Cross Section Element	(m)		Minimum Right-of-way (m)
				Rural	Urban	
Freeway						Depending on Embankment/cutting height, etc.
Rural	100, 120 (> 60)	- Full Access Control - Interchange (I.C.), Flyover (F/O) and Underpass (U/P)	- Lane Width	: 3.60	3.60	
			- Median	: 18.00*	6.00	
Urban	80 (> 60)		- Shoulder	: 3.00, 1.75	3.00, 1.25	
			- Frontage Road	: As required		
Arterial Road	60,80 (> 60)	- Partial Access Control - I.C., F/O, U/P, and At-Grade Intersection as required	- Lane Width	: 3.50		ditto
			- Median	: 6.00		
			- Shoulder	: 3.00, 1.25		
			- Frontage Road	: As required		
Collector Road	40,60 (> 40)	- Mostly Non-Controlled Access - Mostly At-Grade Intersection	- Land Width	: 3.25		ditto
			- Median	: -		
			- Shoulder	: 1.25-2.50		
Local Road	20,30,40 (> 20)	- Non-Controlled Access - At-Grade Intersection	- Lane Width	: 3.00		
			- Median	: -		
			- Shoulder	: 1.25		

Note: * Maximum width
Design speed in parentheses indicates the Indonesian standard

Table 6.2.2 STREET STANDARD FOR SECONDARY SYSTEM (2)

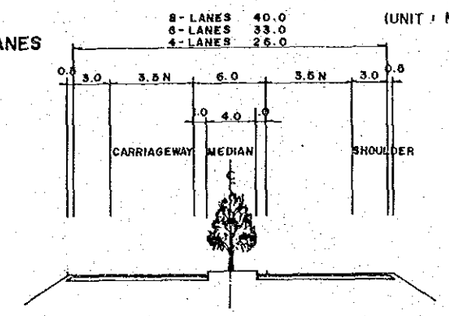
Road/Street Classification	Design Speed (km/hr.)	Access Control and Intersecting Facilities	Width of Street Cross Section Element	(m)	Minimum Right-of-way (m)
Major Arterial Street	40,50,60 (> 30)	- Partial Access Control - I.C., F/O, U/P, and At-Grade Intersection as required	- Lane Width	: 3.50	30.0 - 53.0
			- Median	: 5.00	
			- Shoulder	: 0.50, 0.50	
			- Frontage Road	: 2 x 3.00	
			- Outer separator	: 1.00	
			- Buffer Green/ Sidewalk	: 5.00	
Minor Arterial Street	30,40,50 (> 30)	- Partial Access Control - I.C., F/O, U/P, and At-Grade Intersection as required	- Lane Width	: 3.25	25.0 - 38.0
			- Median	: 5.00	
			- Shoulder	: 0.50, 0.50	
			- Frontage Road	: As required	
			- Buffer Green/ Sidewalk	: 3.00 - 5.00	
Collector Street	20,30,40 (> 20)	- Non-Controlled Access - Mostly At-Grade Intersection	- Land Width	: 3.00	
			- Median	: -	
			- Shoulder	: 0.50, 0.50	
Local Street	20,30 (> 20)	- Non-Controlled Access - At-Grade Intersection	- Lane Width	: 3.00, 2.75	
			- Median	: -	
			- Shoulder	: 0.50, 0.50	

Note : Design speed in parentheses indicates the Indonesian standard

PRIMARY SYSTEM

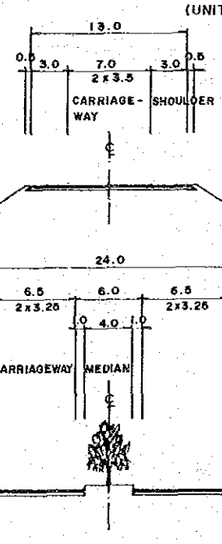
ARTERIAL ROAD

4 - 8 LANES



(UNIT : M)

2 - LANES



COLLECTOR ROAD

(UNIT : M)

4 - LANES

(UNIT : M)

2 - LANES

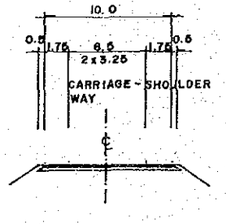
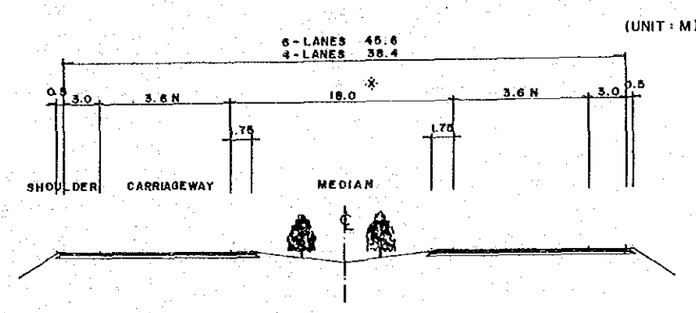


Fig. 6.2.1 TYPICAL CROSS SECTION OF PRIMARY SYSTEM (1)

FREEWAY

RURAL FREEWAY

(UNIT : M)



NOTE : ※ maximum width

URBAN FREEWAY

(UNIT : M)

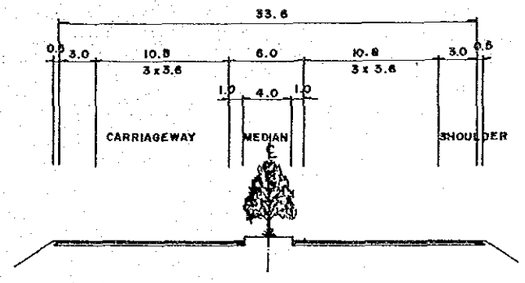
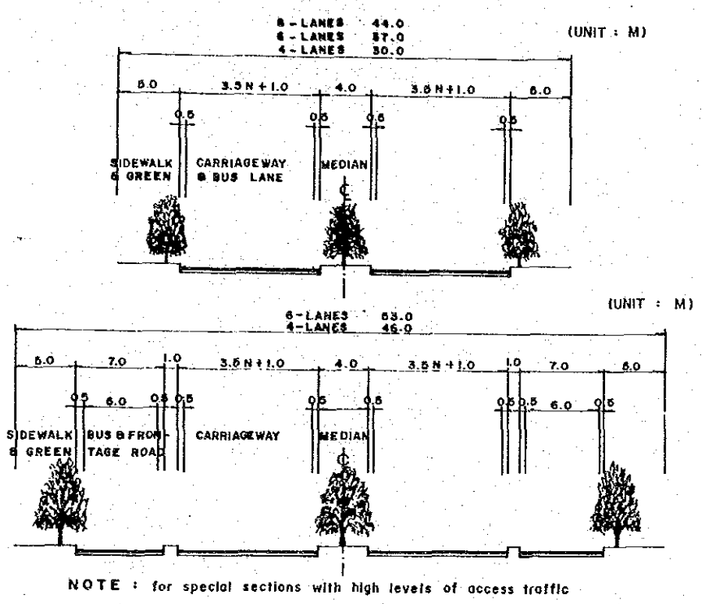


Fig. 6.2.2 TYPICAL CROSS SECTION OF PRIMARY SYSTEM (2)

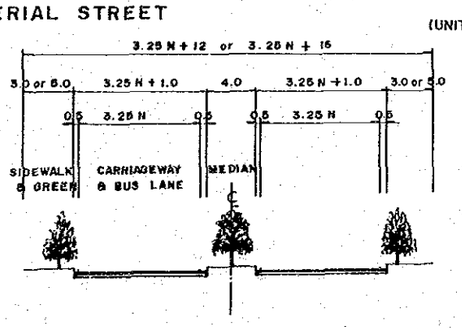
SECONDARY SYSTEM

MAJOR ARTERIAL STREET



NOTE : for special sections with high levels of access traffic

MINOR ARTERIAL STREET



NOTE : N - Number of lanes (8, 6, 4 lanes)

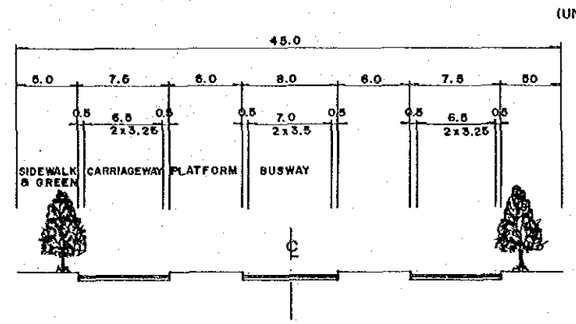
Minimum Right - of - Way (m)

No. of Lanes / Area	8	6	4
Central / Center Area	—	35.5	29.0
Suburban Area	38.0	31.5	25.0

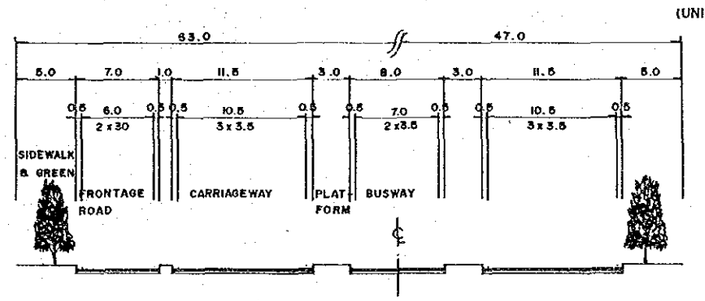
Fig. 6.2.3 TYPICAL CROSS SECTION OF SECONDARY SYSTEM (1)

MASS TRANSPORTATION CORRIDOR

EAST - WEST CORRIDOR



NORTH - SOUTH CORRIDOR (Ps. JUMAT - KOTA)



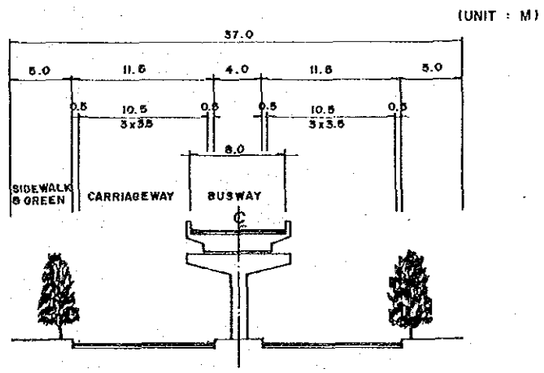


Fig. 6.2.4 TYPICAL CROSS SECTION OF SECONDARY SYSTEM (2)

6.3.1 REQUIRED NUMBER OF LANES

NUMBER OF LANES FROM URBAN AND TRANSPORTATION PLANNING ASPECTS

A major arterial street is a primary back bone of urban formation which supports a wider activity in an urban area by carrying heavier traffic with longer trip lengths than that of a minor arterial street. From these functional differences, the team proposes for the ultimate stage a minimum 4 lane right-of-way for minor arterial streets and a minimum of 6 lanes for major arterial streets.

The development of the Medium/Mass Transportation Corridor (east-west corridor) is a key to foster the future of the cities of Tangerang and Bekasi. It is essential to provide the Medium/Mass Transportation Corridor with a loop shape (supplemented by an arterial street as part of the loop line) in both the Tangerang and Bekasi city areas. The arterial street, as part of the loop line, should provide a 6 lane right-of-way in the ultimate stage. However, a 4 lane street should be constructed in the initial stage in consideration of the traffic demand. The ultimate form of the Mass Transportation Corridor should be constructed from a strategic development viewpoint.

To promote bus operations, the bus priority measures for the peak hours proposed in Chapter 4 necessitate that some of the designated streets in DKI Jakarta should be able to accommodate additional lanes within their ultimate right-of-way.

QUANTITATIVE ANALYSES

According to the traffic survey by the ARSDS team, the composition of large vehicles, peak hour ratio and directional split of existing roads vary largely by road; 2.8 - 38%, 6.0 - 10.5%, 52 - 75% respectively. The capacities of the proposed roads and streets are recommended based on the expectation of future urban traffic (service level, large vehicle by road, peak hour factor of 8% or 9% and directional split 60%) as shown in Table 6.3.1. Frontage roads are not for through traffic, but for access to roadside buildings.

The required number of lanes in 2005 are shown in Fig. 6.3.1 and the ultimate right-of-way plan is shown in Fig. 6.3.2.

Table 6.3.1 ROAD AND STREET CAPACITY

(Unit: P.C.U./Day)

Road/Street Classification		Number of Lanes			
		8	6	4	2
Primary Road :					
Freeway					
Regional Freeway		-	92,000	61,000	-
Intra Urban Tollway	S-W Arc	-	100,000	67,000	-
	N-S Link	-	95,000	63,000	-
	Harbor Road	-	-	63,000	-
Arterial Road		114,000	85,000	56,000	16,000
Collector Road		-	-	55,000	16,000
Secondary Street :					
Major Arterial Street					
Radial		117,000	88,000	58,000	-
Others		132,000	99,000	66,000	-
Minor Arterial Street					
Radial		-	80,000	53,000	-
Others		-	90,000	60,000	-

The number of lanes required for each freeway in 2005 are shown in Table 6.3.2. The major expansion for primary roads in 2005 is shown in Table 6.3.3.

Some sections on arterial streets will have heavy traffic which will appear around the intersections of the streets carrying heavy traffic as shown in Fig. 6.3.1.

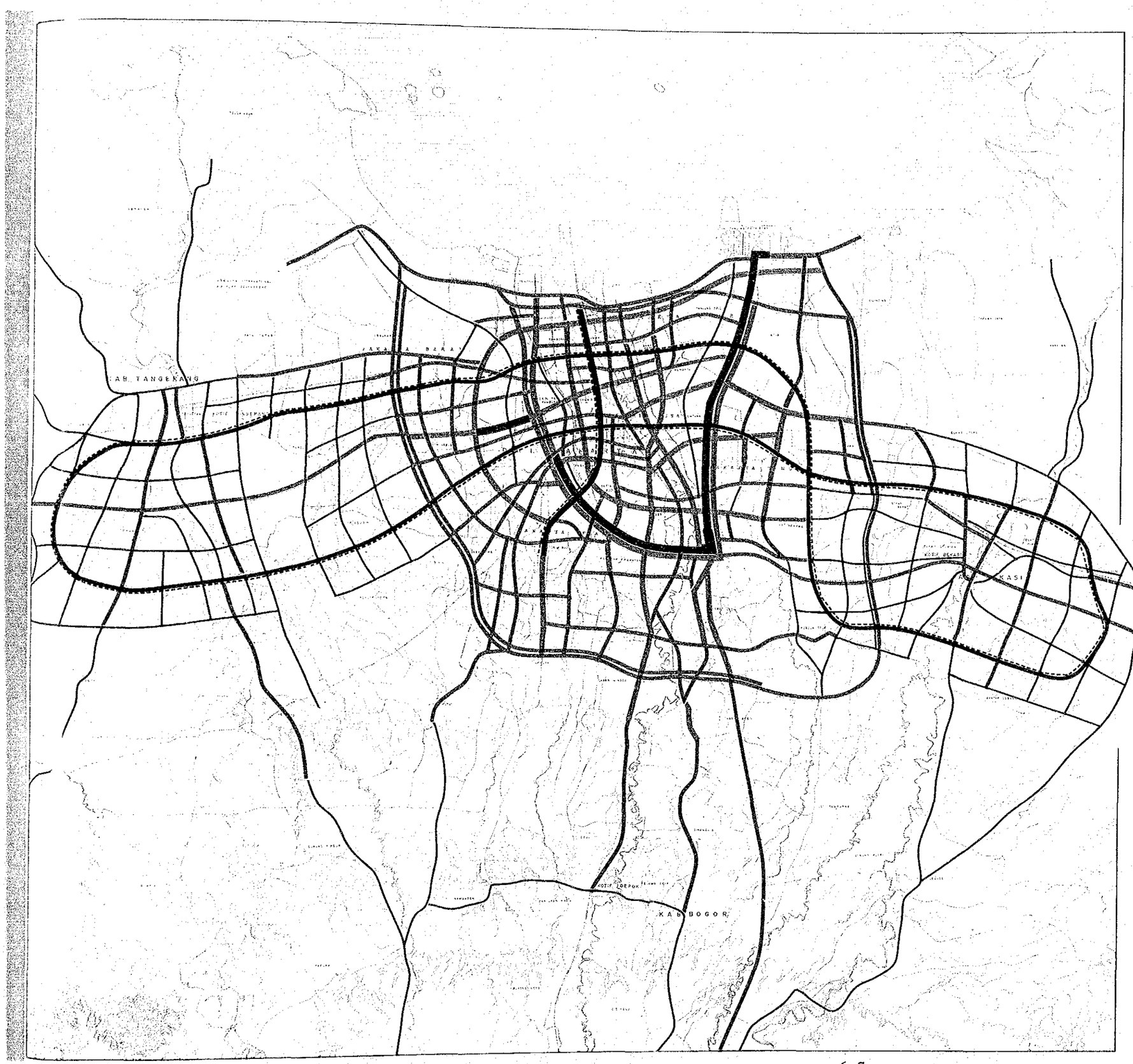


Fig. 6.3.1
PROPOSED ROAD AND STREET PLAN IN 2005

LEGEND

- 10 LANES
- 8 LANES
- 6 LANES
- 4 LANES
- 2 LANES
- MASS TRANSPORTATION CORRIDOR 4 + 2 or 6/8 + 2 LANES

N

0 1 2 3 4 5 10 KM

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

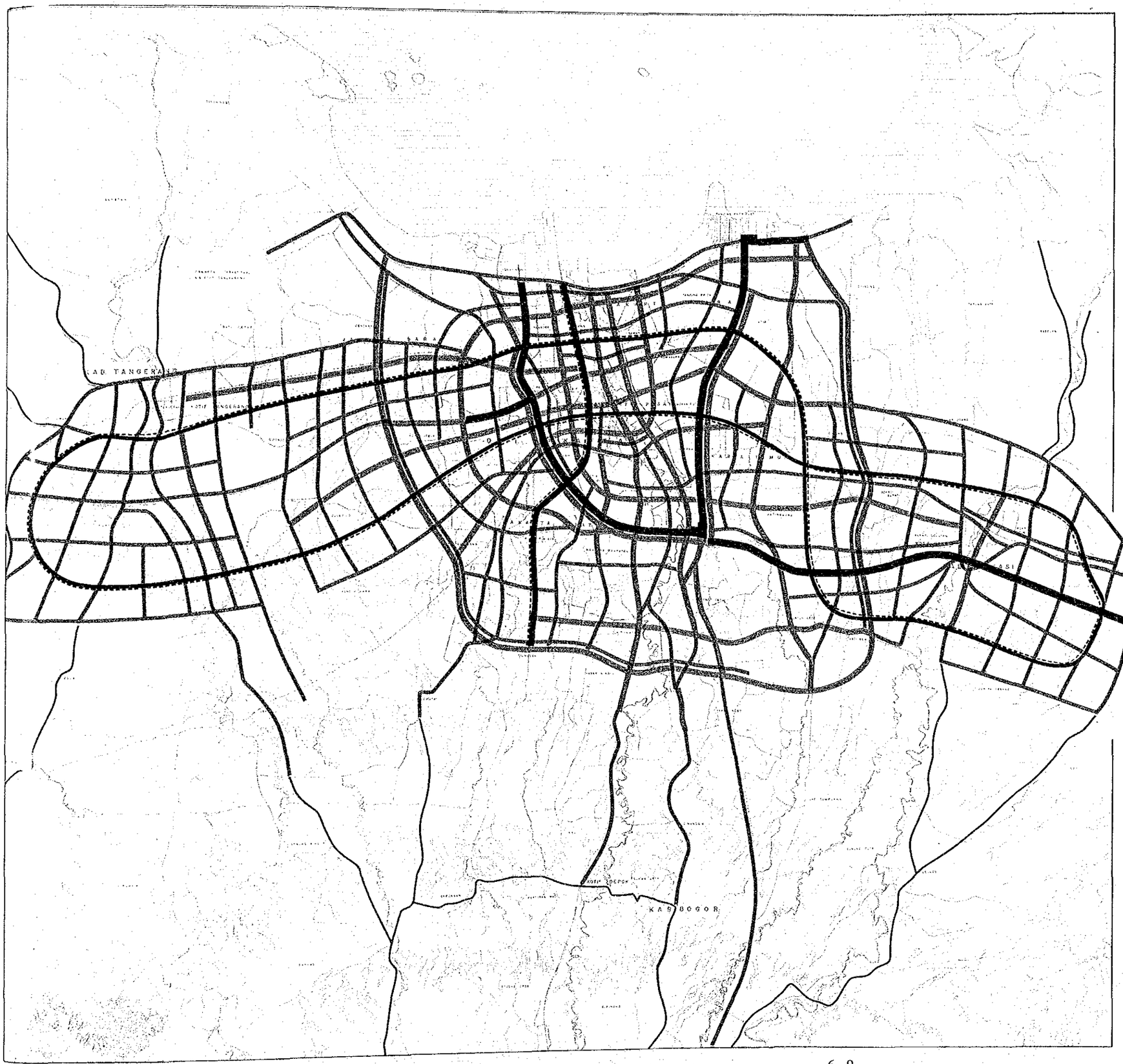


Fig. 6.3.2
PROPOSED ROAD AND STREET
PLAN IN DISTANT FUTURE

LEGEND

- 10 LANES
- 8 LANES
- 6 LANES
- 4 LANES
- 2 LANES
- MASS TRANSPORTATION CORRIDOR 4+2 or 6/8+2 LANES

N

0 1 2 3 4 5 10.KM

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

Table 6.3.2 FREEWAY LANES REQUIRED

Freeway Name	Section	Required No.of Lanes
Jagorawi Freeway	Jl. Sutoyo - Outer Ring Road	6
	South of Outer Ring Road	4
Jakarta - Tangerang Freeway	Tomang - Outer Ring Road	6-8
	West of Outer Ring Road	4
Jakarta - Cikampek Freeway	Jakarta I.C - Cibitung I.C.	4
Jakarta Intra Urban Tollway South-West Arc	<Freeway>	
	Jakarta I.C. - Jl. Tol Sediyatmo	6
	<Frontage Road>	
	Jl. Latumeten - Slipi	6
	Slipi - Jakarta I.C.	8
Jakarta Intra Urban Tollway North-South Link	<Freeway>	
	Jakarta I.C. - Tg. Priok I.C.	6
	<Frontage Road>	6-10
Jakarta Harbor Road		4
Jl. Tol. Prof. Dr. Sediyatmo		4
Jakarta Outer Ring Road	<Freeway>	
	Jagorawi - Jl. Tol Sediyatmo	4
	Jagorawi - Cilincing	4
	<Frontage Road>	
	Jl. Tol Sediyatmo - Taman Mini	4
	Taman Mini - Rawabogo	-
	Rawabogo - Bekasi Railway Line	2
	Bekasi Railway Line - Cilincing	4

Table 6.3.3 PRIMARY ROAD EXPANSION

Road Name	Section	Required No. of lanes
Serpong - Tangerang	Serpong - Bebulak	4
Depok - J.I.U.T. S-W Arc	Depok - Jagakersa	4
	Jagakersa - S-W Arc	6
Jl. Raya Bogor	Sidomukti - Cililitan	4-6
Jl. Perintis Kemerdekaan/ Jl. Raya Bekasi	Cempaka Putih - Outer Ring Road	6

6.3.2 INTERSECTION FACILITIES PLANNING

INTERCHANGE PLAN

It is desirable to provide as many interchanges as possible to attain transportation efficiency. Minimum spacing of arterial interchanges, in general, are recommended by AASHTO to be 1.6 km in urban areas and 3.2 km in rural areas. The proposed network will be involved in an urban area. Spacing of less than 1.6 km crossing the existing and proposed freeways can be developed by using frontage roads as collector-distributor roads. The interchange types, such as diamond, split, trumpet, clover leaf and so on, are determined based on the traffic demand, available space, etc.

GRADE-SEPARATION (FLYOVER) PLAN

Intersections were analyzed using 2,250 P.C.U./green hour for through lanes and 2,000 P.C.U./green hour for turning traffic. The following aspects were also important in deciding on the intersection plan:

- Grade separation to be provided for railway and freeway crossings
- Almost all intersections in the Central Area should have grade separations in the future. Huge investments must be prepared for only the flyover projects. Due to budget constraints, the team proposes an increment of road/street density as the first priority
- The planned busways will not flyover at street intersections in the initial stage, especially for the east-west corridor, until the demand is sufficient to warrant a railway

The railway flyover should be constructed in stages in consideration of not only the mutual traffic demand of the railway and road/street, but also of the road/street class. Accordingly, the flyovers on the Tangerang Line should be constructed in the distant future except freeway crossings.

Fig. 6.3.3 shows an intersection facility plan for 2005.

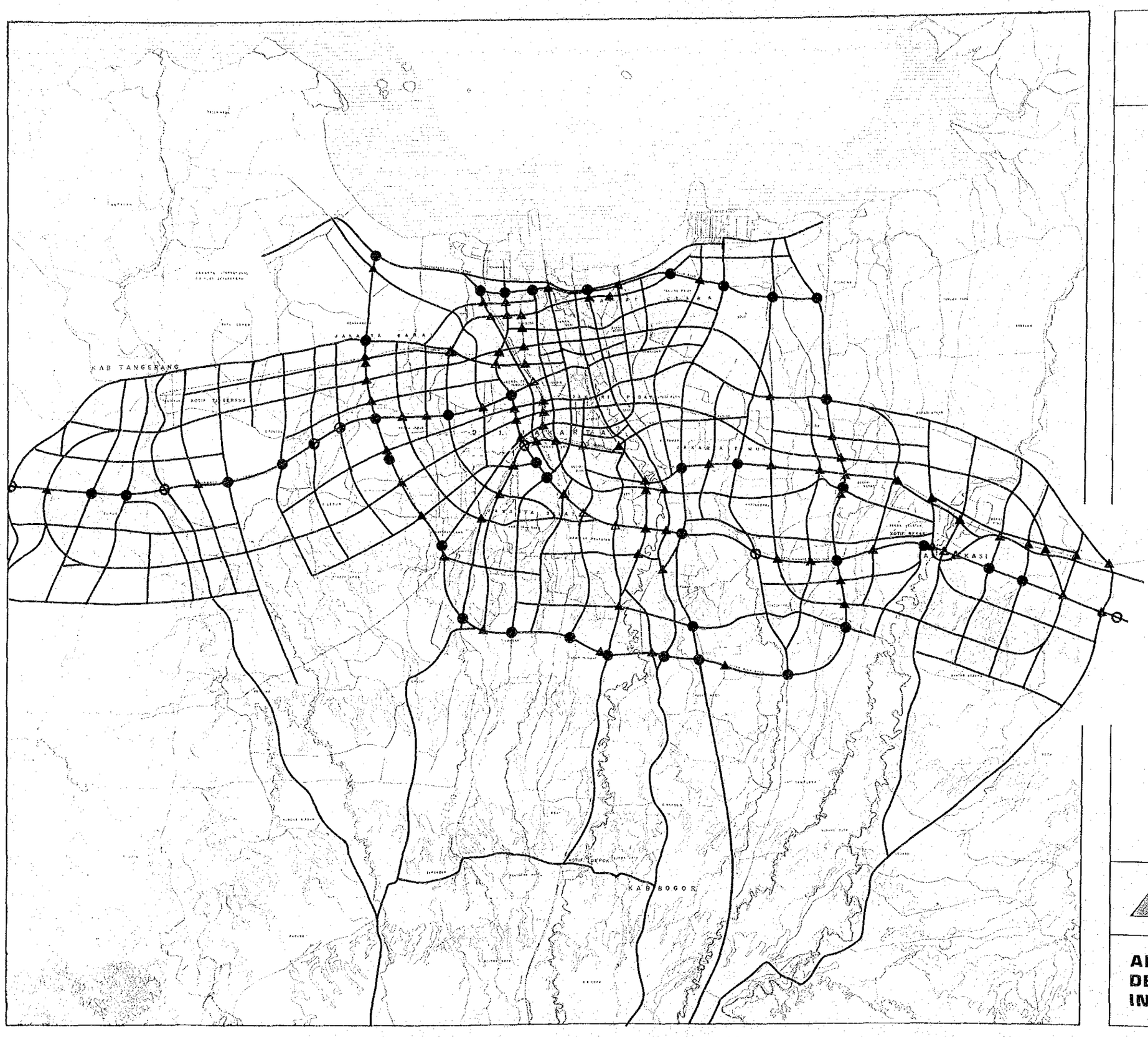


Fig. 6.3.3
PROPOSED INTERSECTION FACILITIES
IN 2005

LEGEND

- ○ EXISTING INTERCHANGE
- ● PROPOSED INTERCHANGE
- ◑ PROPOSED SPLIT INTERCHANGE
- △ EXISTING FLYOVER
- ▲ PROPOSED FLYOVER

N

0 1 2 3 4 5 10KM

ARTERIAL ROAD SYSTEM DEVELOPMENT STUDY IN JAKARTA METROPOLITAN AREA

6.3.3 CONSTRUCTION COST ESTIMATE OF ROAD/STREET IN 2005

The proposed roads and streets in 2005 are 1,000 km in total length with 65 flyovers and 49 interchanges. The total construction cost is estimated at 4,217 Billion Rp. as shown in Table 6.3.4. Detailed roads and streets lists and their locations are shown in Appendix 2.

Table 6.3.4 COST ESTIMATE OF ROAD/STREET CONSTRUCTION AND IMPROVEMENT IN 2005

Road/Street Classification	Length (km)/ Number (nos.)	Construction Cost (million Rp.)
Primary System		
Freeway	116.7	1,174,187
Arterial Road	75.5	141,059
Collector Road	89.7	143,356
Secondary System		
Mass Transportation Corridor	145.3	610,860
Major Arterial Street	178.9	470,929
Minor Arterial Street	394.1	675,934
Flyover for Intersections and Railway Crossings	65 nos.	560,560
Interchange	49 nos.	440,510
Total	1,000.2 km and 114 nos.	4,217,395

6.4.1 ACTIVITY CENTER DEVELOPMENT

Previously in Chapter 3 the strategic incentive role of activity centers and their hierarchy and allocation were examined.

This section will examine the physical planning guidelines and will show how the concrete shape of the activity centers should be planned, developed and physically appear.

The ARSDS team considers thereby the block development as the physical precondition from the following three criteria:

- Efficient Transportation Management
- Efficient Use of Land
- Creation of Attractive Facilities and Spaces

Activity center development in block wise layout with sufficient commerce, business, services, and various transportation facilities such as station plazas, parking facilities etc., can also efficiently cope with the medium/mass transportation development and become thereby incentive elements for urban development such as the East-West axis development.

EFFICIENT TRANSPORTATION MANAGEMENT

The importance of transportation management for activity center development was pointed out in Chapter 3. The indispensable conditions from the viewpoint of transportation management, and for the sake of activity center development, can be summarized as follows:

- Development of the station plaza as a transfer facility of the mass transportation network
- Development of sufficient arterial and collector streets following the Urban Unit System
- Development of the pedestrian street network and vehicle free zone
- Development of parking facilities

The first and the second conditions will be examined in the following Sections 6.4.2 and 6.4.3 respectively.

Concerning the way to develop the third and the fourth conditions, the ARSDS team considers the following:

- To develop the pedestrian street network and introduce the shopping mall into some parts of this network
- To develop a vehicle free zone in the middle of the activity center corresponding with the above pedestrian street network and create a charming space by providing sufficient vegetation and green open space
- To develop sufficient parking facilities and collector streets surrounding the above vehicle free zone so as to both avoid making the central vehicle free zone a dead zone or zone of complete chaos

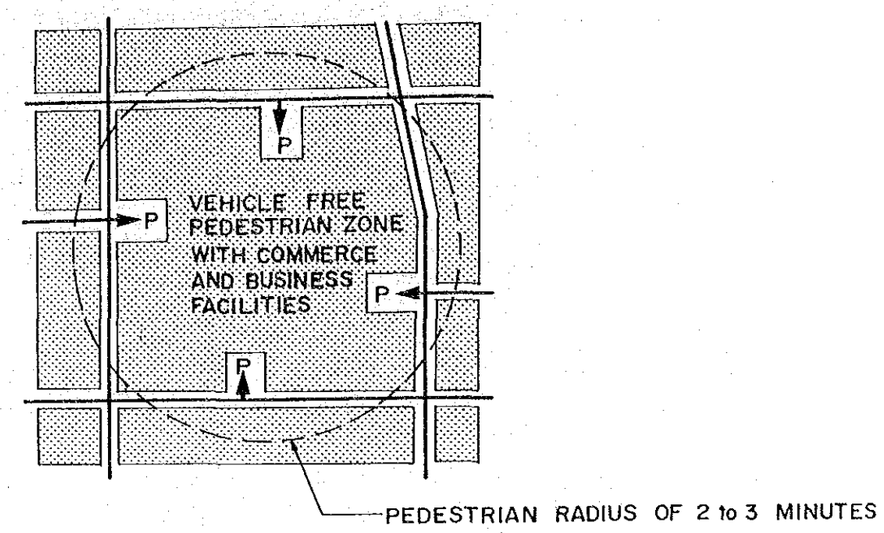


Fig. 6.4.1 PEDESTRIAN RADIUS IN ACTIVITY CENTER

EFFECTIVE USE OF LAND

In order to move strongly ahead with center development, it is also necessary to raise the physical capacity for accumulation by effective use of land in conjunction with the traffic improvements described above.

The conventional ribbon development essentially limits the solution of this demand. The qualitative change to block development and the introduction of middle and high rise facility schemes in the activity center area are therefore necessary.

Furthermore, continuous rows of shops and buildings, instead of in the free standing building pattern, should be developed to make them alive.

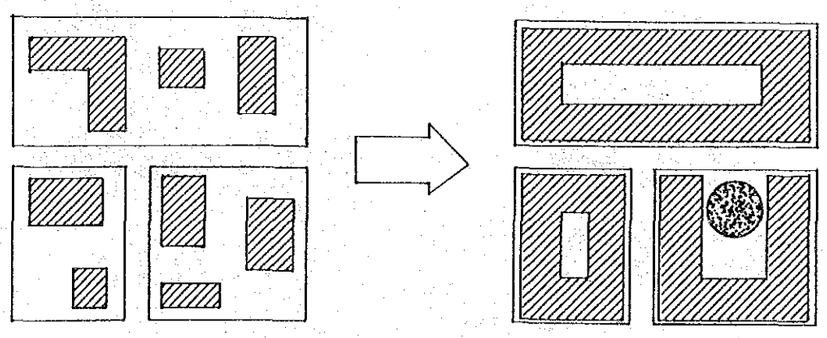


Fig. 6.4.2 CHANGE OF BUILDING LAYOUT IN ACTIVITY CENTER

CREATION OF ATTRACTIVE FACILITIES AND SPACE

In order to reduce the concentration toward the Central Area of Jakarta and some limited activity centers, and to decentralize the employment, urban services and the traffic volume thereby, the activity centers should be attractive enough.

However, the existing activity centers have the following problems:

- The functions of activity facilities are too simple and monotonic as an attractive gathering spot to draw various people of various social classes
- The development is ribbon oriented, and therefore, they are monotonous and not very attractive
- Open space is insufficient and spatial charm is missing. Existing open space is used for parking
- Vegetation is insufficient in spite of a tropical climate
- Consideration for pedestrians are insufficient

Against these problems, the Sub and Secondary Centers in the suburban area are expected, first, to multiply the functions of activity centers' facilities and enrich the following functions in line with those of commerce and business:

- Social and Cultural
- Sports and Recreational
- Educational
- Health

Considering how to allocate and layout these multiple facilities as an attractive and pleasant activity center, it becomes necessary to change the arrangement from the assemblage of conventional ribbon development to a block wise layout. By taking green open space, parks, etc. in the form of block development, various variations of space composition can be achieved.

By increasing amenity, people will come more frequently to the activity centers. The commerce and business facilities will receive benefits and the potential of the activity centers will increase.

In the activity centers in the Central Area the development should be oriented toward the performance of active urbanity, thereby attaching importance upon the amenity for pedestrians.

In the activity centers in the suburban area it should be tried to provide an attractive environment with plenty of suburban advantages such as sufficient green open space, recreational facilities etc. They should thereby contribute to increasing the image of the development area.

6.4.2 STATION PLAZA DEVELOPMENT

To change the urban structure from one being dependent upon individual transit to one being dependent upon a mass transportation system, it is the precondition to increase the demand for the latter by development of commerce, business and service facilities around the stations in the Central Area, in the activity centers and the housing development along the Medium/Mass Transportation Corridors.

For the above purpose, the development of the station plaza is an effective and indispensable transfer facility between the railway and bus systems to reinforce and supplement each other so as to increase the use of medium/mass transportation.

The merits brought on by the development of station plazas are summarized as follows:

- Promotion of the medium/mass transportation system
  The railway is a line haul trunk mass transportation system having no feeder service. The bus on the other hand is suitable for feeder service because it is an unfixed system. By providing station plazas, people can move more smoothly with less transfer time from houses to railway in the suburban area and from railway to work places in the Central Area and activity centers.

- Activation of economic activities
  High demand is created by the multiplied effect between the development of medium/mass transportation and the urbanization development along the Medium/Mass Transportation Corridor. The medium/mass transportation system and the commerce, business and service activities thereby receive even more benefits and all the economic activities are fostered.

- Creation of an attractive urban environment
  As faces and gates for visitors, and as places of urban life, other than just filling the need for commuting, station plazas play multiple roles in the urban environment by providing living space for shopping, rendezvous, etc.

Therefore, station plaza development has to be made in a comprehensive planning context that is closely related with urban green development, such as providing green open space, streetside trees etc., and pedestrian space development, such as shopping malls.

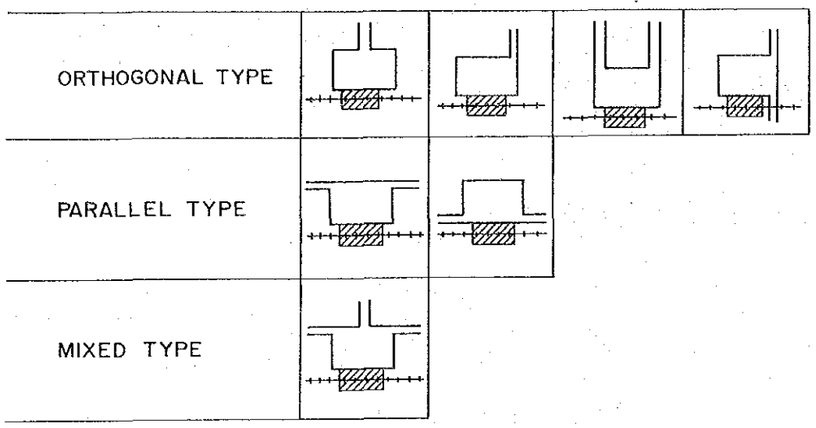
Amenity as a whole should thereby be achieved in addition to filling the transportation guideline.

Since these three merits are deeply interrelated, the development of the station plaza is not a mere technical issue of transportation. It must be solved in larger contexts such as block development and urban renewal development of activity centers.

With the understanding that activity centers should become strong nuclei toward the year 2005, for the sake of medium/mass transportation development and formation of growth poles, the station plaza development plays the key role.

LAYOUT GUIDELINES

First the station plaza has to have a well planned connection with access streets. Their basic types and variations in connecting the railway and the access streets can be shown as follows:



In addition, they should be planned by adopting the following guidelines:

- Elimination of through traffic
- Simplification of the traffic movement. For this purpose, the clockwise one way movement is considered as the principle mean
- Separation between vehicles and pedestrians

COMPOSITION ELEMENTS

In order to fulfill the function of a transportation transfer facility and an urban environmental facility, the station plaza has to have the following major spatial elements and supplementary equipments:

Major spatial elements:

- Bus Stop (Large and Micro buses)
- Stand for Taxi and Bajaj (Bajaj, mainly in the suburban area)
- Parking place
- Vehicle lane
- Pedestrian street and plaza

Supplementary elements:

- Vegetation
- Lighting
- Local map and sign

A CASE STUDY OF STATION PLAZA

A brief layout sketch of the station plaza at Senen is drawn here as a case study as shown in Fig. 6.4.1. Senen is fortunate in having various public facilities, such as a respectable station with an exceptional sub-way, a community center, a swimming pool and large shopping centers.

The present bus terminal is located a bit far from the railway station, and to get there people have to cross the wide Jl. Station Senen. In order to provide direct connection among them, the swimming pool should be removed to provide space for the station plaza.

By providing a continuous pedestrian space, with sufficient vegetation, the station, station plaza and the community center can be united and integrated into an urban space with high amenity and convenience.

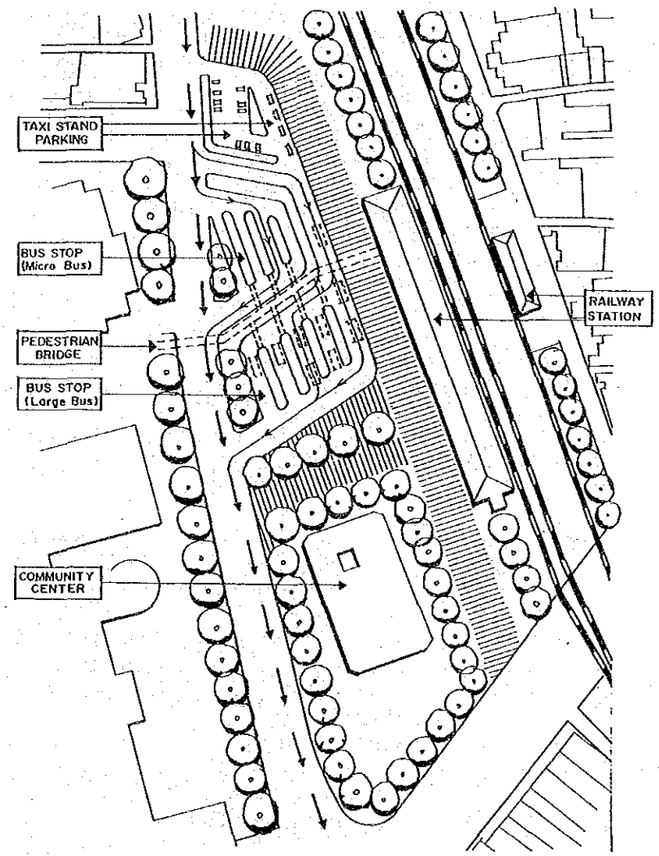


Fig. 6.4.3 CASE STUDY OF STATION PLAZA IN SENEN

6.4.3 URBAN UNIT DEVELOPMENT

The basic problem of the existing road and street network in the Jakarta Metropolitan Area is parallel to the lack of arterial streets, as mentioned in the previous section, and the delayed development of collector and local streets.

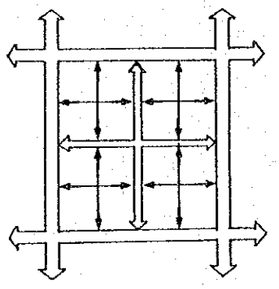
This forms obstacles against the following development targets:

- Establishment of a hierarchical street system with a reasonable relationship with landuse
- Change from the conventional ribbon development to block development
- Medium/mass transportation oriented urban development by providing easy access to it

The basic theme is to shorten the pitch of arterial streets by increasing their numbers, and to develop sufficient collector and local streets among them which support arterial streets.

Therefore, an urban unit is composed of the following two different systems:

- External System : Arterial streets surrounding the urban unit
- Internal System : Collector and local streets being surrounded by arterial streets



LEGEND:

Arterial Street
Collector Street
Local Street

By setting the Urban Unit System in the urban development zone of the east-west axis development, the functions of the Multi Corridor System and Multi Nucleus System would be activated, the urban structural change from the conventional ribbon to block development would be promoted, and a well balanced equitable, efficient urban environment with amenity could thereby be created.

Following the theme described above, the Urban Unit System will be examined and shown as prototype models according to the location, such as the Central Area and suburban areas. The way of the spacing of arterial streets was described in Section 3.5.7.

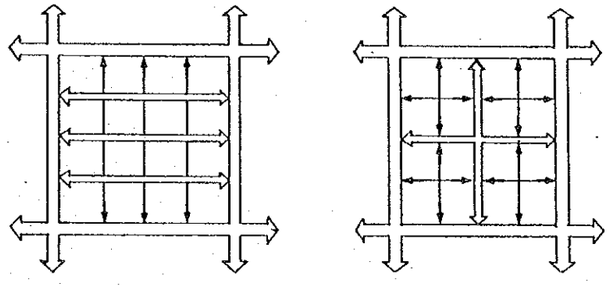
AREAL DIVISIONS

To discuss the urban unit in detail, the ARSDS team first divided the Jakarta Metropolitan Area into three parts according to their principal landuses.

- The Suburban Area (outside the Intra Urban Tollway)
  The principal landuse here is housing. The subject is how to develop the street network which enables smooth access to the Central Area and the activity centers. The direction of the movement is rather important.
- The Intermediate Area (inside the Intra Urban Tollway/outside the Loop Railway Line)
  Compared with the suburban area, the share of commercial and business landuse in this area is larger.
- The Central Area (inside the Loop Railway Line)
  Commercial and business facilities are accumulated in this area and the commuting traffic from the suburban areas concentrate to this area. The subject is how to develop a street network with a high liberty of choice. The direction of the movement is uncertain.

GRID SYSTEM

By comparing the three divisions of the Jakarta Metropolitan Area and their principal landuses with the two different grid systems, appropriate combinations between the two are discussed in this section.



DIRECTIONAL GRID HOMOGENEOUS GRID

Fig. 6.4.4 GRID SYSTEM

1) Directional Grid
A directional grid induces movement to a certain side and a certain arterial street by differentiating the two directions of the collector streets. Its merits are:

- It can efficiently correspond to the Multi Corridor System and therefore also to the medium/mass transportation system
- It can reduce the acquisition of street space in the grid

2) Homogeneous Grid
A homogeneous grid induces undifferentiated flow to every side and to all arterial streets by putting the same gravity on both directions. Its merit is:

- It can efficiently correspond to flexible demand

By comparing the three divisions of the areas and their principal landuses with the merits of these two grid systems, the ARSDS team came to the following combinations:

The Suburban Area - Directional Grid
The Intermediate Area - Directional Grid
The Central Area - Homogeneous Grid

According to these combinations, the urban units are discussed further below.

THE SUBURBAN AREA (2 KM DIRECTIONAL GRID) AND THE INTERMEDIATE AREA (1 KM DIRECTIONAL GRID)

In the suburban area, landuse and transportation planning have to correspond in order to induce development which is dependent on medium/mass transportation. Since the Intermediate Area follows the same system, it is therefore omitted in this section. The development along the Medium/Mass Transportation Corridor is reviewed separately by bus and railway.

1) The Bus Corridor

Planning Guidelines:

- To secure individual transit toward the central and suburban areas, parallel arterial streets leading to the east-west axis should be provided. These are used together with crossing arterial streets as shown below:

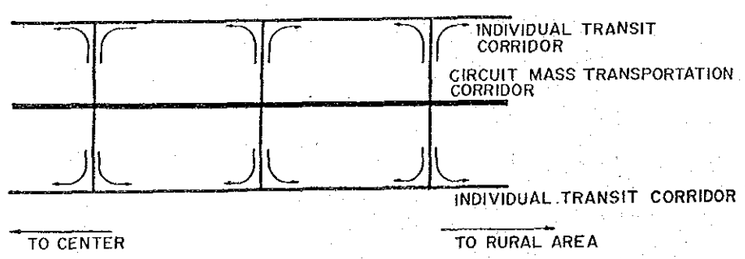


Fig. 6.4.5 SYSTEM SEPARATION BY CORRIDOR (INDIVIDUAL – MASS TRANSIT)

- Not to operate the buses competitively to the Medium/Mass Transportation Corridor on its frontage roads. Bus operations should be limited on the parallel arterial streets with individual transit and on the crossing streets against the medium/mass transportation corridor. Bus interchanges or terminals can be located around their crossing points

- To establish a technical operation system such as the square loop interchange which prohibits diagonal crossing to allow for a smooth continuous flow on the Medium/Mass Transportation Corridors (Fig. 6.4.6)

- To largely divide the movements into two parts; for vehicles and pedestrians and to give differentiated direction

- To provide collector streets parallel to arterial streets in order to decentralize the traffic produced by the facilities along arterial streets, and to allocate some facilities, such as pasars, around the parallel collector streets which generate large traffic volumes

- To provide a space of around 100 meters along the Medium/Mass Transportation Corridor and around 50 meters along arterial streets for the location of commercial, business and administrative facilities according to their future development potentials

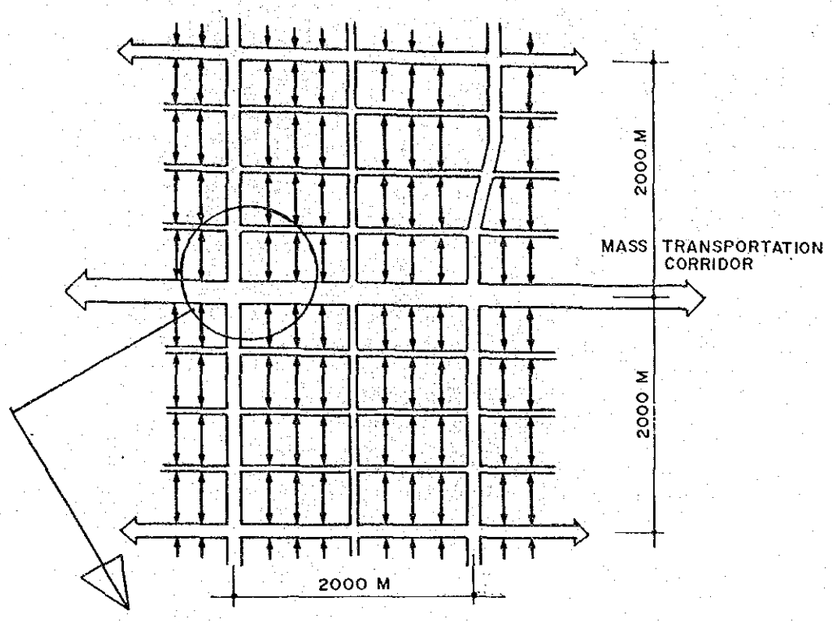


Fig. 6.4.6 URBAN UNIT ALONG MASS TRANSPORTATION CORRIDOR (BY BUS)

2) The Railway Corridor

Planning Guidelines:

- To develop housing areas along the railway corridors to induce a great deal of demand for mass transportation
- To raise the service standard of mass transportation by developing station plazas and a bus network for it
- To compactly develop the commercial, business and community facilities within a 400 meter pedestrian radius (5 to 6 minutes) around the station, so that the development of mass transportation and the formation of the suburban community can be united, and mass transportation can become a part of the residents lives
- To guarantee viability of the commuter train system by increasing the number of stations in the suburban area at intervals of around 2 km, assuming that 1,000 to 1,200 meters is the maximum pedestrian radius (at present some intervals are more than 5 km)

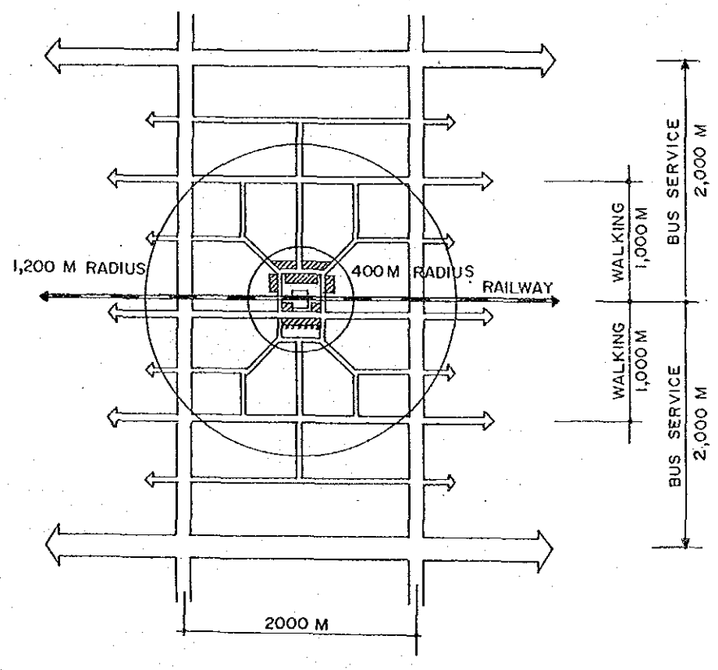


Fig. 6.4.7 URBAN UNIT ALONG RAILWAY CORRIDOR

CENTRAL AREA (0.5 km HOMOGENEOUS GRID)

1) Mixed Landuse Area (Commercial, Business and Housing)

Planning Guidelines:

- To develop collector streets parallel to arterial streets so as to decentralize the traffic produced by the facilities along arterial streets
- To provide a space of around 100 meters width along major arterial streets and around 50 meters width along minor arterial streets for the location of commercial, business and administrative facilities according to their future development potentials
- To develop a separated street network for vehicles and persons
- To develop local streets in the housing area to give fire engines and ambulances easy access in emergencies
- To provide sufficient public facilities and open space inside the housing area

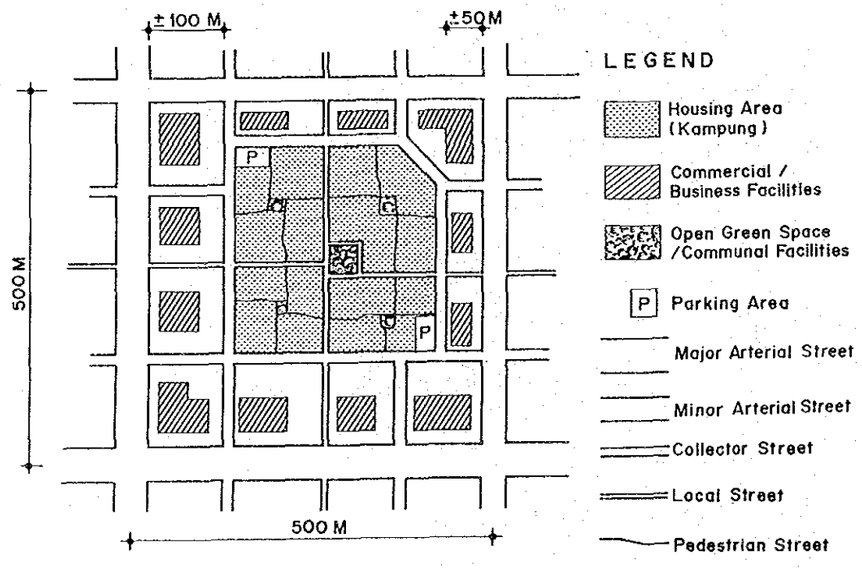


Fig. 6.4.8 URBAN UNIT IN THE CENTRAL AREA OF MIXED LANDUSE

2) The Activity Center Area

Planning Guidelines:

- To develop the arterial streets as multi corridors to smooth accessibility to the centers, and to separate as far as possible the local and through traffic
- To develop collector streets parallel to the arterial streets so as to decentralize the traffic produced by the facilities along the arterial streets
- To develop a separated street network for vehicles and persons, and introduce the shopping mall into some parts of the latter
- To develop continuous rows of shops and buildings in the activity centers, instead of in the free standing pattern, and to make them alive
- To develop a vehicle free zone in the middle by surrounding it with collector streets, and to create a charming space by allocating open green space, etc.
- To provide, therefore, sufficient parking areas around the collector streets
- To provide sufficient space in front of the stations for station plazas

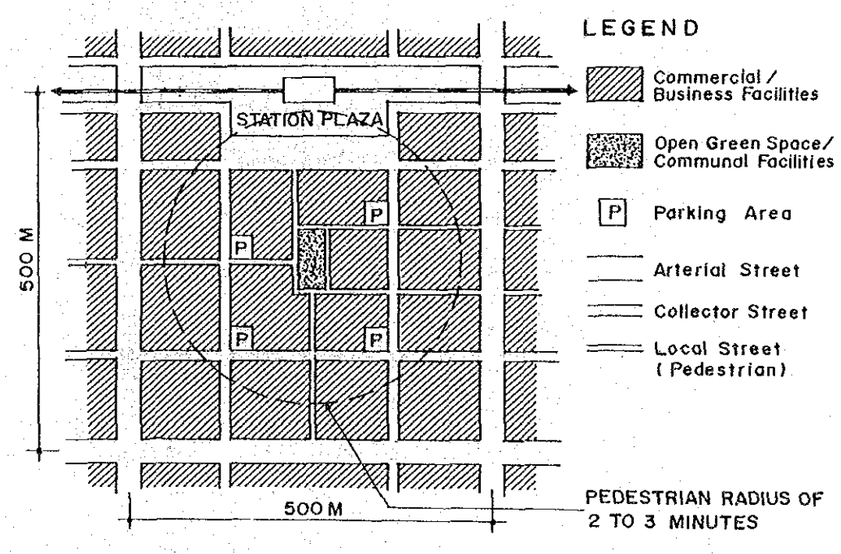


Fig. 6.4.9 URBAN UNIT IN THE ACTIVITY CENTER AREA