

## 6.9 Traffic Regulation Improvement Plan

### 6.9.1 One Way System

#### 1) Basic Concept

The one-way roads are mainly located at CBD and southern commercial area of Ujung Pandang. It seems that the one-way system is relatively well functioned on most of the regulated roads. However, it is necessary to improve this system for better functioning on some of the one-way roads in order to secure smooth traffic and to increase traffic safety for road users.

#### 2) Planning

The following improvement plans of one-way system are proposed and those locations are illustrated in Fig. 6.9.1.

##### (1) Jl. Bulusaraung between Jl. Jend. Sudirman and Jl. G. Lompobattang

In order to secure smooth traffic and to increase traffic safety at intersections of Jl. Jend. A. Yani - Jl. Bulusaraung and Jl. Jend. Sudirman - Jl. HOS Cokroaminoto. Jl. Bulusaraung between Jl. Jend. Sudirman and Jl. G. Lompobattang shall be regulated as one-way road heading eastward. This measure will not only improve smooth traffic flow but also decrease saturation flow rate at these intersections.

##### (2) Jl. Gowa Raya (St. Alauddin) at Pa'baeng-baeng

It is proposed that this road shall be widened into 4 lanes in the short term plan. It is desirable that the one-way regulation shall be repealed after widening in view of its road classification and to avoid longer trip distance. The one-way regulation of Jl. Kumala shall simultaneously be discontinued.

##### (3) Circulation System around Intersection of Jl. Mesjid Raya and Jl. Sunu

The main purpose of this traffic circulation plan is to improve traffic safety at intersection of Jl. Mesjid Raya and Jl. Sultan Dg. Raja. For this purpose, it is proposed that a part of Jl. Sunu and Jl. Sultan Dg. Raja are turned into one-way road as shown in Fig. 6.9.1.

In order to achieve the circulation system, it is necessary to improve the channelization at intersections as shown in Fig. 6.9.2. The improvement plan at intersection of Jl. Mesjid Raya and Jl. Sunu is illustrated in Fig. 6.4.17.

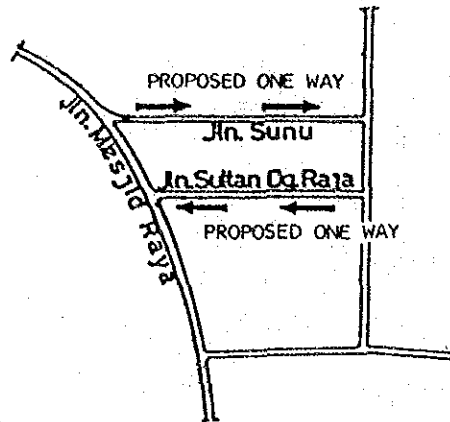


**UJUNG PANDANG AREA  
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**Fig.  
6.9.1**

**Location of One Way Regulation  
Amendment**

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**Fig. 6.9.2 Circulation Plan at Jl. Sunu and Jl. Sultan Dg. Raja**

These one way improvement plan shall be implemented as soon as possible on two roads as specified above, except on Jl. Gowa Raya (St. Alauddin). It goes without saying that changing the one way system at Jl. Gowa Raya (St. Alauddin) shall be carried out after widening of this road.

**3) Improvement Cost Estimation**

The improvement cost (direct construction cost) for one-way system is estimated based on unit cost as quoted by thousand Rupiah in 1988 prices. Improvement cost is mainly for provision of one-way signs and necessary markings. Cost estimation for one-way improvement plan is shown in Table 6.9.1.

**Table 6.9.1 Improvement Cost for One-Way Regulation**

Unit: Thousand Rupiah  
1988 Prices

	Quantity	Unit Cost	Cost	Remarks
One way sign	4	350	1,400	Overhung type
	10	50	500	Pedestal type
Marking	60 m	3	180	
Other (pavement)	300 m <sup>2</sup>	17	5,100	Jl. Sultan Dg. Raja
<b>Total</b>			<b>7,180</b>	

## 6.9.2 Parking

### 1) Basic Concept

The parking situation in the urban area of Ujung Pandang does not seem to be a serious problem at present except in some special cases, mainly because the number of private vehicles in this area is relatively small. The problems regarding parking in Ujung Pandang are :

- a) Through traffic is influenced by parking vehicles on some arterial roads.
- b) Parking facilities for on-street parkings such as parking lots and information panels are insufficient.

In the short term plan, the improvement plan for parking is planned to solve the above mentioned problems.

### 2) Planning

The locations where traffic flows are influenced by parking vehicles are illustrated in Fig. 6.8.2. Though parking is prohibited at these locations, many cars are still parked there. These illegal parking vehicles obstruct the through traffic. Hence, it is proposed that some measures shall be taken to enforce parking restriction and to improve parking restriction signs at these locations. The improvement of parking restriction signs consists of:

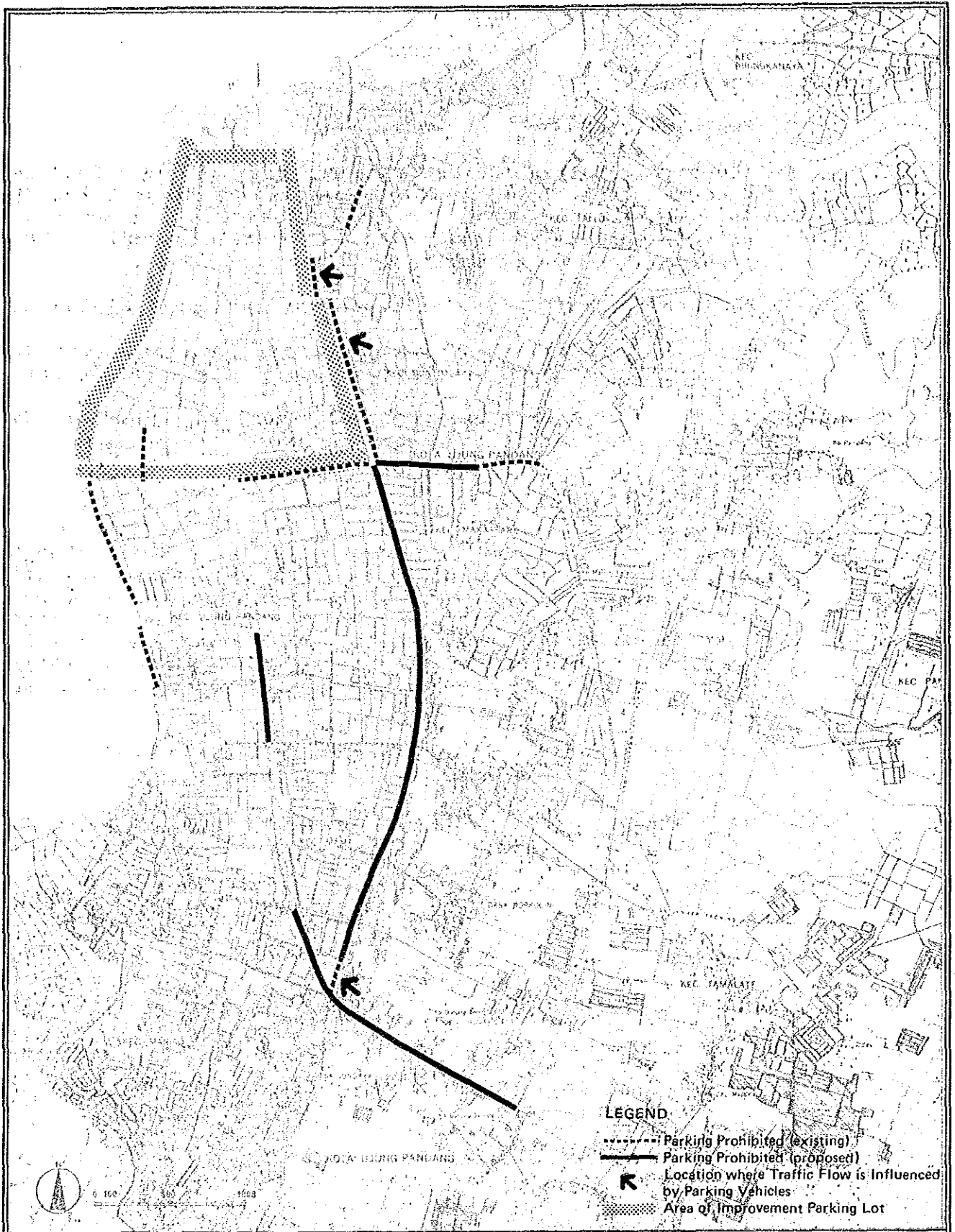
- a) To increase number of signs at prohibited zones
- b) To make clear the extent of prohibited zone

In addition, in order to secure smooth traffic flow, it is necessary to prohibit on-street parkings along major roads and to enforce parking restriction on arterial roads. In consideration of existing traffic condition, it is desirable to prohibit on-street parking at following road sections as shown in Fig. 6.9.3.

- a) Jl. Veteran
- b) Jl. Sudirman between Jl. S. Saddang and Jl. Lanto Dg. Pasewang
- c) Jl. Ratulangi between Jl. Gowa Raya (St. Alauddin) and Jl. Landak
- d) Jl. Gowa Raya (St. Alauddin) between Jl. Veteran and Jl. A.Pettarani

Most on-street parking lots are not clearly indicated due to the lack of markings, and this leads to random parking. Therefore, improvement of on-street parking lots is proposed. Improvement plan consists of :

- a) Indication of parking lots by paint or concrete block



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**Fig.  
6.9.3**

**Parking Improvement Plan**

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b) Installation of information panels

It is desirable that implementation of this plan shall start from parking lots located in C.B.D. area which has high parking demand, and the parking lots located in other area shall be improved in consideration of parking demand and its traffic conditions.

3) Parking Plan in the Future

On-street parking has been allowed to cope with the need of parking space by shoppers and to give considerations for the shops located on both sides of the streets in the commercial area. For the time being the convenience of door-to-door mode afforded by the passenger cars can still be ensured.

However, if the number of private cars increases, it will become difficult to find an empty parking lot, and illegal parkings will increase. Furthermore, illegally parking vehicles obstruct through traffic on the road, and this situation causes traffic congestion and increases traffic accidents. Therefore in order to avoid the above mentioned situation, it is necessary to plan the following measures:

- a) To control on-street parkings on busy roads.
- b) To prepare public and private off-street parking facilities of a suitable scale at several strategic locations in the city.
- c) To establish a law by which the new commercial facilities such as department store and hotel are under obligation to install the parking space within their premises when they are newly constructed.

In addition, in order to make these parking facilities function effectively, it is necessary to install pedestrian facilities such as sidewalks between those parking facilities and premises of drivers destination.

4) Cost for Parking Improvement Plan

Cost for parking improvement plan is estimated based on unit cost as quoted by thousand Rupiah in 1988 prices. Improvement cost consists of the cost of provision of signs and improvement of parking lot indicators. Cost estimation for parking improvement plan is shown in Table 6.9.2.

**Table 6.9.2. Cost for Parking Improvement Plan**

Unit: Thousand Rupiah  
1988 Prices

	Quantity	Unit Cost	Cost
Prohibited Sign	188	50	9,400
Parking Sign	80	100	8,000
Parking Lot			
Indication	4,370 (lots)	3	31,464
<b>Total Cost</b>			<b>48,864</b>

### 6.9.3 Development of Traffic Education Park

#### 1) Basic Concept

The short term development plan is prepared mainly from the viewpoints of traffic management in accordance with three planning strategies i.e. "to increase traffic capacity," "to control traffic demand", and "to decrease traffic accidents". The plan is focused on improvement of existing traffic facilities such as intersection improvement plan, sidewalk preparation plan and road widening plan.

Generally speaking, the solution to traffic congestion and accidents has two aspects; that is improvement of facilities as the hardware measure and education of traffic rule and manner for drivers as well as pedestrians as the software measure.

Therefore, it is also very important to improve the vehicle driving manner and pedestrian road crossing manner to secure smooth traffic flow and to avoid traffic accidents. In fact, these manners can not be regarded as "good", judging from extensive reconnaissance survey on traffic conditions in the city. Consequently, software measure shall be implemented through public relations (PR) and education of traffic rules and manners, simultaneously with facility improvement. In this respect, a plan to develop a traffic education park is conceived.

#### 2) Plan for Traffic Education Park

##### (1) Function

The function of this park is to educate and train the citizens of Ujung Pandang how to properly drive vehicles

while observing the traffic rules and regulations and keeping good driving manners, and how to cross the roads avoiding traffic accidents and without causing obstruction to smooth traffic flow. This education shall be practiced in such a way that both drivers and pedestrians can easily appreciate the advantage and safety by following and keeping the traffic rules and good manners, in a very pleasant atmosphere.

In addition, this park shall serve as a recreational facility with many attractive exhibits on transport equipments and apparatus and on traffic functioning as public relations. The educational program of this park may be linked with the school and adult education on weekdays.

## (2) Facility

The facilities of the park shall consist of the following in consideration of the above mentioned function and characteristics:

- a) Traffic educational center
- b) Traffic facilities i.e. intersection , signal, roads for training of vehicle driving manner and pedestrian crossing manner
- c) Amusement facilities for children
- d) Shops and kiosks for foods and toys
- e) Pure recreational facilities for people i.e. forest, flower garden, pond, lawn garden with bench, etc.

According to the future land use plan prepared by Ujung Pandang Municipality in 1984- 1986, the recreation areas are planned at Barombong located at southern part of the city.

Taking into account the function and characteristics of this project, it is desirable that this park shall be located within above mentioned recreation area with roughly estimated area of 10 ha, same size of Karebosi park located in the center of the city.

The imaginary plan is shown in Fig. 6.9.4 and Fig. 6.9.5 respectively.

## 3) Cost Estimate

Construction cost of the park is estimated as 1,610 million Rupiah, and detailed breakdown of the cost are shown in Table 6.9.3.



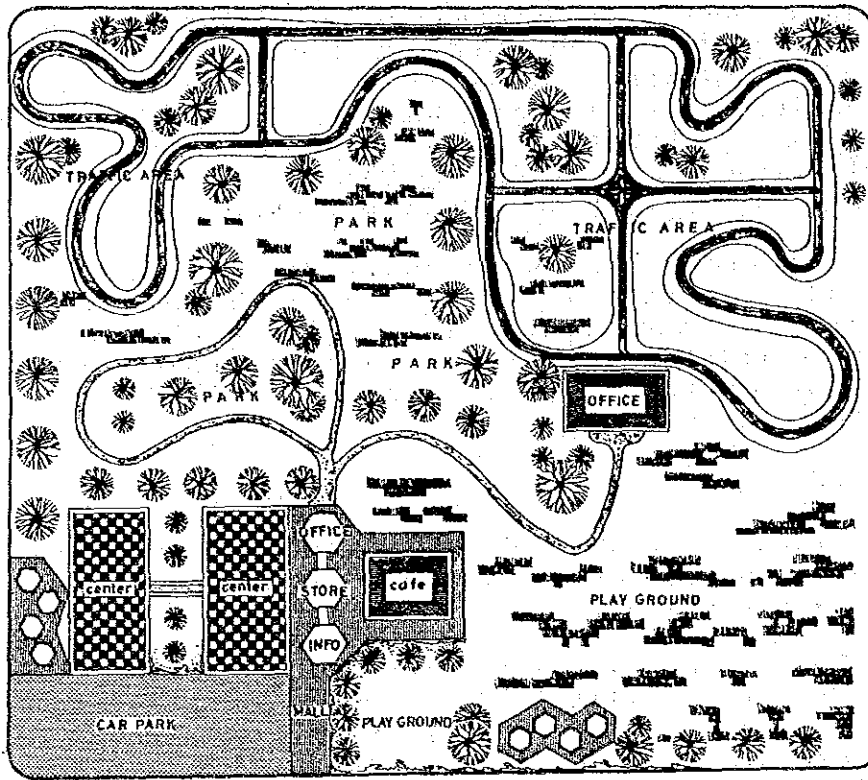
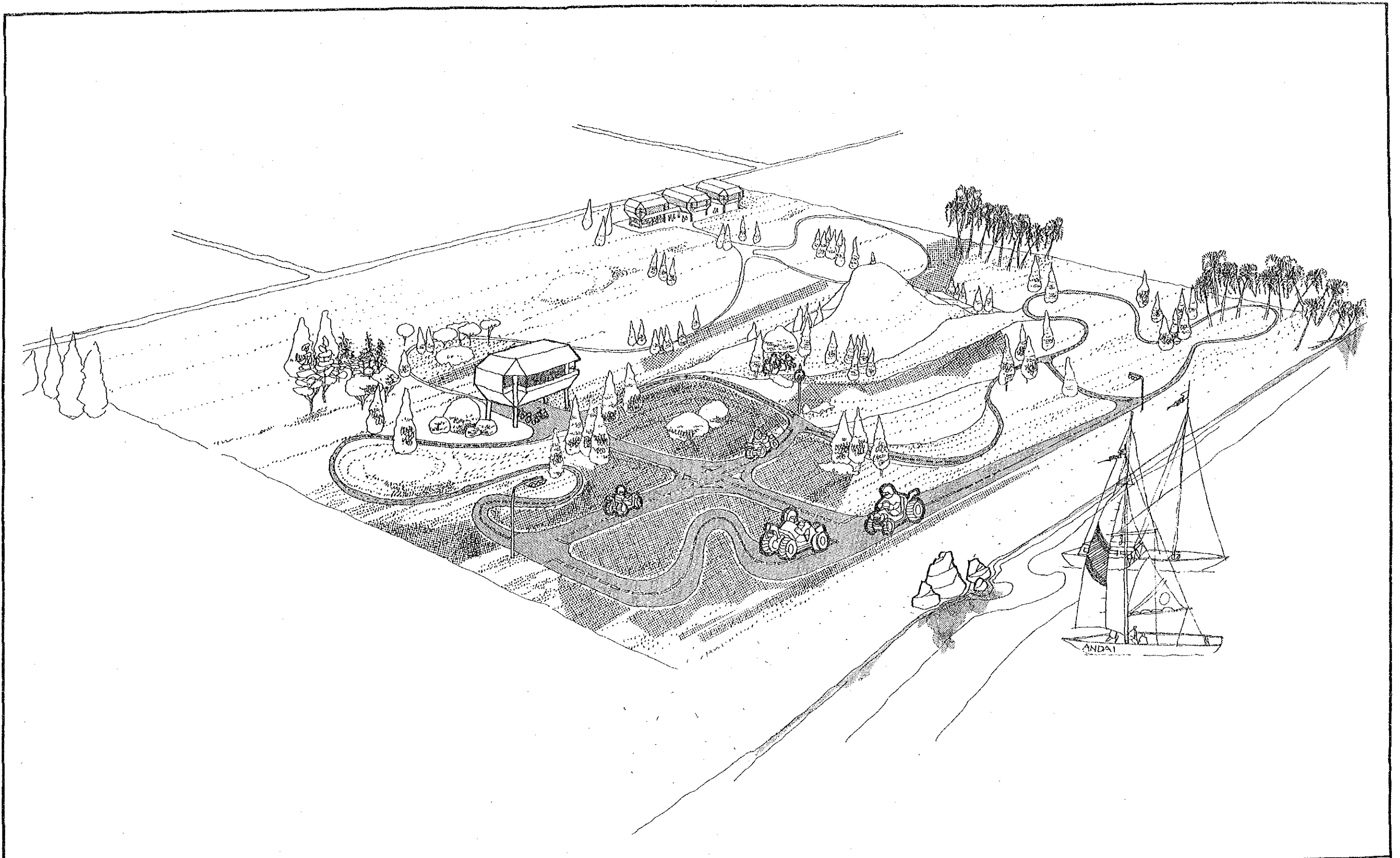


Fig. 6.9.4 Imaginary Site Plan of Traffic Education Park

Table 6.9.3 Construction Cost of Traffic Education Park

Unit: Thousand Rupiah  
1988 Prices

Items	Unit	Quantity	Unit cost	Cost
Car Parking	m <sup>2</sup>	4,200	10	42,000
Center	m <sup>2</sup>	3,600	100	360,000
Office	m <sup>2</sup>	1,000	100	100,000
Information	m <sup>2</sup>	450	100	45,000
Store	m <sup>2</sup>	450	100	45,000
Cafeteria	m <sup>2</sup>	1,500	100	150,000
Traffic Area	m	1,500	40	60,000
Pedestrian Path	m	400	20	8,000
Mall	m	100	40	40,000
Plantation	m <sup>2</sup>	100,000	3	300,000
Traffic Facility	vol	1	-	200,000
Land Acquisition	m <sup>2</sup>	100,000	3	300,000
<b>Total</b>				<b>1,610,400</b>



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Fig.  
6.9.5

Imaginary Sketch of Traffic Education Park

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#### 4) Implementation Timing

As it takes a long time to improve driving manner and pedestrian road crossing manner, it is desirable that this plan is carried out as soon as possible, so that citizens can be provided with such training/educational facilities as well as recreational facilities.

## 6.10 Project Cost Estimation

The short term plans are described in previous sections, and also those direct construction cost is estimated for each plan. Here the project costs for short term plans are composed of the following cost items:

### 1) Composition of Project Cost

Project cost for each short term plan consists of :

- a) Construction cost
- b) Land acquisition and compensation cost
- c) Engineering Service cost
- d) Administration cost
- e) Contingency cost

The details of this cost are described in Section 5.9.1.

### 2) Assumptions Adopted for Project Cost Estimation

The project cost is estimated based on the following premises:

- a) Engineering service cost is quoted as 12 percent of construction cost
- b) Administration cost is quoted as 5 percent of the total of construction cost, land acquisition cost and compensation cost
- c) Contingency cost is quoted as 15 percent of the total of construction cost, land acquisition cost, compensation cost, engineering cost and administration cost.

The project cost for each short term plan is shown in Table 6.10.1.

Table 6.10.1 (1) Project Cost for Short Term Plan

Unit Thousand Rupiah  
1988 Prices

Project	Name	Project Size	Constructions	Land Acquisition	Engineering	Administration	Contingency	Total
1. Road Widening								
Refer to Table 5.9.6								
2. Intersection Improvement	Improvement	13 sites	486,348		58,362	24,317	85,354	654,381
	Signal Installation	6 sites	365,513		43,362	18,276	64,148	491,798
Sub - Total								
			851,861		102,223	42,593	149,502	1,146,179
3. Pedestrian Facilities	Sidewalk Construction	45,170 m	3,464,504		415,740	173,225	608,020	4,661,489
	Pedestrian Overpass Bridge	5	222,140		26,657	11,107	38,968	298,890
	Pedestrian Paradise	0	0					
Sub - Total								
			3,686,644		442,397	184,332	647,006	4,960,379
4. Road Rehabilitation	1. Veteran-Bandang	4,940 m	192,152		23,038	9,608	33,723	258,541
	2. Ratulangi-Sudirman	4,120 m	39,552		4,746	1,978	6,941	53,217
	3. Rajawali-Penghibur	3,750 m	180,822		21,699	9,041	31,734	243,296
	4. Landak-Kakatua	750 m	37,800		4,536	1,890	6,634	50,860
	5. Bulusaraung-Mesjid Raya	1,830 m	8,784		1,054	439	1,542	11,819
	6. Latimojong-Andalas	4,360 m	42,976		5,157	2,149	7,542	57,824
	7. Seram	930 m	4,849		582	242	859	6,524
	8. Sunu	1,780 m	108,224		12,987	5,411	18,993	145,615
	9. Tinumbu	3,630 m	207,640		24,917	10,382	36,441	279,380
	10. Rappocini Raya	770 m	12,936		1,552	647	2,270	17,405
	11. Landak Baru	200 m	17,812		2,137	891	3,126	23,966
	12. Hertasning	1,620 m	284,342		34,121	14,217	49,902	382,582
	13. Emmy Saalan-Toddopuli	3,210 m	346,632		41,596	17,332	60,834	466,394
	14. Andi Tonro	1,230 m	34,243		4,109	1,712	6,010	46,074
Sub - total								
		33,120	1,518,764		182,251	75,938	266,543	2,043,496
5. Bus Stop Improvement	Installation Shelter	64 sites	31,744		3,809	1,587	5,571	42,711
	Provision of Bus Bay	43 sites	104,440		12,533	5,222	18,329	140,524
	Sub - Total							
			136,184		16,342	6,809	23,900	183,235

Table 6.10.1 (2) Project Cost for Short Term Plan

Unit Thousand Rupiah  
1988 Prices

Project	Name	Project Size	Constructions	Land Acquisition	Engineering	Administration	Contengency	Total
6. Bus Terminal Improvement	1. Panaikang		81,952		9,834	4,098	14,283	110,267
	2. Sungguminasa		28,874		3,465	1,444	5,067	38,850
	3. Pasar Sentral		92,253		11,070	4,613	16,190	124,126
	4. Pa'baeng-baeng		16,458		1,975	832	2,888	22,144
	5. Parang Tambung		38,862		4,663	1,943	6,820	52,288
	6. Panampu		66,660		7,999	3,333	11,699	89,691
	7. Pasar Panakkukang		78,809		9,457	3,940	13,831	106,037
	8. Mangasa		7,357		883	368	1,291	9,899
	9. Daya		19,628		2,355	981	3,445	26,409
	Sub - Total		486,795		58,415	24,340	85,432	654,983
7. Becak Transport Improvement	Becak Lane Construction	6,550 m	60,927		7,311	3,046	10,698	81,977
	Becak Prohibited	180	22,400		2,688	1,120	3,931	30,139
	Sub - Total		83,327		9,999	4,166	14,624	112,116
8. Traffic Regulation	One Way System		7,180		862	359	1,260	9,661
	Parking system		48,864		5,864	2,443	8,576	65,747
	Traffic Education		1,610,400		193,248	80,520	282,625	2,166,793
	Sub - Total		1,666,444		199,973	83,322	292,461	2,242,201

**CHAPTER 7 ECONOMIC ANALYSIS AND  
PLAN EVALUATION**





## CHAPTER 7 ECONOMIC ANALYSIS AND PLAN EVALUATION

In this chapter, the plan evaluation was executed by economic analysis as well as from engineering viewpoint. Economic analysis is to determine the economic feasibility of the plan, and engineering criteria stands for the reduction in average congestion degree and increase in average travel speed to be achieved on the improved road network after implementation of the plan.

The economic evaluation on road development or improvement plan is commonly practiced by comparative assessment of the accrued benefit to the required cost in economic terms by plan implementation. The benefit elements applied in this study are the monetary value of saving in travel time and reduction in vehicle operating cost which are to be yielded by implementation of the proposed plan. On the other hand, as discussed in the previous Chapter 5 & 6, required cost for plan implementation stands for those costs for construction, land acquisition and compensation, engineering fee and administrative expenses which are needed at time of implementation, and operating and maintenance expenses.

### 7.1 Procedure

#### 7.1.1 Project Selection and Plan Formation

##### 1) Project Selection

The output of Ujung Pandang Area Highway Development Study is the Master Plan for improvement and development of the arterial roads in the Study area. This Master Plan should indicate to form up the optimum road network to meet with expected traffic demand in 2009 in consistency with the urban development pattern and urban road development strategy of the Study area being Ujung Pandang as its center.

For formulation of the Master Plan, all the candidate projects either for improvement/rehabilitation or new development of the major roads and road related facilities were identified based on traffic survey, road inventory and traffic demand projection, in careful consideration of various impacts and patterns influencing urbanization in the Study area.

These candidate projects were then screened by various criteria depending on respective project nature. Those projects concerning with road network comprise either widening of existing roads or construction of new roads. Their screening criteria were mainly based on demand/supply analysis of expected traffic volume versus road traffic capacity as well as judgment derived from engi-

neering expertise. There were some projects dealing with traffic management which were screened based on congestion or saturation degree and frequency or number of serious traffic accidents occurred either on road sections or at intersections. Also, for those projects pertaining to road transportation facilities, main criteria were based on capacity analysis and physical conditions of the facilities.

## 2) Plan Formation

It is to be pointed out that all the screened projects are needed for formation of the road network in 2009. The screened projects were then divided into three (3) groups in line with the urban road development strategy and through discussion with the counterparts.

The first group consisted of those projects which require small investment but need urgent implementation to solve the existing traffic problems. There are in the category of "Short Term Plan".

As described in Chapter 6, the short term plan consists of those projects which mainly deal with traffic management aspects on the existing road network in the Study area.

The second group is composed of those projects which shall be implemented and completed by 2009, the target year of this study, by which a recommendable road network can be formed up to accommodate the traffic demand in that year. All the projects in this group were incorporated in "Long Term Plan".

It is to be mentioned that regarding the projects for short and long term plans, due consideration has been given to an appropriate size of budget or required cost and suitable work load or volume. Consequently, each project has been made to be an adequate size represented by road segment, so as to enable the implementing agency to execute the project smoothly and efficiently without making any missing links in the network.

Because of the reason that an effective performance of a road network can only be achieved not by a single addition of a certain new road segment, but by provision of a set or package of several road segments and improvement measures.

By these comprehensive and integrated arrangement the road network can be expanded and effectuated to meet an expected traffic demand. Also, since there is a considerably long time span up to the year 2009, it is rational and practical to propose a phasing of the long term plan for its implementation in accordance with the pro-

jected traffic demands in 1994 and 2009. Accordingly, the long term plan is phased into two (2) stages; Stage I where a pack of projects shall be completed to meet traffic demand in 1994, and Stage II to meet demand in 2009. For this reason, the selected projects (mainly road segments) for short and long term plans were bound together in several different combinations to be the alternatives of the plans, judging from engineering view point.

These different combinations of projects are regarded as plan alternatives and referred in this study as Plan cases.

### 7.1.2 Procedure for Analysis

The economic analysis in this study is attempted with the following procedure:

- a) Estimation of economic cost of each alternative
- b) Estimation of unit value of time saving and reduction in vehicle operating cost (VOC) by type of vehicle
- c) Calculation of yearly investment amount of each alternative according to implementation schedule
- d) Estimation of total vehicle-hours and vehicle-kms on the existing road network and those on each alternative per year in terms of vehicle-hour and vehicle-km by type of vehicle
- e) Calculation of the difference of the total time value and VOC between the existing road network and each alternative in a set time span.

## 7.2 Plans for Evaluation

In reference to the previous Section 7.1, the economic analysis was attempted to the Long Term Plan (Stage II) which includes all the projects screened and selected to form up the proposed highway network to meet the traffic demand in 2009. This is to verify the economic feasibility of the long term plan formulated to be the ideal arterial road network from the engineering standpoint and criteria. Then, three (3) plan alternatives (Cases C, D and E) worked out to meet the traffic demand in 1994 were economically analysed to determine the best alternative in economic terms among the three.

The plan alternatives or cases for economic analysis are illustrated in Fig.7.2.1 and 7.2.2.

As to those improvement measures or small scale projects requiring for immediate implementation proposed in Short Term Plan, economic evaluation was not carried out because they were justified their necessity and priority by the engineering criteria, as detailed in Chapter 5. However, as a supplemental justification, Case A and Case B in Short Term Plan were economically evaluated in this study.

- a) Short Term Plan:
  - Case A - Intersection Improvement Projects (19 intersections)
  - Case B - Road Widening Plan (Segments 3, 13 & 15)
- b) Long Term Plan (Stage I) to meet the traffic demand in 1994:
  - Case C - Road Widening & New Construction (Segments 1, 2, 3, 7, 13, & 15)
  - Case D - Road Widening & New Construction (Segments 1, 2, 3, 7, 10, 13 & 15)
  - Case E - Road Widening & New Construction (Segments 1, 2, 3, 5, 6, 7, 10, 13 & 15)
- c) Long Term Plan (Stage II) to meet with the traffic demand in 2009:
  - Case F - Road Widening & New Construction (Segments 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 & 17)

For all the plan alternatives presented by each Case (A - F), economic comparison has been made on the total vehicle-hours and vehicle-kms on the existing road network and the new network improved by implementation of each plan alternative for a period of each project life. The project life or evaluation period has been set for 20 years with exception of Case A for 5 years, as is the case for highway development plan.

As to those improvement measures or small scale projects requiring immediate implementation proposed in Urgent Plan, economic evaluation was not carried out because they were justified their necessity and priority by the engineering criteria, as detailed in Chapter 5.

However, as a supplemental justification, Case A and Case B in Urgent Plan were economically evaluated in this study.

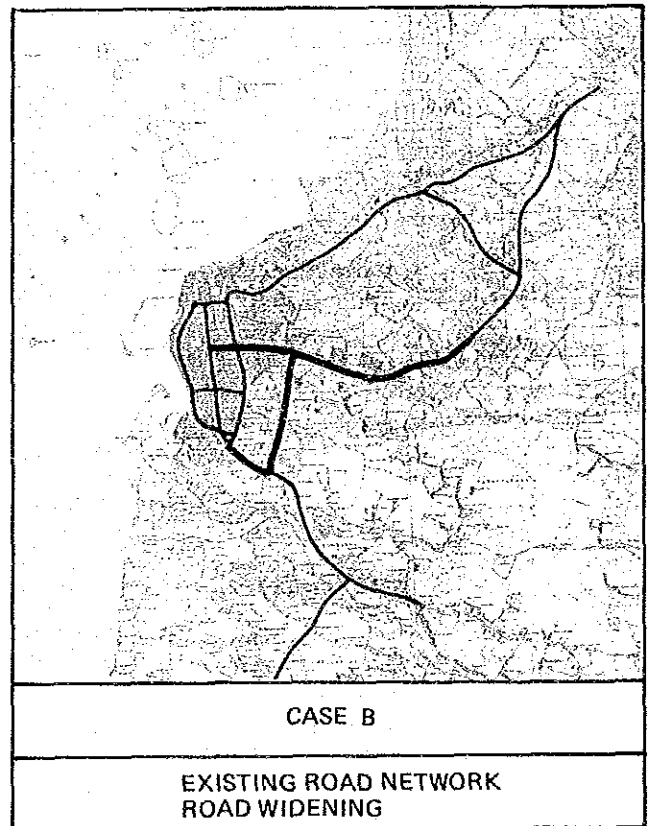
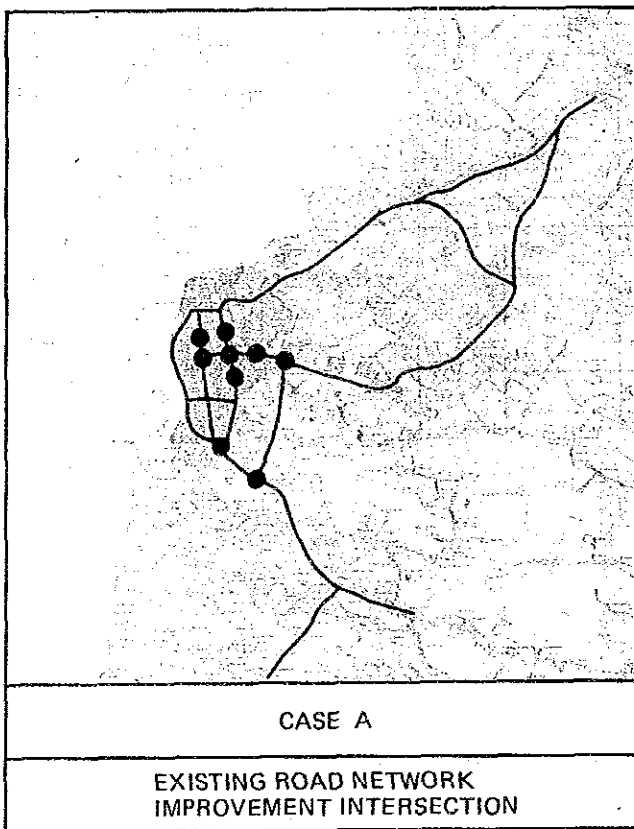
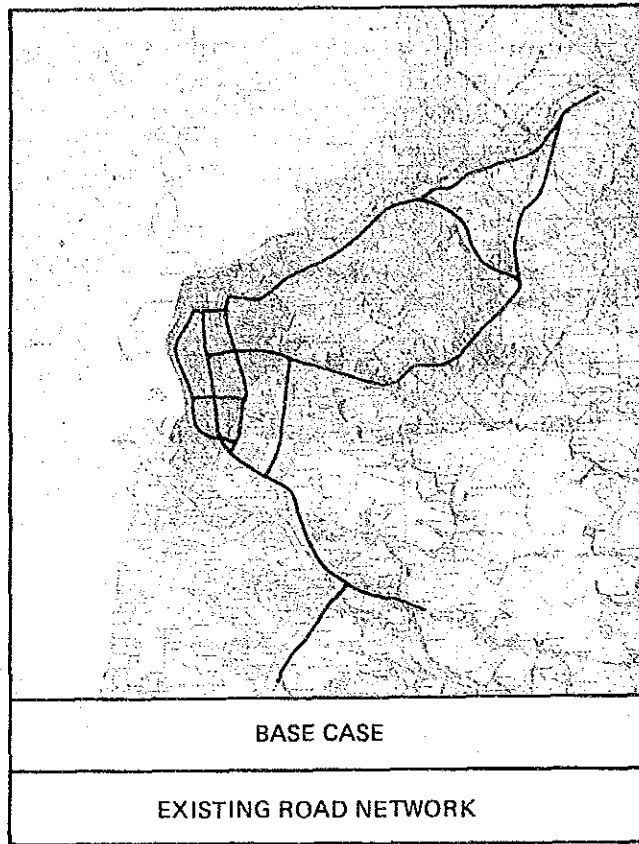
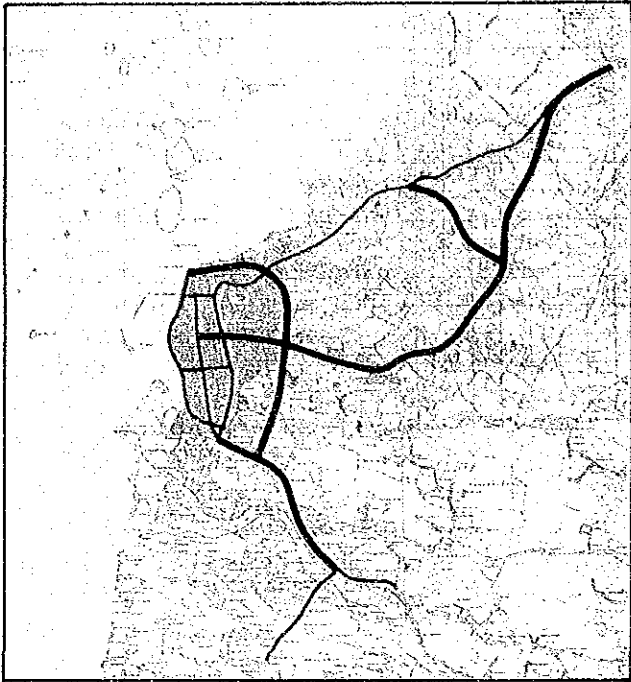
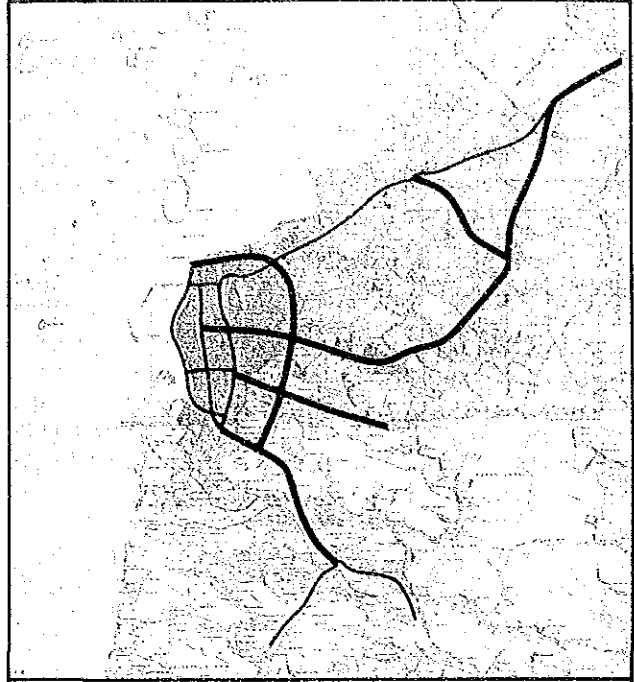


Fig. 7.2.1 Alternative Case for Traffic Management Plan



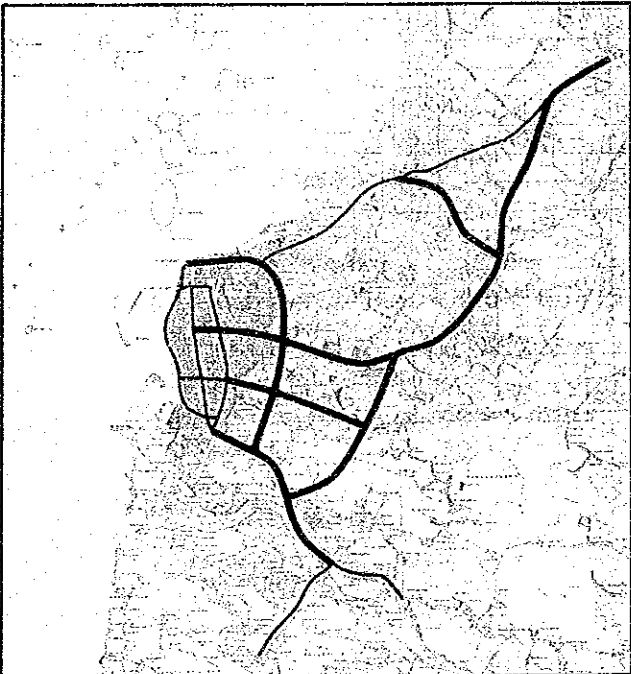
CASE C

1994 ROAD NETWORK  
SEGMENT 1, 2, 3, 7, 13, 14, 15, 16



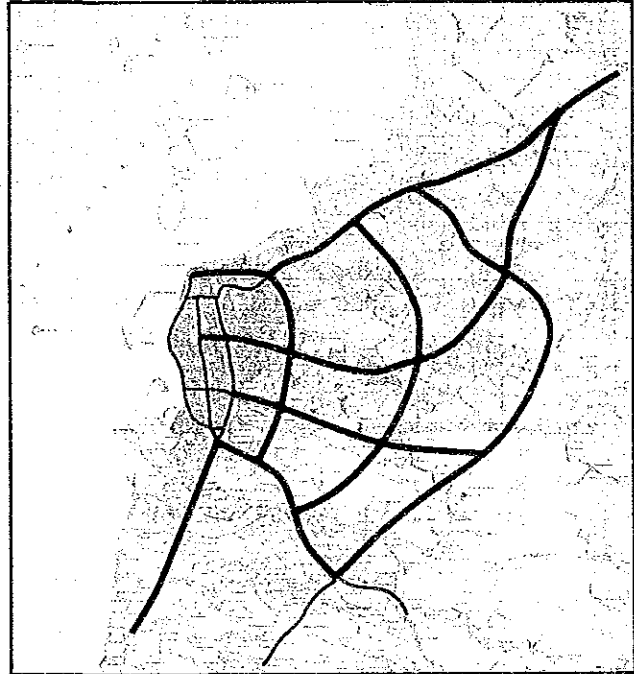
CASE D

1994 ROAD NETWORK  
SEGMENT 1, 2, 3, 7, 10, 13, 14, 15, 16



CASE E

1994 ROAD NETWORK  
SEGMENT 1, 2, 3, 5, 6, 7, 10, 13, 14, 15, 16



CASE F

2009 ROAD NETWORK  
ALL SEGMENT (1 - 17)

Fig. 7.2.2 Alternative Case for Highway Development Plan



### 7.3 Economic Cost Estimation

The economic cost to be applied for economic evaluation in this study is estimated by deduction of taxes and duties from the financial cost worked out for each plan alternative (Case) in the previous Chapter 5. Taxes included in the financial cost consist of business tax, municipal tax, and import duty to be levied for certain materials and equipments for construction of public facilities. The former ranges from 5 to 10 percent and the latter from 5 to 20 percent. In consultation with the Provincial and Municipal Public Works Departments in Ujung Pandang, estimation of the economic cost of each Case was made for direct construction cost, land acquisition and compensation cost, engineering service cost, administrative expenses and contingencies with the reduction rates of 15, 5, 5 and 10 percent respectively. Also, the reduction rate of 15 percent was applied for operating and maintenance cost.

The summary of the economic and financial costs by Case is tabulated in Table 7.3.1 and the details are as shown in Tables 7.3.2 and 7.3.3.

These economic costs estimated by above method were then distributed to annual allocation in accordance with the implementation schedule of each Case.

The maintenance costs also estimated and distributed to annual allocation in accordance with the implementation schedule of each Case. The allocated maintenance costs on each Cases are shown in Interim Report(2) Appendices Chapter A-7-1.

Table 7.3.1. Summary of Financial and Economic Costs by Case

Unit: in Million rupiah  
1988 Prices

Case	Financial Cost	Economic Cost
A	1,146.0	963.0
B	7,915.0	6,624.0
C	39,108.0	33,250.0
D	50,134.0	42,633.0
E	61,253.0	52,055.0
F	171,944.0	146,245.0

Table 7.3.2 Economic Cost of Each Segment (4 Lanes)

(Unit: In Million Rupiah (price in 1988))

Name of Road	Segment Length (m)	Construction Cost	Land Cost	Sub-Total	Engineering Fee	Administration	Contingency	Total
Inner Ring Road	1	2,652	1,305	3,957	302	186	600	5,047
	2	2,955	313	3,268	337	155	508	4,268
	3	1,823	0	1,823	208	87	290	2,408
Middle Ring Road	4	7,381	870	8,251	841	392	1,280	10,764
	5	3,686	401	4,087	420	194	635	5,336
	6	4,060	823	4,883	463	232	753	6,331
Outer Ring Road	7	2,316	330	2,646	264	126	410	3,446
	8	8,055	1,060	9,123	918	433	1,414	11,888
	9	7,035	1,863	8,898	802	413	1,338	11,251
Center Radial Road	10	5,738	1,530	7,268	654	345	1,116	9,383
	11	3,559	1,550	5,109	406	243	773	6,531
South Radial Road	12	15,924	2,039	17,963	1,815	853	2,785	23,416
Jl. Cowa Jaya (1)	13	2,473	208	2,681	282	127	417	3,509
Jl. Cowa Jaya (2)	14	7,521	2,114	9,635	657	458	1,478	12,428
Jl. Cowa Raya (1)	15	538	0	538	61	26	84	709
Jl. Cowa Raya (2)	16	2,634	596	3,230	300	168	540	4,538
Jl. Toll	17	11,307	1,093	12,400	1,289	589	1,926	16,206

Table 7.3.3 Economic Cost of Each Segment (2 and 6 lanes)

(Unit: in Million Rupiah (price in 1988))

Name of Road	Segment Length (m)	Construction Cost	Land Cost	Sub-Total	Engineering Fee	Administration	Contingency	Total
(2-lanes)								
Inner Ring Road	1	2,900	1,406	2,711	160	129	405	3,405
	2	2,850	-	-	-	-	-	-
	3	4,200	-	-	-	-	-	-
(2-lanes)								
Middle Ring Road	4	5,850	4,128	870	4,998	471	237	770
	5	2,670	-	-	-	-	-	-
	6	4,400	2,359	823	3,182	269	151	456
(2-lanes)								
Outer Ring Road	7	3,250	1,210	330	1,540	138	73	236
	8	6,900	4,008	1,068	5,076	457	241	779
	9	6,950	-	-	-	-	-	-
(6-lanes)								
Center Radial Road	10	5,100	-	-	-	-	-	-
	11	3,650	-	-	-	-	-	-
South Radial Road	12	5,710	-	-	-	-	-	-
(6-lanes)								
Jl. Cowa Jaya (1)	13	10,200	5,623	6,352	11,975	641	569	1,790
Jl. Cowa Jaya (2)	14	16,800	-	-	-	-	-	-
(6-lanes)								
Jl. Cowa Raya (1)	15	1,450	-	-	-	-	-	-
(6-lanes)								
Jl. Cowa Raya (2)	16	5,100	-	-	-	-	-	-
Jl. Toll	17	11,500	-	-	-	-	-	-

## 7.4 Benefit Calculation

As discussed in the preceding section, the direct benefit adopted in this study consists of saving in travel time in monetary terms and reduction in vehicle operation cost. In-direct benefits are observed in some cases but are not included in benefit calculation. The direct benefits are calculated by economic cost for each alternative plan or Case, identifying the saved time cost and reduced vehicle operating cost accrued by plan implementation, in comparison with those of the existing road network.

### 7.4.1 Unit Value of Benefit

#### 1) Travel Time Value

In reference to Integrated Urban Infrastructure Development Plan (IUIDP) South Sulawesi Region, January, 1988, the average per capita income in 1986 was estimated at Rp. 313,500 per annum in the Study area. Assuming an annual growth rate to be 3.4%, annual per capita income in 1988 is estimated to be Rp. 335,130.

With an assumption that the average working hours for an employed person is 2,000 hours per year, and the economic participation rate is 28% in 1988, the average hourly wage is calculated as Rp. 167.6 per hour.

It is also estimated that the time value of non-working hour is assumed to be 25% of working hour, and also the time values of car owner and non-car owner are 150% and 75% respectively of average hourly wage calculated above.

#### a) Time Value of Car Owner :

Working Hour	Rp 251.3/hr
Non-working Hour	Rp 62.8/hr

#### b) Time Value of Non-car Owner :

Working Hour	Rp 125.6/hr
Non-working Hour	Rp 31.4/hr

Based on the traffic survey conducted by the Study Team in 1988, the number of trips made during working hour is estimated to share approximately 40%. Subsequently, the average hourly time values of a car owner and a non-car owner are estimated as shown below.

c) Average Time Value:

Car Owner	Rp 138.1/hr
Non-car Owner	Rp 68.8/hr

The traffic survey of the Study Team shows that the ownership rate of motorcycle accounts for about 76 percent and that of sedan and pick-up is 24 percent, excluding bus and truck. With application of these rates and commonly practiced time value of passenger car owner being 2.7 times that of motorcycle owner, the time value of a passenger by vehicle type is calculated as follows:

Sedan and Pick-up	Rp 226.0/passenger.hr
Motorcycle	Rp 98.5/passenger.hr
Bus and Microlet	Rp 69.0/passenger.hr

Consequently, with the average number of passengers per motor vehicle obtained from aforesaid traffic survey, the time value per vehicle.hour by vehicle type is estimated for the year 1988, and for 1994 and 2009 by application of assumed growth rate of 3.4 percent per annum of the per capita income in the Study area as shown below.

Table 7.4.1 Time Value by Vehicle Type

(Unit: Rp/veh.hr)

Vehicle Type	Av. No. of Passenger per Vehicle	Time Value by Veh. Type		
		1988	1994	2009
Motorcycle	1.58	155.6	190.2	314.0
Sedan	2.27	513.0	627.0	1,035.3
Pick-up	2.20	497.2	677.7	1,003.4
Truck	(3.00)	1,380.0	1,686.6	2,784.9
Mini-Bus	5.95	410.6	501.8	828.6
Bus	12.27	846.6	1,034.7	1,708.5

2) Vehicle Operating Cost

Vehicle operating cost (VOC) is generally composed of the costs of fuel, oil, tires, depreciation in use, maintenance for parts and labor, interest and age depreciation. The VOC by type of vehicle in the Study area was referred to the study on Medan Area Transportation by JICA, 1980, for the vehicles traveling in the Study

area. The referred VOC was modified by the characteristics of the Study area and annual price escalation to reach the level in 1988, which is tabulated as follows:

**Table 7.4.2 Vehicle Operating Cost by Speed and Type of Vehicle**

(Unit: Rp./km)

Speed (Km/h)	Motor cycle	Sedan	Pick-up	Truck	Microlet	Bus
5		83.3	79.6	216.5		209.6
10	20.7	81.0	77.0	194.2	65.1	192.8
15	19.8	78.2	74.3	176.0	63.4	177.4
20	18.9	76.8	73.0	159.3	61.7	163.4
25	18.2	74.0	70.3	145.3	59.1	150.9
30	17.5	71.2	67.6	134.1	57.3	141.1
35	16.9	69.9	66.4	124.3		132.7
40	16.3	68.5	65.1	116.0	55.0	125.7
45	15.6	67.1	63.7	110.4		121.5
50	14.9	64.3	61.1	106.2	53.5	117.3
55	14.4	62.9	59.8	104.8		116.0
60	14.0	61.5	58.4	103.4	50.4	116.0
65	14.0	61.5	58.4	104.8		117.3
70	14.0	61.5	58.4	107.6	50.2	121.5
75	13.6	61.5	58.4	113.2		125.7
80	13.3	61.5	58.4	118.7	47.8	132.7
85	13.0	61.5	58.4	127.1		139.7
90	12.7	61.5	58.4	135.5	46.9	149.5
95	12.7	61.5	58.4	146.7		160.7
100	12.6	62.9	59.8	159.3	46.7	173.2

#### 7.4.2 Calculation Conditions and Equation

The calculation to identify the net benefit, benefit/cost ratio and economic internal rate of return of each Case was carried out with the following conditions:

- a) Time Value : Rp in Vehicle-Hour
- b) VOC : Rp in Vehicle-Km
- c) Price : current market price in 1988
- d) Rate of Discount : 12% per annum
- e) Effective Days per Year : 365 days
- f) Project Life : Case A; 5 years after completion

The equations applied for calculations to identify evaluation factors such as net benefit and benefit cost ratio are presented as follows:

$$\sum_{t=1}^T \frac{B_t}{(1+r)^t} - K - \sum_{t=1}^T \frac{O_t}{(1+r)^t} = B - C \quad \text{where:}$$

$K$  = road improvement and development cost (initial investment)  
 $O_t$  = operation/maintenance cost at "t"th year  
 $B_t$  = economic benefit at "t"th year  
 $r$  = rate of discount  
 $T$  = evaluation period in number of year  
 $i$  = economic internal rate of return

$$\sum_{t=1}^T \frac{B_t}{(1+r)^t} / (K + \sum_{t=1}^T \frac{O_t}{(1+r)^t}) = B/C$$

$$\sum_{t=1}^T (B_t - K - O_t)/(1+i)^t = 0$$

## 7.5 Economic Analysis and Plan Evaluation

The economic analysis was carried out based on the estimated economic values of time saving in terms of vehicle-hours and reduction in VOC in terms of vehicle-kms for each plan alternative represented by each Case.

These economic values stand for net benefit, benefit/cost ratio and internal rate of return which obtained by comparison of total time value and VOC in a set time span to be yielded in the existing road network and a new road network created by implementation of each alternative plan. The details of benefit/cost calculations are shown in Interim Report (2), and the summary of analysis is presented as follows:

Summary of Economic Evaluation

Priority Class	Plan Alternative	Initial Cost (Million Rp)	B - C (Million Rp)	B/C (%)	IRR
Short Term Plan	Case A	1,146.0	1,422.1	3.2	51.6
	Case B	7,915.0	15,136.5	4.2	42.4
Long Term Plan(Stage I)	Case C	39,108.0	24, 55.6	2.2	23.3
	Case D	50,134.0	27,737.2	2.0	21.4
	Case E	61,253.0	35,947.0	2.0	21.4
Long Term Plan(Stage II)	Case F	171,944.0	32,490.6	1.7	18.7

Note: Discount Rate = 12%

### 7.5.1 Short Term Plan

Judging from this summary, both Case A and Case B proposed in Short Term Plan yield net benefits of about 1,400 and 15,100 million Rupiah respectively against the initial investment amounts of 1,150 and 7,900 million Rupiah with the benefit/cost (B/C) ratios of 3.2 and 4.2 and economic internal rate of return (IRR) of 51.6 and 42.4 percent.



These values well indicate quite a high economic feasibility of both Cases. It is also emphasized that these two Cases are exactly in line with the urban road development strategy for solution to the traffic problems and increase in traffic capacity by full utilization of existing facilities with least possible cost.

#### 7.5.2 Long Term Plan (Stage I)

Regarding three alternatives plans proposed in Long Term Plan (Stage I), Case C can be considered to yield the highest economic return with the net benefit of 24,500 million Rupiah against the initial investment of 39,100 million Rupiah having B/C ratio of 2.2 and IRR of 23.3 percent.

It can also be said that this alternative plan requires the smallest investment amount among the three alternatives because it mainly aims at capacity increase by widening of three arterial roads of Jl. Gowa Jaya, Jl. Gowa Raya and industrial estate access road and development of Inner Ring Road. This alternative is also in consistency with the aforesaid road development strategy.

In addition to economic evaluation, technical feasibility is also analyzed from the engineering viewpoint, in particular on the traffic conditions and road network configuration. The criteria for traffic conditions are made in terms of average congestion degree and average travel speed to be achieved on the improved road network after implementation of each alternative plan.

When these criteria are applied to Cases C, D and E proposed for the Long Term Plan (Stage I), there is no remarkable difference either on the average congestion degree or on the average travel speed among the three alternatives as shown in Table 7.5.1. So, the alternative with the least cost for initial investment and operating and maintenance cost shall be regarded as the best one, which is Case C.

Also, the configuration of the road network in Case C as shown in Fig.7.5.1 can form a fairly well prepared network which can functionally concentrate and distribute the traffic volume and flow projected in 1994 by the improved Radial Roads and Inner Ring Roads.

As a result, Case C is selected and recommended to be the best plan in Long Term Plan (Stage I).

### 7.5.3 Long Term Plan (Stage II)

Case F proposed in Long Term Plan can also yield fairly a good economic return of 32,500 million Rupiah as its net benefit with the B/C ratio of 1.7 and IRR of 18.7 percent. This Case is planned out to accommodate the traffic demand to be expected in the target year of 2009 when the Study area is anticipated to grow at a considerable pace with two city sub-centers to be located in Antang and Daya districts. For this purpose, this Long Term Plan includes two additional Ring Roads and two new Radial Roads to form up the recommendable artery network, which requires the investment amount of about 172 billion Rupiah. Still, this plan is regarded economically feasible as the analytical figures show. However, it might be recommendable to carefully allocate the development budget in reasonable proportions for each Five Year Development Plan period up to 2009.

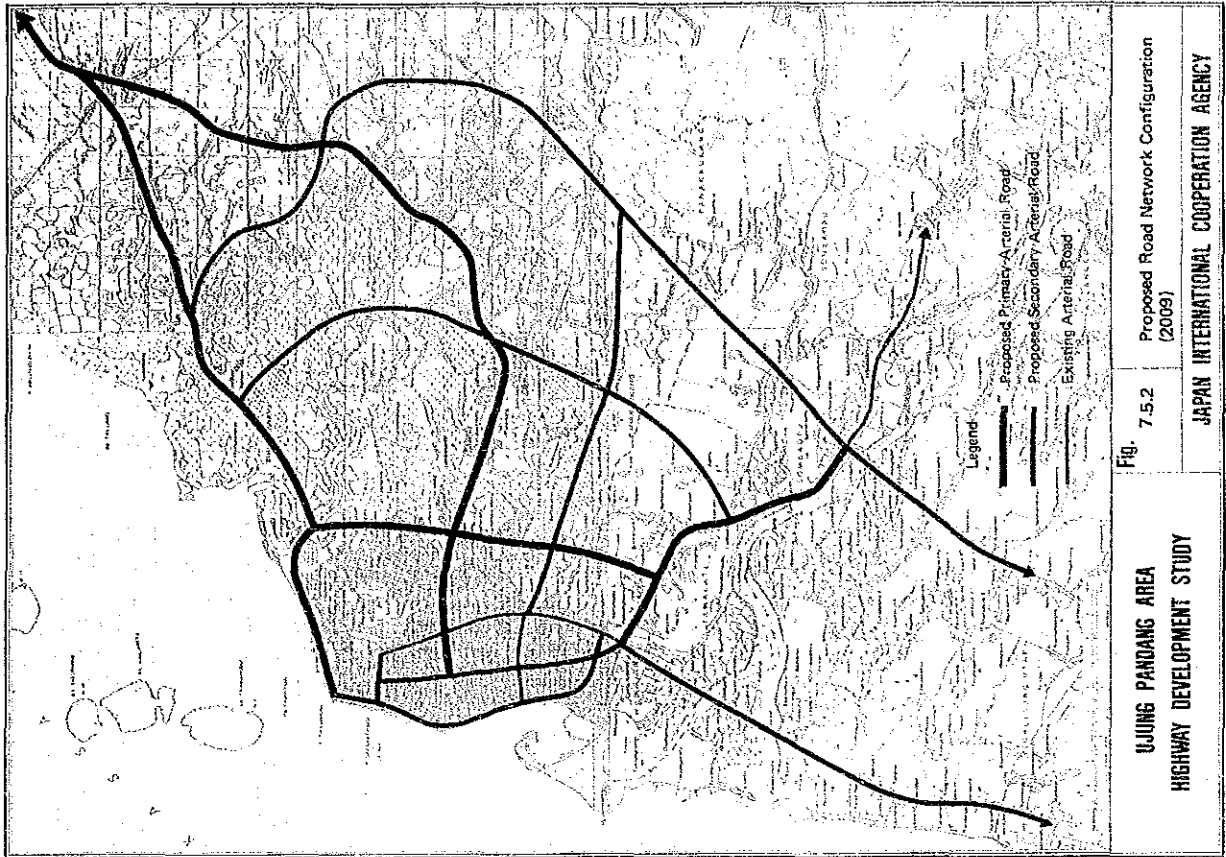
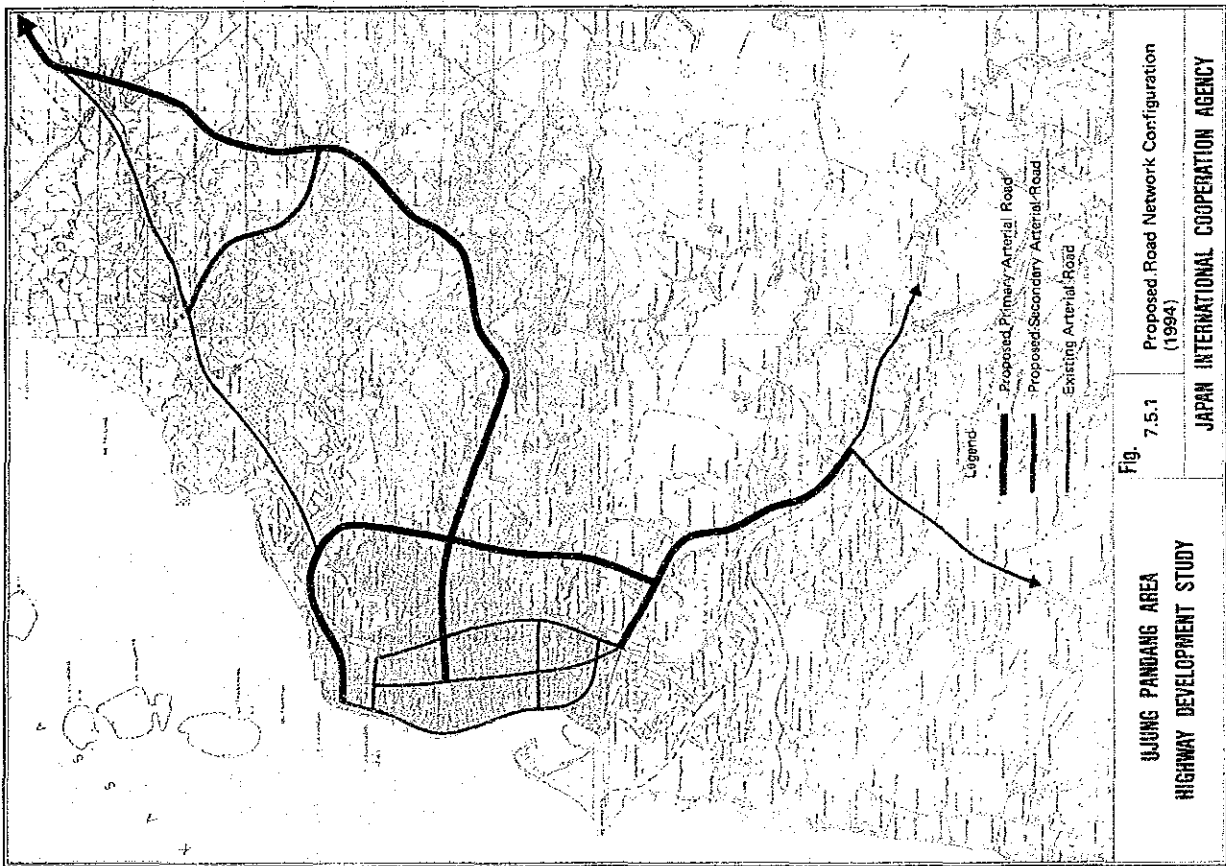
The technical analysis is also applied to Case F. In 2009 when all the projects packed in Case F are implemented and completed, the average congestion degree on this network as shown in Fig. 7.5.2 is estimated to be 0.88, which is much improved from that on the existing network being 1.49. Regarding average travel speed, it is estimated to be 26.0 km per hour, substantial improvement in comparison with that of existing network, only 20.8 km per hour.

The road network configuration in Case F is made of five major Radial Roads and three major Ring Roads which are strategically located to meet traffic demand of passenger and cargo expected to arise in 2009.

It is also to be mentioned that implementation of the recommended alternatives plan, namely the Urgent Plan including Case A and B, Case C of the Short Term Plan and Case F of the Long Term Plan will contribute to a harmonious development, beautification and stimulation of urban social and economic activities in this region.

Table 7.5.1 Comparison of Traffic Conditions on Each Case

Plan	Case	Traffic Condition	Year		
			1988	1994	2009
	Base Case	Average Speed (km/h) Congestion Degree	27.26 0.52	25.53 0.71	20.84 1.49
Short Term Plan	A	Average Speed (km/h)	27.42	25.62	21.01
		Congestion Degree	0.52	0.71	1.50
	B	Average Speed (km/h)	-	26.01	-
		Congestion Degree	-	0.67	-
Long Term Plan (Stage 1) (1994)	C	Average Speed (km/h)	-	27.36	22.25
		Congestion Degree	-	0.58	1.20
	D	Average Speed (km/h)	-	27.75	22.57
		Congestion Degree	-	0.55	1.14
	E	Average Speed (km/h)	-	28.55	22.71
		Congestion Degree	-	0.52	1.05
Long Term Plan (Stage 2) (2009)	F	Average Speed (km/h)	-	-	26.00
		Congestion Degree	-	-	0.88



## 7.6 Examination of Traffic Volume on Jl. Toll (Prof. Dr. Ir. Sutami)

### 7.6.1 General

In the previous section, the road network configurations in years 1994 and 2009 are determined as shown in Fig. 7.5.1 and Fig. 7.5.2 respectively.

However, BINA MARGA has just commenced the study on the widening of Jl. Toll (Prof. Dr. Ir. Sutami) as introducing toll road system, and it is supposed that traffic situation might be changed, if this widening project will be implemented.

Therefore, the future traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) under conditions of with widening of Jl. Toll (Prof. Dr. Ir. Sutami) and/or Jl. Gowa Jaya (Urip Sumoharjo) from 2-lane to 4-lane road and without those widening are forecasted and the effectiveness of the widening of Jl. Toll (Prof. Dr. Ir. Sutami) is examined.

### 7.6.2 Traffic Analysis

#### 1) Existing Traffic Volume

According to JASA MARGA, the record of the traffic volume at the Toll Bridge for the years 1985 - 1987 is as shown in Table 7.6.1.

Table 7.6.1 Average Daily Traffic Volume at Toll Bridge  
(veh/day)

Year	Month	Car	Truck & Bus	Motorcycle	Total
1985	Jan.	1,487	382	1,344	3,213
	Aug.	1,519	508	1,472	3,526
1986	Jan.	1,963	536	1,275	3,774
	Aug.	2,538	802	1,933	5,273
1987	Jan.	3,191	892	1,652	5,735
	Aug.	4,540	1,126	2,368	8,035

Source : JASA MARGA

In addition, the traffic volume was counted by Study Team during the daytime from 7:00 a.m. to 7:00 p.m. in Jan. 1988. The result is shown in Table 7.6.2.

**Table 7.6.2 Traffic Volume Counted by Study Team**

(veh/12 hr)

Vehicle Type	Traffic	Volume	%
Bicycle	432	-	
Motorcycle	1941	1941	27.3
Car	1638	4154	58.6
Pick-up	1023		
Mini-bus	1493	1002	14.1
Bus	10		
Truck	992		
Becak	21	-	
<b>Total</b>	<b>7550</b>	<b>7097</b>	<b>100 %</b>

Source : Traffic Counting Survey Jan. 1988  
by JICA Study Team

Converting the figures in Table 7.6.2 to 24 hrs traffic volume by using conversion factor 1.3, which is obtained from the traffic counting survey result at Jl. Gowa Jaya (Urip Sumoharjo), the traffic volume is estimated to be 9,226 veh/ day.

Accordingly, the growth rate during the past 4 years is calculated to be about 42 % per annum, which is extremely high when compared with the growth rate of vehicle registration in Ujung Pandang. (Refer to Table 7.6.3)

This high growth rate is mainly attributed by the increasing diversion traffic from Jl. Gowa Jaya where traffic demand has reached its capacity already.

2) Future Traffic Volume on Jl. Toll (Prof. Dr. Ir. Sutami)

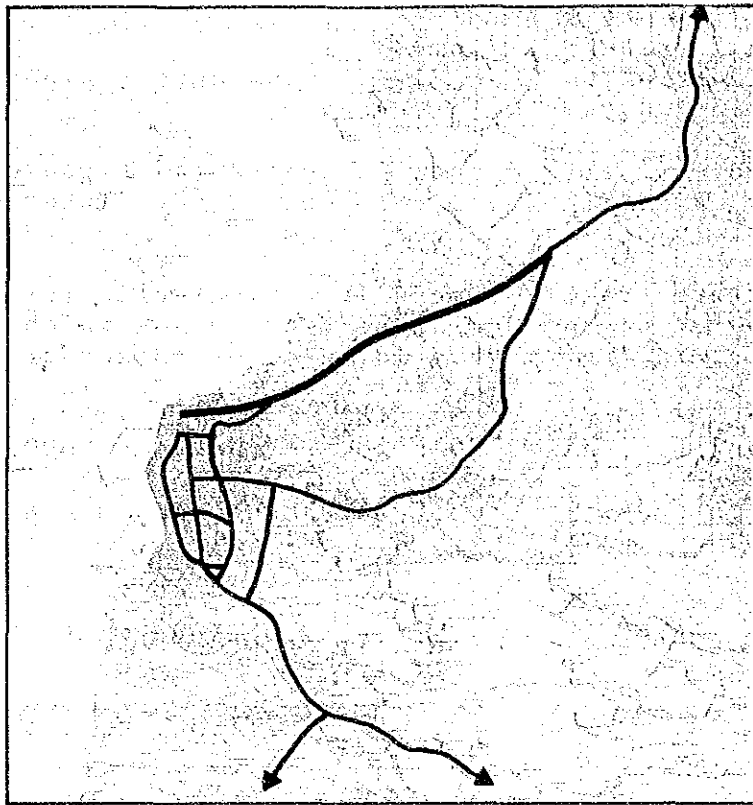
Basically the traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) is significantly affected by the traffic condition of alternative road namely Jl. Gowa Jaya (Urip Sumoharjo), since both roads are running in parallel with the same direction. Accordingly, future traffic volume is estimated for the following alternative cases :

- a) Base case  
Do-nothing i.e. same as the existing network condition
- b) Case X (see Fig. 7.6.1)  
Jl. Toll (Prof. Dr. Ir. Sutami) is widened to a 4-lane road and Port Access Road is constructed

Table 7.6.3 Number of Vehicle in Ujung Pandang

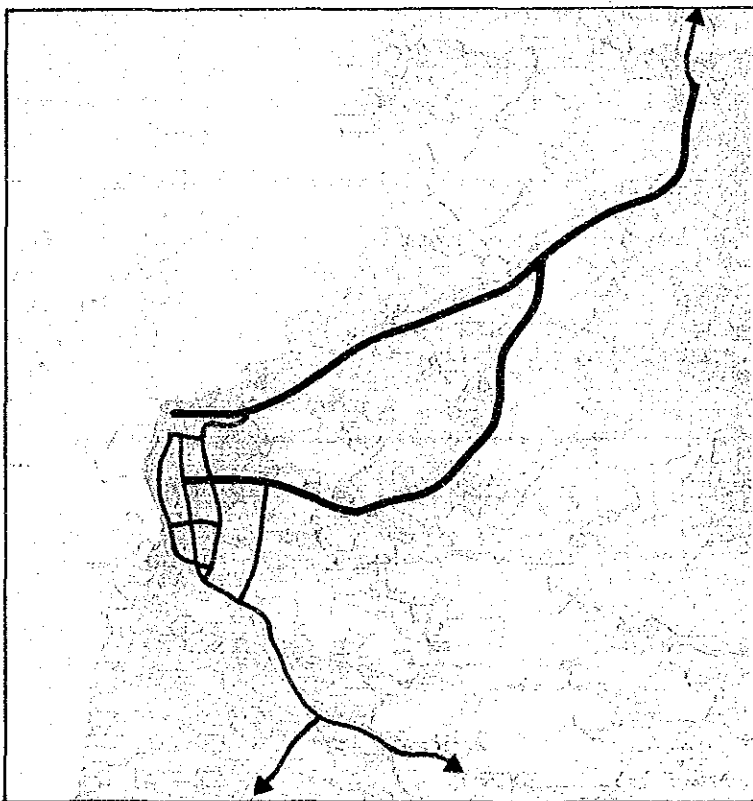
Classification	Year				Increase Rate (1977 - 1987)	Ownership Rate (vehicle/1000 persons)		Remarks
	1975	1977	1986	1987		1977	1986	
Passenger Car	5,640	7,425	11,746	12,958	5.7%	12.3	15.1	Sedan, jeep St. wagon etc.
Truck	7,716	11,668	15,396	19,945	5.5	19.4	19.8	
Bus	1,047	2,720	4,450	4,778	5.8	4.5	5.7	incl. pete-pete, microlet
4-wheel vehicles Total	13,863	21,813	31,592	37,681	5.6	36.2	40.6	
2-wheel vehicles	49,638	75,037	115,541	118,658	4.7	124.6	148.4	motor bicycle, motor scooter
Total	63,501	96,850	147,133	156,339	4.9	160.8	189.0	

Source: Kotamadya Ujung Pandang Dalam Angka (Monografi dan Analisa kota)  
Bappeda Kotamadya Dati II Ujung Pandang  
Table of DAFTAR (1986, 1987)



**Fig. 7.6.1**  
**Alternative**  
**Case X**

— Existing Road  
 — Improved Road



**Fig. 7.6.2**  
**Alternative**  
**Case Y**



c) Case Y (see Fig. 7.6.2)

In addition to Case X, Jl. Gowa Jaya (Urip Sumoharjo) is widened to a 4-lane road

The future traffic demand is forecasted based on "Ujung Pandang Area Highway Development Study" Interim Report (2) Oct. 1988 by JICA Study Team.

This future traffic demand is estimated in terms of O-D table based on the Home Interview Survey which was carried out in Jan. 1988. In terms of passenger car unit (p.c.u.), the total vehicular traffic in the Ujung Pandang area grows 1.33 times the existing traffic in the year 1994, and 2.59 times in the year 2009.

The traffic assignment of future demand is made for the cases shown in Table 7.6.4.

**Table 7.6.4 Traffic Assignment Case**

Network	Traffic Demand		
	1988	1994	2004
Base Case	○	○	○
Case X	-	○	○
Case Y	-	○	○

3) Future Traffic Volume on Alternative Cases

Table 7.6.5 shows the traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) based on the assignment results of future demand to the alternative cases. In this table, the composition of vehicle type in terms of p.c.u. is approximately as follows;

	1994	2009
Motorcycle	12 %	8 %
Car	41 %	51 %
Microbus	20 %	15 %
Truck	27 %	26 %
Total	100 %	100 %

**Table 7.6.5 Comparison of Traffic Volume on Jl. Toll (pcu/day)**

Year	Road Section	Base Case	Case X(A)	Case Y(B)	(A)-(B)
		Do Nothing	Jl. Toll be widened	Jl. Toll Jl. Gowa Jaya be widened	
1994	1	-	33,500	25,800	7,700
	2	-	30,400	20,600	9,800
	3	20,000	35,500	21,400	14,100
	4	20,000	35,500	21,400	14,100
	5	19,500	35,200	21,000	14,200
	6	9,000	14,000	11,000	3,000
2009	1	-	64,200	55,400	8,800
	2	-	83,500	66,600	16,900
	3	53,200	85,700	63,900	21,800
	4	53,200	85,700	63,900	21,800
	5	41,800	69,300	54,700	14,600
	6	21,000	40,000	35,000	5,000

The followings are major findings from this table.

a) Base Case

Fig. 7.6.3 and Fig. 7.6.4 show the result of traffic assignment of the existing demand to the Base Case. It is found that the traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) is still less than its capacity, while that on Jl. Gowa Jaya (Urip Sumoharjo) is already exceeding the capacity.

The traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) will increase from 10,000 pcu in 1988 to 20,000 pcu in 1994, due to the congestion on Jl. Gowa Jaya (Urip Sumoharjo). However, the traffic volume will decrease to be about 14,000 pcu/day in 1994 if only Jl. Gowa Jaya (Urip Sumoharjo) is widened and Jl. Toll (Prof. Dr. Ir. Sutami) is remained as 2-lane road.

b) Case X

If only Jl. Toll (Prof. Dr. Ir. Sutami) is widened to 4 lanes, the traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) will increase due to the diverted traffic from Jl. Gowa Jaya (Urip Sumoharjo). Traffic Volume will range from 30,000 to 35,500 pcu/day in 1994 and from 64,000 to 85,700 pcu/day in the year 2009.

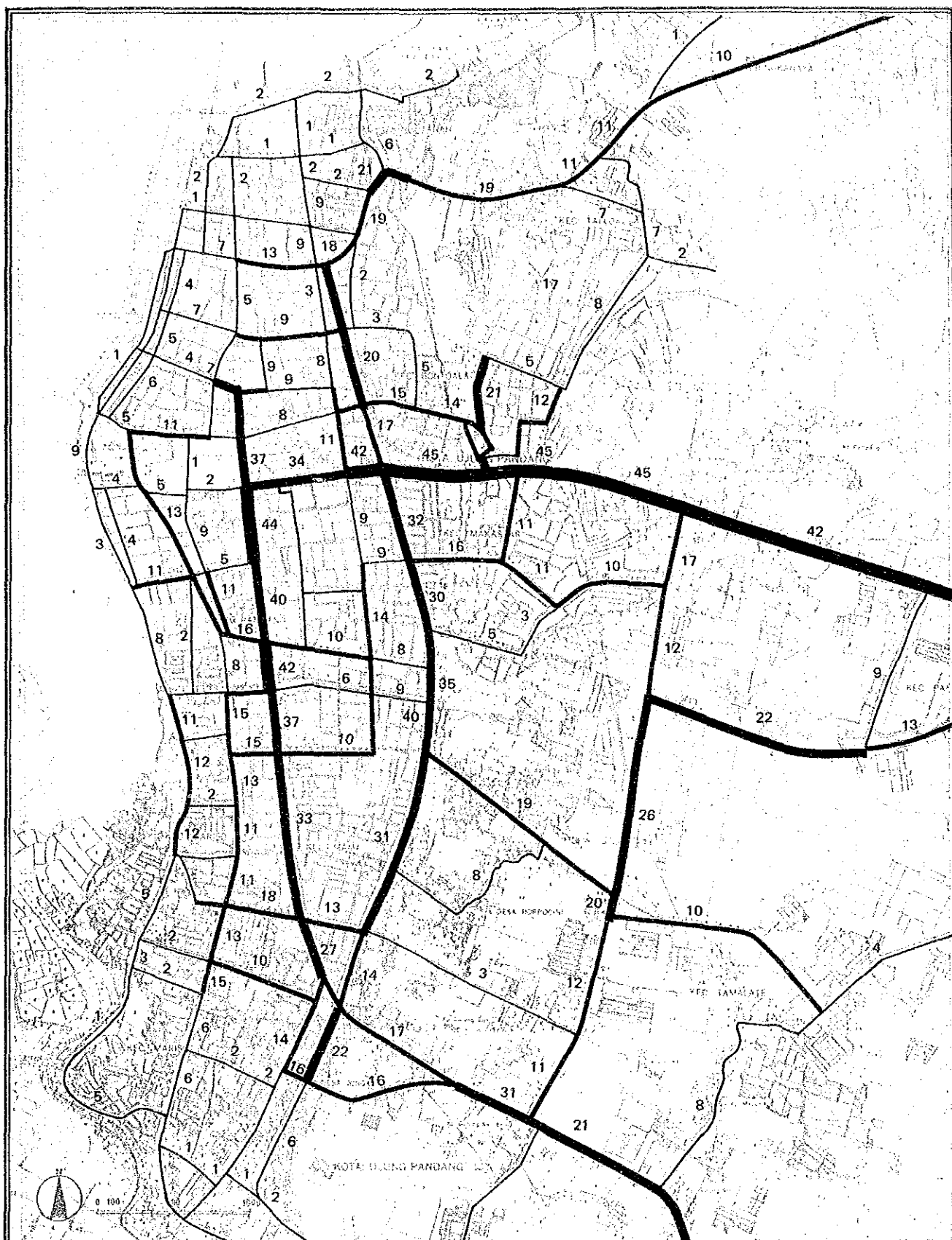
c) Case Y

If the both roads, Jl. Toll (Prof. Dr. Ir. Sutami) and Jl. Gowa Jaya (Urip Sumoharjo), are widened to 4 lanes, the traffic volume on Jl. Toll will be much less than the Case X. It ranges from 20,600 to 25,800 pcu/day in 1994 and from 54,700 to 66,600 pcu/day in 2009.

d) Conclusions

The relationship between traffic volume and traffic capacity on roads sections for each alternative case is illustrated in Fig. 7.6.6 to Fig. 7.6.9 respectively. From these figures, followings are pointed out.

- A. Jl. Toll (Prof. Dr. Ir. Sutami) is required to be widened to 4-lane road by the year 1994 based on the existing road network.
- B. Even though, based on the proposed road network, the Jl. Toll (Prof. Dr. Ir. Sutami) is also required to be widened to 4-lane road by the year 1995 or 1996.

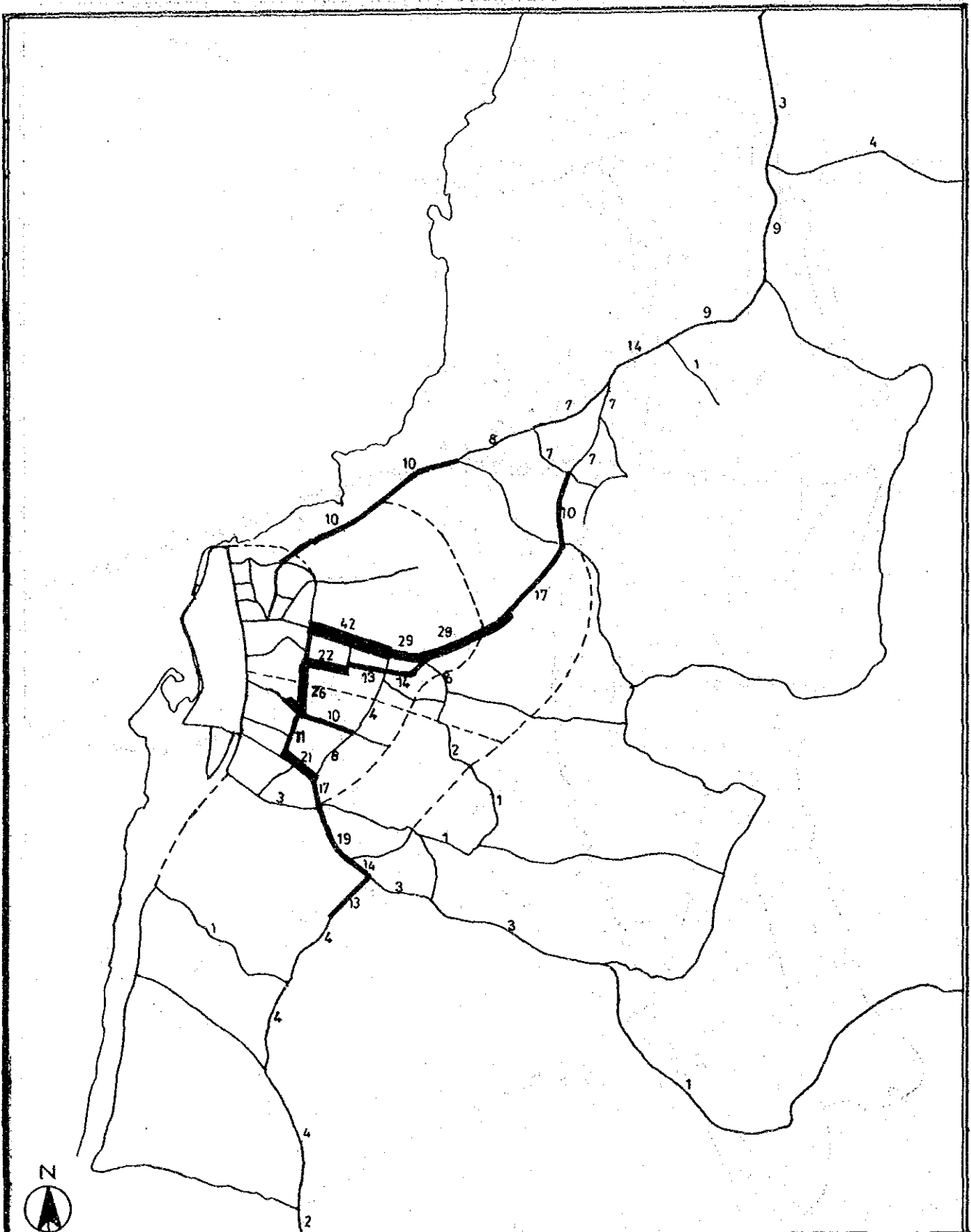


Legend	Thousand pcu/day
	- 10
	10 - 20
	20 - 40
	40 -

**Fig.**  
**7.6.3**

Traffic Assignment to  
Existing Network (1988)

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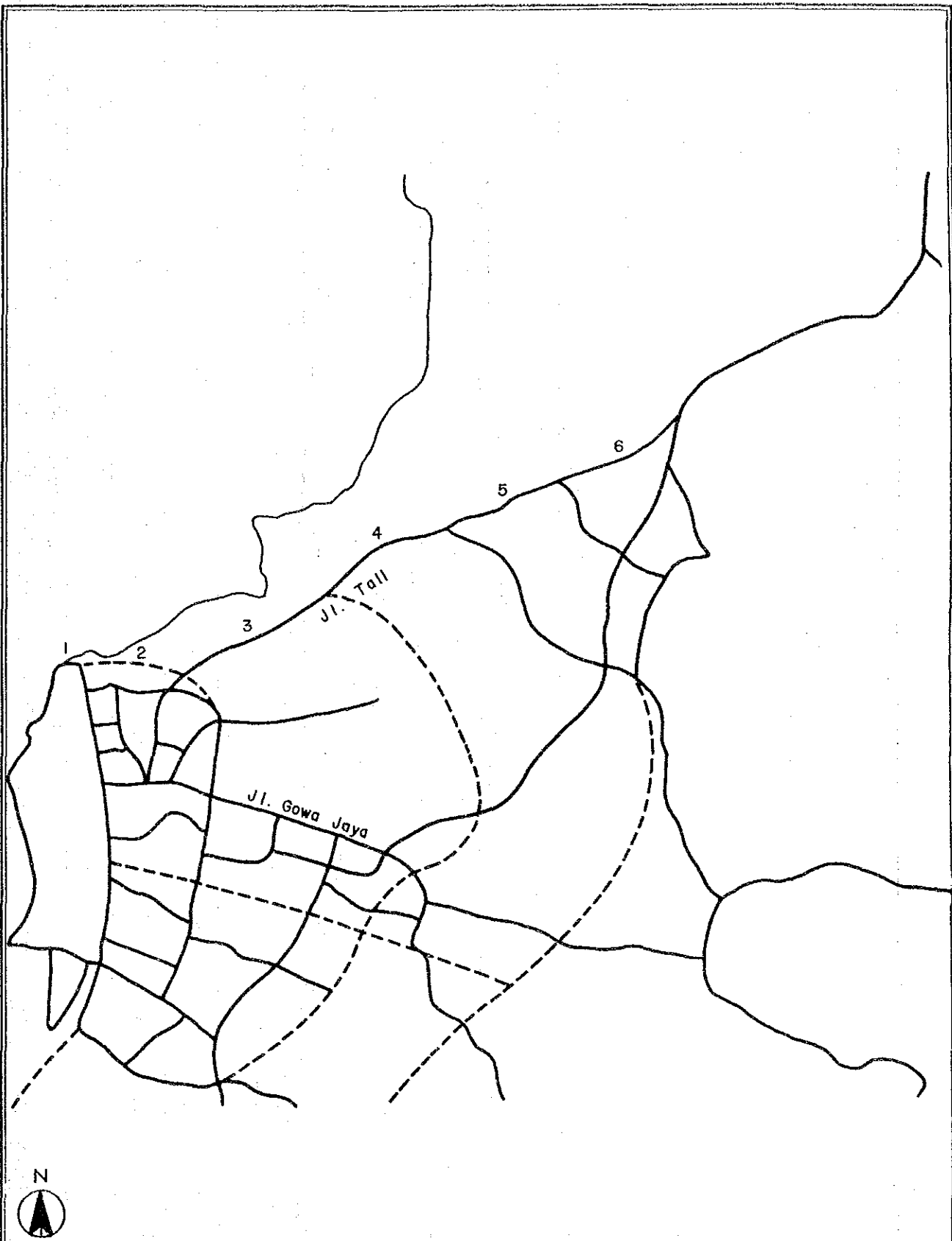


Legend	Thousand pcu/day
	- 10
	10 - 20
	20 - 40
	40 -

Fig. 7.6.4

Traffic Assignment to Existing Network (1988)

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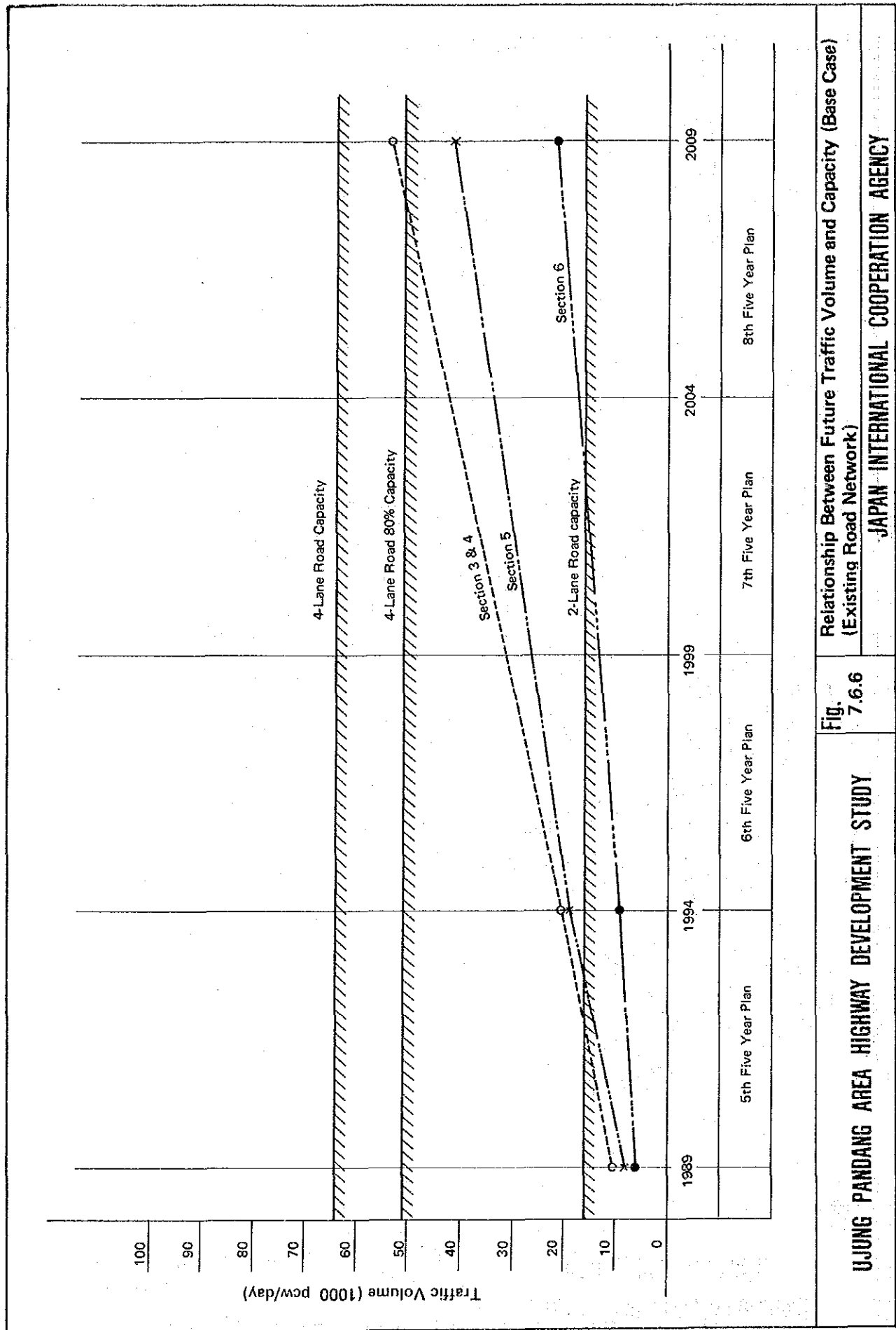


**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig.**  
7.6.5

Road Section of Jl. Toll  
(Prof. Dr. Ir. Sulami)

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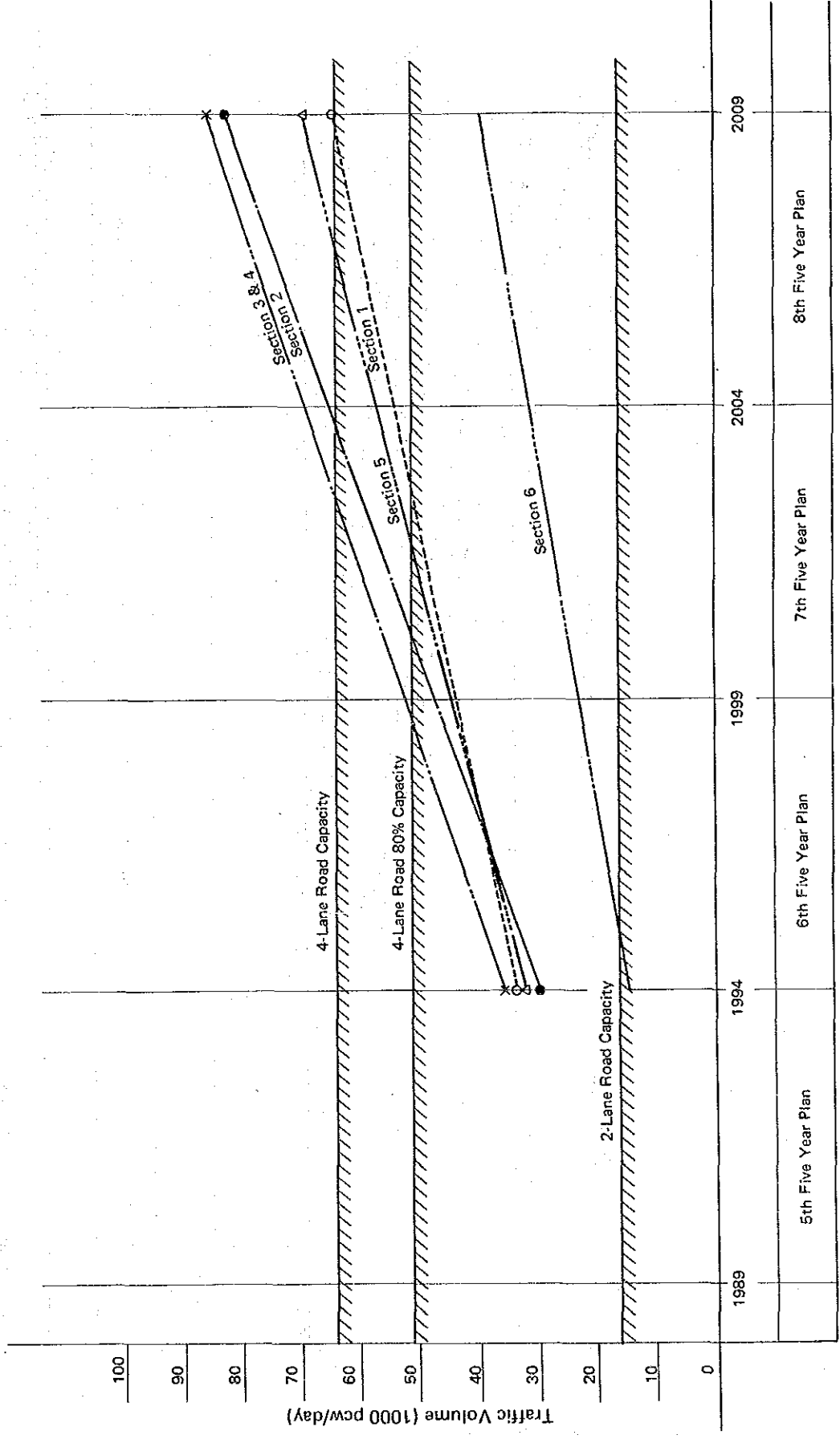


Relationship Between Future Traffic Volume and Capacity (Base Case)  
(Existing Road Network)

Fig. 7.6.6

UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY

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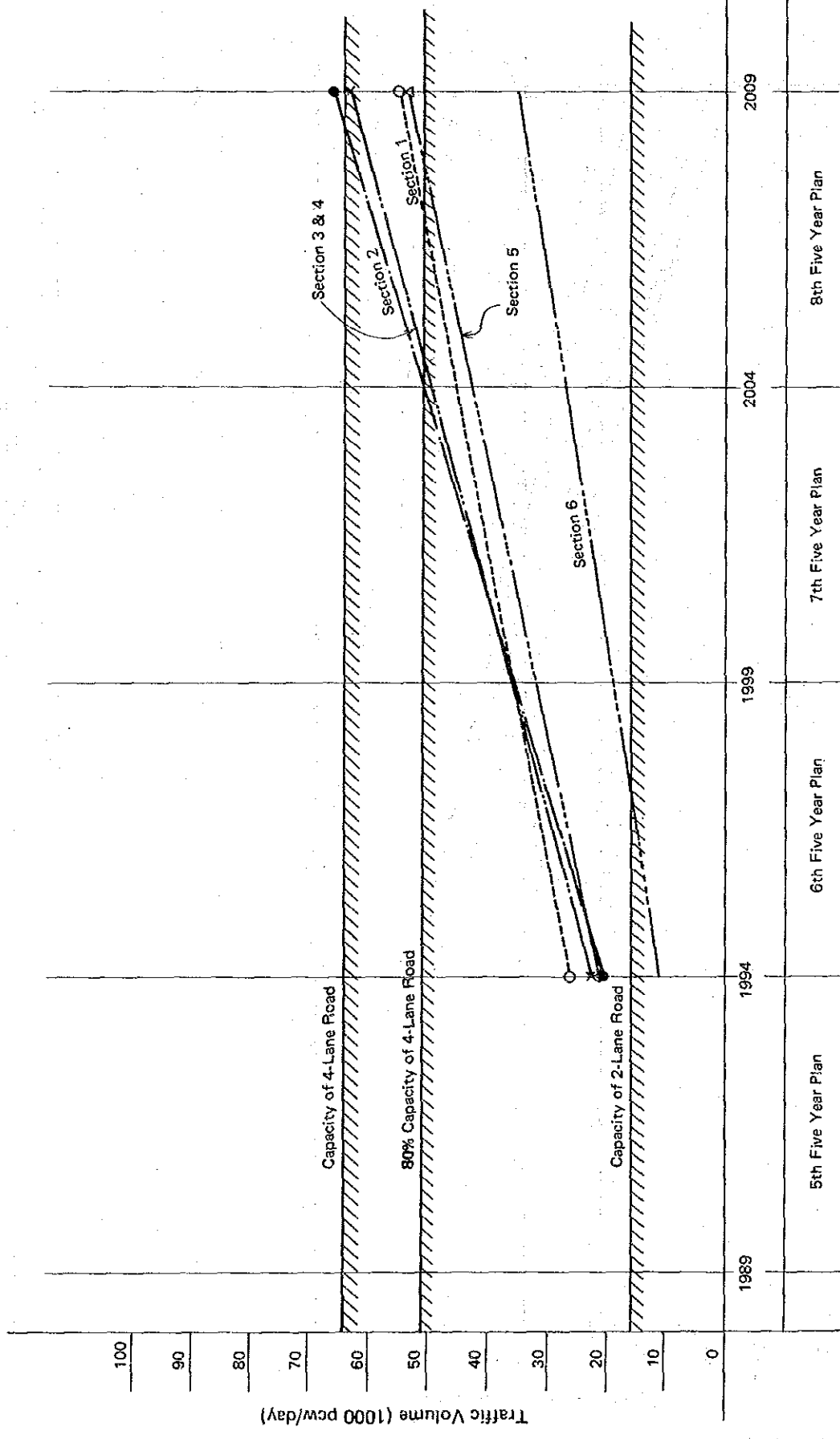
Relationship Between Future Traffic Volume and Capacity (Case X)  
(Existing Road Network)

Fig. 7.6.7

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Relationship Between Future Traffic Volume and Capacity (Case Y)  
(Existing Road Network)

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Fig. 7.6.8

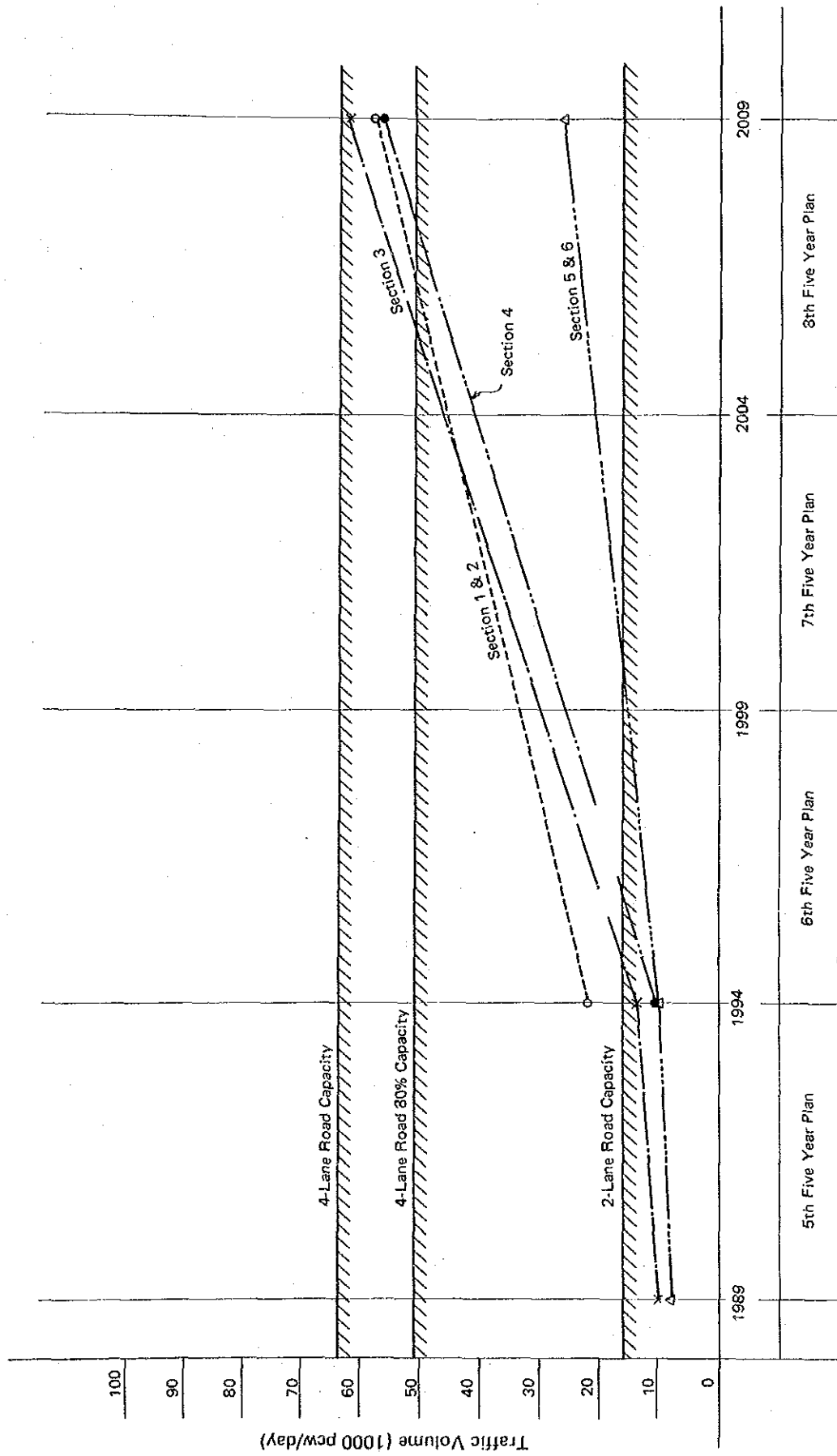
UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY

5th Five Year Plan

6th Five Year Plan

7th Five Year Plan

8th Five Year Plan



Relationship Between Future Traffic Volume and Capacity  
(Proposed Road Network)

Fig. 7.6.9

UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY

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## CHAPTER 8 PROJECT LIST



## CHAPTER 8 PROJECT LIST

### 8.1. Formation of Project

#### 8.1.1 Basic Consideration

In the previous sections, the existing traffic and transport facilities problems in Ujung Pandang area have been studied, and various improvement plans have also been proposed to cope with these problems.

The highway development plan with target year 1994 and 2009 is proposed mainly as the existing road improvement plan and road construction plan. The traffic management improvement plan is proposed mainly as the plan which comprises intersection improvement plan, road rehabilitation plan, pedestrian facilities improvement plan and so on.

The proposed highway development plan consists of seventeen (17) segmental projects and the proposed traffic management plan consists of 45 segmental projects. One segmental project if implemented alone may not be so effective to the solution of the traffic problems.

In this case, a set of segmental projects combined together to improve a road network system shall be given great attention and emphasis and these projects shall be implemented simultaneously in a harmonious way. Especially, the implementation of highway development plan should be conducted as a formulation of road network system.

Considering the above mentioned conditions, the following basic criteria for formation of project are identified:

- a) A small size segmental project in terms of work volume and investment cost is combined with other related segmental projects to form one project of same nature or measure, in particular for traffic management improvement.
- b) As to highway development, several segmental projects are combined together so as to improve and expand the road network system.
- c) The projects should be economically and technically feasible.
- d) The projects should be kept in balance with demand.
- e) The projects should be kept in balance with the National development policy of Indonesian Government.

Based on the above mentioned criteria, the project list of the Study are identified. As mentioned in the previous section "Project Evaluation", the projects are classified into three (3) groups as shown below taking

into account above mentioned criteria.

- a) Short Term Project to be completed by the end of next Five Year Plan period in 1994.
- b) Long Term Project (Stage I) to be completed by the end of next Five Year Plan period in 1994.
- c) Long Term Project (Stage II) to be completed by 2009.

### 8.1.2. Highway Development Projects

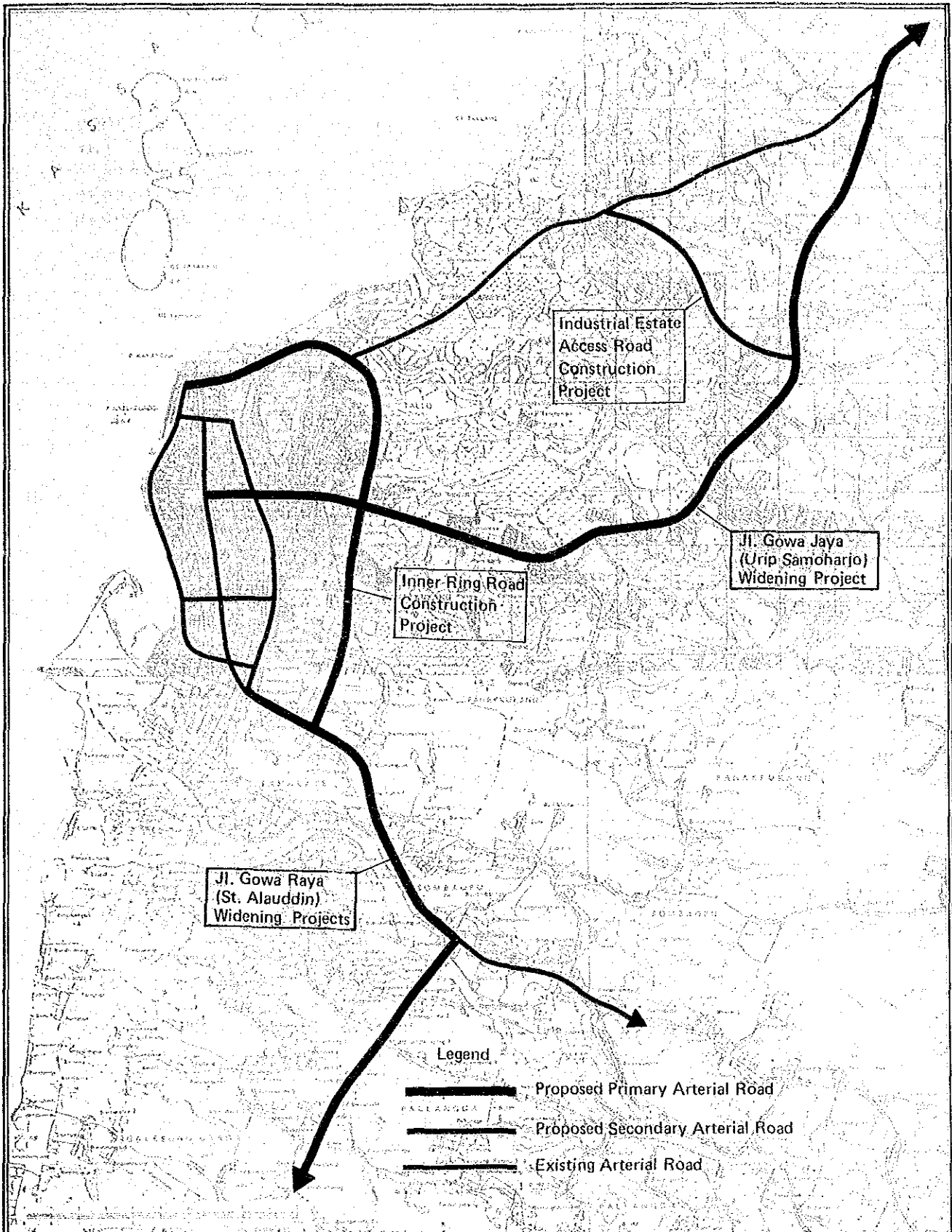
#### 1) Long Term Project (Stage I)

Based on the criteria for formation of project and as the results of project evaluation, the highway development plan for Long Term Project (Stage I) with target year 1994 is proposed as shown in Fig. 8.1.1. The Long Term Plan (Stage I) consists of five (5) road projects as shown below.

- (1) Inner Ring Road Construction Project  
(Segment 1, 2 and 3)
- (2) Jl. Gowa Jaya (Urip Sumoharjo) Widening Project  
(Segment 13 and 14)
- (3) Jl. Gowa Raya (St. Alauddin) Widening Project  
(Segment 15 and 16)
- (4) Industrial Estate Access Road Construction Project  
(a part of Outer Ring Road )  
(Segment 7)

In addition to above projects, (5) Jl. Toll (Prof. Dr. Ir. Sutami) Widening Project is required to implement Long Term Project (Stage I) based on the following reasons:

- a) The future traffic volume on Jl. Toll (Prof. Dr. Ir. Sutami) will exceed the 2-lane road capacity by the year 1996. Therefore, it is required that Jl. Toll (Prof. Dr. Ir. Sutami) should be widened from 2-lane to 4-lane by the year 1995.
- b) The Jl. Toll (Prof. Dr. Ir. Sutami) has very important road functions for industrial development in Ujung Pandang area. Jl. Toll (Prof. Dr. Ir. Sutami) directly connects Hassanudin Air Port, Industrial Estate in Daya and Makassar Sea Port. Therefore, it is required that the Jl. Toll (Prof. Dr. Ir. Sutami) should be widened to contribute the industrial development and to increase the socio-economic urban activities in Ujung Pandang area.
- c) Jl. Toll (Prof. Dr. Ir. Sutami) also is a very important road for the primary road network in Ujung Pandang Area and South Sulawesi region.



**UJUNG PANDANG AREA  
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**Fig.  
8.1.1**

**Proposed Road Network Configuration  
(1994)**

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## 2) Long Term Project (Stage II)

The Long Term Plan (Stage II) with the target year 2009 is also proposed taking into account the criteria for formation of the project and results of project evaluation as shown in Fig. 8.1.2. The Long Term Plan (Stage II) consists of eight (8) road projects as shown below.

- (1) Inner Ring Road Construction Project  
(Segment 1,2 and 3)
- (2) Middle Ring Road Construction Project  
(Segment 4,5 and 6)
- (3) Outer Ring Road Construction Project  
(Segment 7,8 and 9)
- (4) Center Radial Road Construction Project  
(Segment 10 and 11)
- (5) South Radial Road Construction Project  
(Segment 12)
- (6) Jl. Gowa Jaya (Urip Sumoharjo) Widening Project  
(Segment 13 and 14)
- (7) Jl. Gowa Raya (St. Alauddin) Widening Project  
(Segment 15 and 16)
- (8) Jl. Toll (Prof. Dr. Ir. Sutami) Widening Project  
(Segment 17)

### 8.1.3. Short Term Project (Traffic Management Projects)

In the previous section, traffic management plans for Short Term with target year 1994 is studied to solve the traffic and transport facilities problems in Ujung Pandang urbanized area based on its planning strategies and planning concept.

Generally speaking, the investment cost of traffic management project is usually not so large, however, the effectiveness of implementation may be large compared with the required cost.

Therefore, it is important that traffic management plan shall be formulated as flexible as possible so that it can be modified according to the traffic situation. From this stand point, the traffic management plan shall be arranged for short period of two (2) to three (3) years.

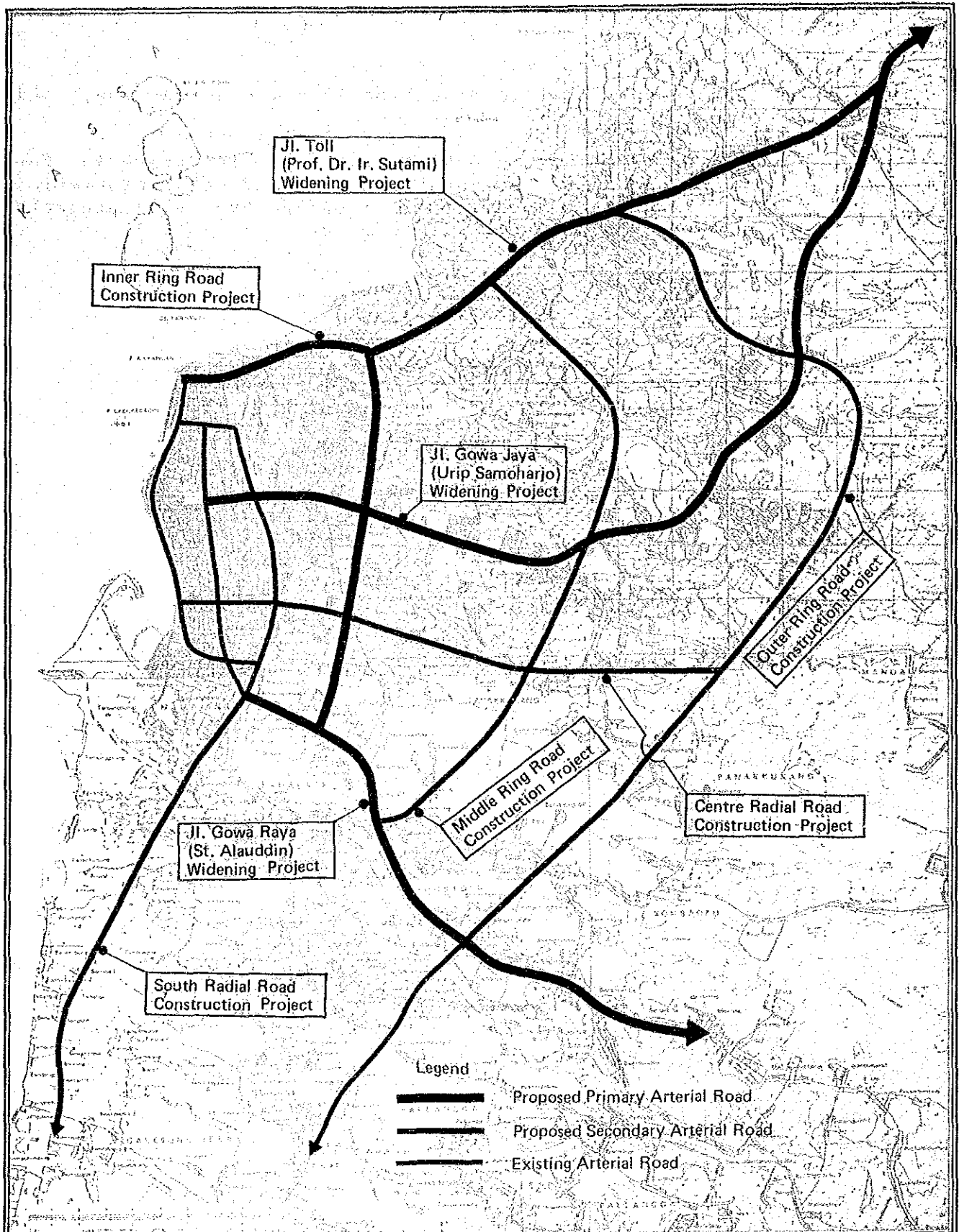
The traffic management plan is formulated based on above mentioned planning policies and strategy as urgent action plan. Therefore, all traffic management projects are proposed in Short Term Plan.

The Traffic Management Plan consists of various segmental and remedial projects for existing road widening, intersections improvement, sidewalk construction, pedestrian's paradise, road rehabilitation, bus terminal

improvement, traffic educational park construction, and so on.

However, taking into account the basic criteria for formation of project and functions and characteristics of the proposed segments, following seven (7) projects are proposed as Short Term Project:

- (1) Existing Road Widening Project
- (2) Intersection Improvement Project
- (3) Pedestrian Facilities Improvement Project
- (4) Road Rehabilitation Project
- (5) Bus Facilities Improvement Project
- (6) Becak Transport Improvement Project
- (7) Traffic Regulation Improvement Project



**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig.**  
8.1.2

**Proposed Road Network Configuration  
(2009)**

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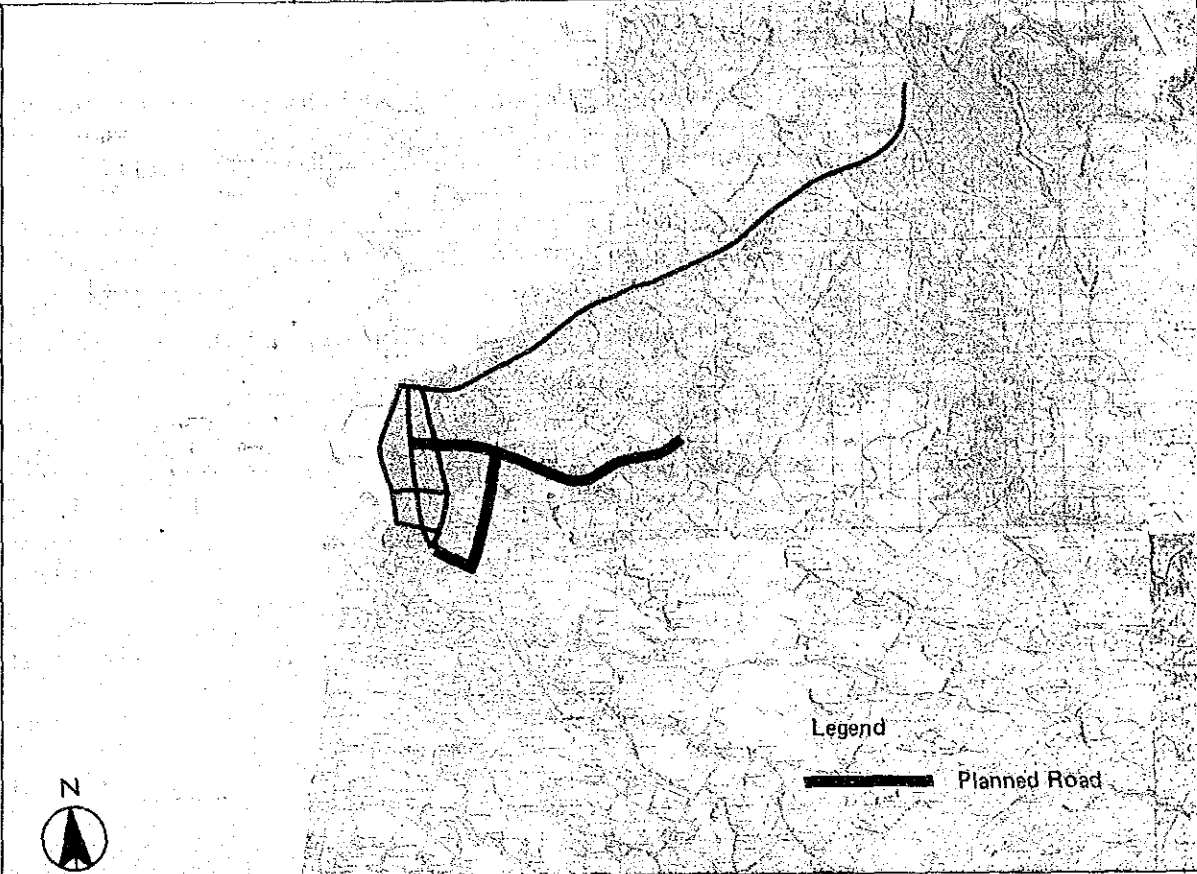
## 8.2 Project List

In the previous section, the highway development projects and traffic management projects are proposed based on technical view point and economical conditions.

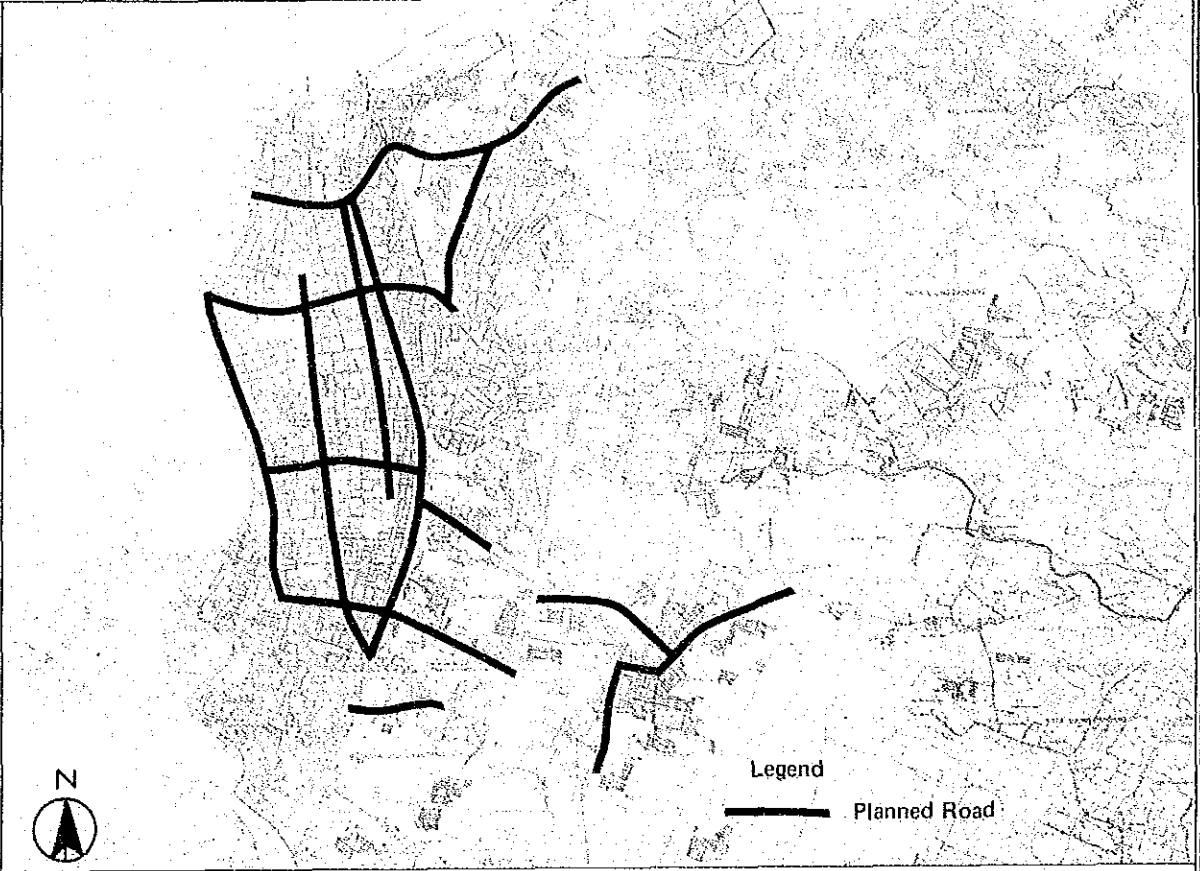
These proposed projects are listed in Table 8.2.1 and the outline of proposed projects are presented in Fig. 8.2.1 to Fig. 8.2.9.

Table 8.2.1 Projects List

	Project Name	Segment	Project Size
Short Term Project	1) Road Widening	3,13,15	15,850 m
	2) Intersection Improvement	-	19 locations
	3) Road Rehabilitation	-	14 routes
	4) Pedestrian Facilities Improvement	-	29 routes
	5) Bus Facilities Improvement	-	196 locations
	6) Becak Transport Improvement	-	2 routes
	7) Traffic Regulation Improvement	-	4 locations
Long Term Project (Stage 1) (1994)	1) Inner Ring Road Construction	1,2,3	9,950 m
	2) Jl. Gowa Jaya Widening (Urip Sumoharjo)	13,14	27,000 m
	3) Jl. Gowa Raya Widening (St. Alauddin)	15,16	6,550 m
	4) Jl. Toll Widening Project (Prof. Dr. Ir. Sutami)	17	11,500 m
	5) Construction Total	7	3,250 m 58,250 m
Long Term Project (Stage II) (2009)	1) Inner Ring Road Construction	1,2,3	9,950 m
	2) Middle Ring Road Construction	4,5,6	12,920 m
	3) Outer Ring Road Construction	7,8,9	17,100 m
	4) Central Radial Road Construction	10,11	8,750 m
	5) South Radial Road Construction	12	5,710 m
	6) Jl. Gowa Jaya Widening (Urip Sumoharjo)	13,14	27,000 m
	7) Jl. Gowa Raya Widening (St. Alauddin)	15,16	6,550 m
	8) Jl. Toll Road Widening (Prof. Dr. Ir. Sutami)	17	11,500 m
Total			99,480 m

Name of Plan	Road Widening Project					
Project Location Map						
Outline of Plan	<ol style="list-style-type: none"> <li>1) Existing JI. (Urip Samoharjo) National Road with 2 lanes is widened to 4 lanes. The improved road length is 10,200 m.</li> <li>2) Existing JI. Pettarani with 2 lanes is widened to 4 lanes. The improved road length is 4,200 m.</li> <li>3) Existing JI. Gowa Raya (St. Alauddin) with 2 lanes is widened to 4 lanes. The improved road length is 1,450 m.</li> <li>4) Total project cost is 7,915 Million Rupiah at 1988 prices.</li> </ol>					
Necessity of Project	<ol style="list-style-type: none"> <li>1) The existing traffic volume in 1988 on these three(3) roads is exceeding traffic capacity.</li> <li>2) This project is economically and technically feasible.</li> <li>3) B/C and IRR are presented as 4.2 and 42.4% respectively.</li> </ol>					
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<table border="1" style="width: 100%;"> <tr> <td style="width: 15%; text-align: center;">Fig. 8.2.1</td> <td style="text-align: center;">Plan Location Map (Short Term Plan)</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>JAPAN INTERNATIONAL COOPERATION AGENCY</b></td> </tr> </table>	Fig. 8.2.1	Plan Location Map (Short Term Plan)	<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>	
Fig. 8.2.1	Plan Location Map (Short Term Plan)					
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>						

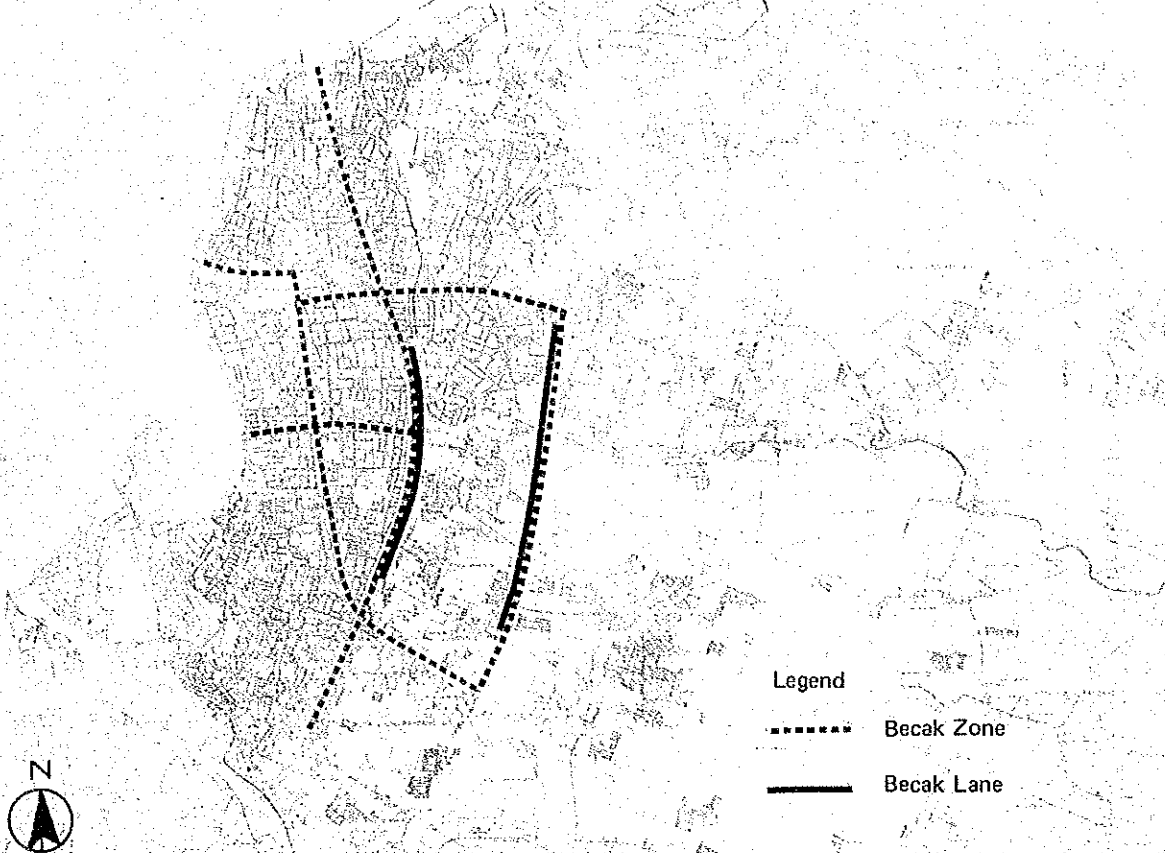
Name of Plan		Intersection Improvement Project	
Project Location Map			
	Outline of Plan	<ol style="list-style-type: none"> <li>1) 19 intersections to be improved are selected.</li> <li>2) Major improvement measures for 13 intersections are improvement of channelization and provision of markings including pedestrian cross walk.</li> <li>3) Major improvement measures for 6 intersections are improvement of channelization and installation of traffic signal.</li> <li>4) Total project cost is 1146 Million Rupiah at 1988 prices.</li> <li>5) B/C and IRR are presented as 3,2 and 51,5% respectively.</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) It is necessary to increase traffic capacity and to secure smooth traffic flow, and also to decrease traffic accidents.</li> <li>2) This project is economically feasible with B/C ratio of 3.2 and IRR of 51.5%.</li> </ol>		
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		Fig.	Plan Location Map (Short Term Plan)
		8.2.2	
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>			

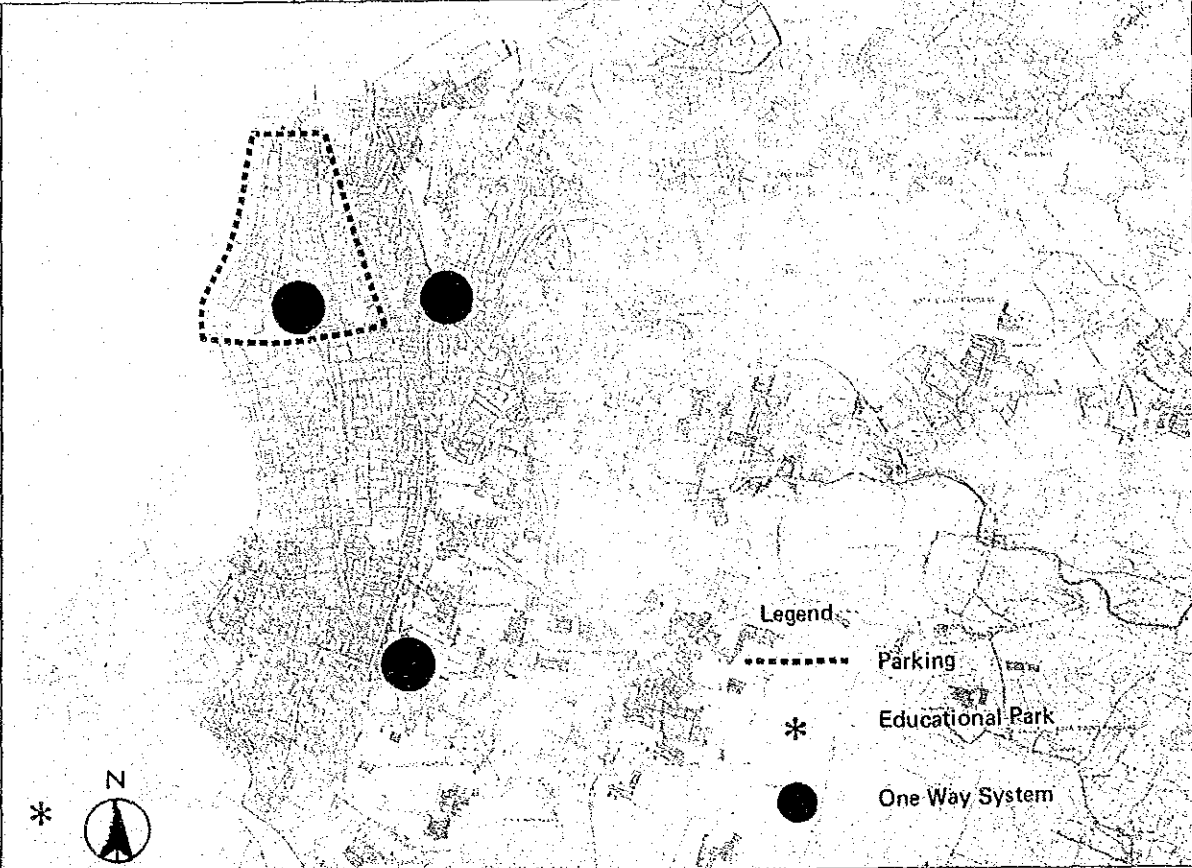
Name of Plan	Road Rehabilitation Project	
Project Location Map		
Outline of Plan	<ol style="list-style-type: none"> <li>1) 14 road sections to be rehabilitated are selected in which shoulder pavement is required for 4 road sections.</li> <li>2) The heavy rehabilitation including subgrade raising is needed for 4 road sections.</li> <li>3) Overlay is required for 2 road sections.</li> <li>4) Total project cost is 2,043 Million Rupiah at 1988 prices.</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) It is necessary to secure traffic function of road and smooth traffic flow, and also to protect road structure.</li> </ol>	
<p style="text-align: center;"><b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b></p>	<p>Fig. 8.2.3</p>	<p>Plan Location Map (Short Term Plan)</p>
	<p><b>JAPAN INTERNATIONAL COOPERATION AGENCY</b></p>	

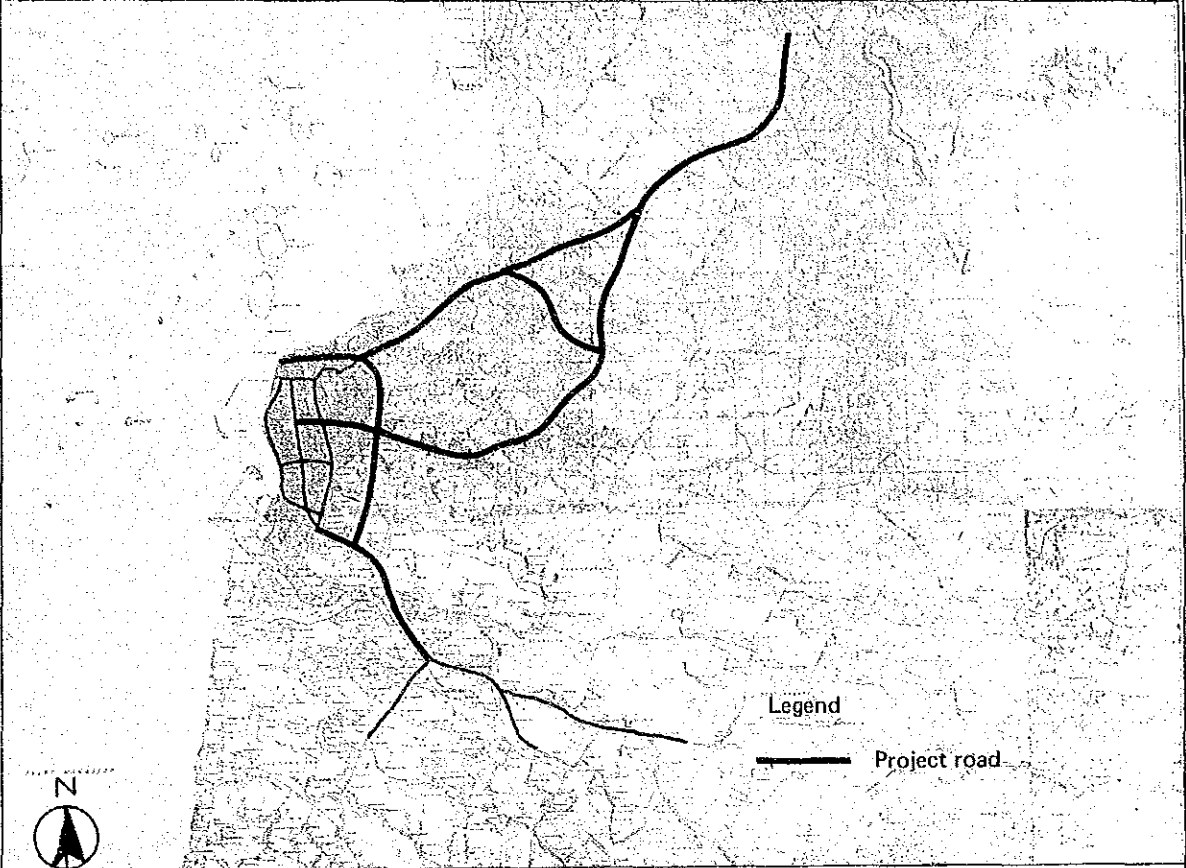
Name of Plan		Pedestrian Facilities Improvement Project	
Project Location Map			
	Outline of Plan	<ol style="list-style-type: none"> <li>1) Side walk provision plan About 4.5 km sidewalk shall be provided along the arterial roads and collection roads, at near school, around park and market.</li> <li>2) Pedestrian overpass provision plan Five pedestrian overpasses shall be provided at Jl. Urip-Sumoharjo and Jl. Pettarani where many traffic accidents involving pedestrian occurred and traffic volumes are large, furthermore, crossing length is comparatively long.</li> <li>3) Pedestrian's paradise Jl. Penghibur running along Losari Beach shall be open for pedestrians between 5:00 p.m. and 10:00 p.m. on every Saturday (for the section) between Benteng Park and intersection of Jl. Monginsidi. All vehicles shall be prohibited during same time band.</li> <li>4) Total project cost is 4,960 Million Rupiah at 1988 prices.</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) Side walk provision plan <ul style="list-style-type: none"> <li>- To decrease the traffic accidents</li> <li>- To increase traffic capacity</li> <li>- To promote the good environmental aspects</li> <li>- To utilize the road as multi purpose facility.</li> </ul> </li> <li>2) Pedestrian overpass provision plan <ul style="list-style-type: none"> <li>- To decrease traffic accidents</li> <li>- To increase traffic capacity</li> </ul> </li> <li>3) Pedestrian's paradise provision plan <ul style="list-style-type: none"> <li>- To utilize the good perspective place as pedestrian's plaza</li> <li>- To promote the civilian activities</li> <li>- To increase the amusement aspects of civilian.</li> </ul> </li> </ol>		
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<b>Fig. 8.2.4</b>	<b>Plan Location Map (Short Term Plan)</b>
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>			

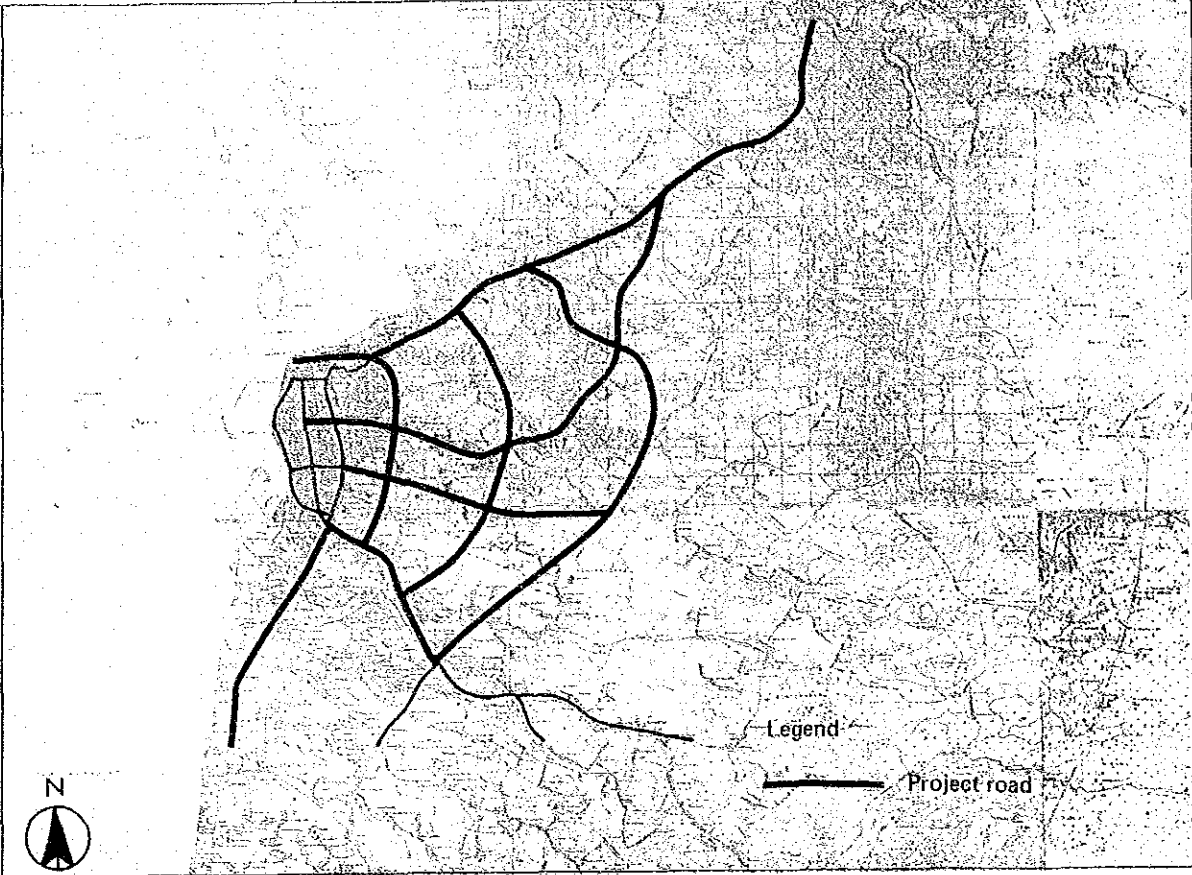


Name of Plan	Bus Facilities Improvement Project	
Project Location Map		
Outline of Plan	<ol style="list-style-type: none"> <li>1) Bus bay is provided for 43 bus stops.</li> <li>2) Bus stop markings are provided for 183 bus stops.</li> <li>3) Shelter and benches are installed at 64 bus stops.</li> <li>4) Bus terminal is improved for 9 terminals.</li> <li>5) Total project cost is 838 Million Rupiah at 1988 prices.</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) It is necessary to increase the operational efficiency of the terminals and to improve bus passenger services.</li> <li>2) It is necessary to improve bus passenger services and to secure smooth traffic flow, and to ensure traffic safety when buses stop to load/unload passengers.</li> </ol>	
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<b>Fig. 8.2.5</b> <b>Plan Location Map (Short Term Plan)</b> <b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>

Name of Plan	Becak Transport Improvement Project	
Project Location Map	 <p style="text-align: right;">Legend        ----- Becak Zone        _____ Becak Lane</p>	
Outline of Plan	<p>1) Procedure</p> <p>Step 1 The becak is shut out from major intersections and road sections and becak entry prohibition shall be implemented at above locations.</p> <p>Step 2 The becak service shall be limited within certain areas.</p> <p>Step 3 The becak service shall be phased out in consideration of road congestion and bus service (expansion of routes and increase of service frequency) shall be provided instead of becak service.</p> <p>2) Total project cost is 112 Million Rupiah at 1988 prices.</p>	
Necessity of Project	<p>1) It is necessary to secure the function of arterial road and to decrease becak accidents.</p>	
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<p>Fig. 8.2.6 Plan Location Map (Short Term Plan)</p> <p style="text-align: center;"><b>JAPAN INTERNATIONAL COOPERATION AGENCY</b></p>

Name of Plan	Traffic Regulation Project	
Project Location Map		
Outline of Plan	<ol style="list-style-type: none"> <li>1) One way system <ul style="list-style-type: none"> <li>- Changing the one way section at Jl. Bulusaraung near intersection of Jl. Sudirman - Jl. Bulusaraung.</li> <li>- One way system shall be introduced to the intersection of Jl. Masjid Raya - Jl. Sunu.</li> <li>- The one way regulation shall be changed into two ways regulation on Jl. Gowa Raya at Pa'baeng-baeng after implementation of Jl. Gowa Raya widening.</li> </ul> </li> <li>2) Parking <ul style="list-style-type: none"> <li>- Parking enforcement is strengthened at the place where traffic flow is influenced by parking vehicles.</li> <li>- On street parking lot indication in CBD is improved.</li> </ul> </li> <li>3) Traffic education park <p>This park (area = 10 ha) is developed to have traffic and amusement facilities for citizen at Barombong.</p> </li> <li>4) Total project cost is 2,242 Million Rupiah at 1988 prices.</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) One way system <ul style="list-style-type: none"> <li>- to secure smooth traffic</li> <li>- to decrease traffic accidents</li> </ul> </li> <li>2) Parking <ul style="list-style-type: none"> <li>- to secure smooth traffic</li> <li>- to prevent random parking</li> </ul> </li> <li>3) Traffic education park <ul style="list-style-type: none"> <li>- to educate proper driving manner</li> <li>- to improve pedestrian's crossing attitude</li> </ul> </li> </ol>	
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<b>Fig. 8.2.7</b> <b>Plan Location Map (Short Term Plan)</b> <b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>

Project Name	Long Term Project (Stage I)	
Project Location Map		
Project Outline	<ol style="list-style-type: none"> <li>1) Inner Ring Road is constructed as 4-lanes, L=9,950 m</li> <li>2) Jl. Gowa Jaya (Urip Sumoharjo) is widened as 2-lanes to 4-lanes, L=27,000 m</li> <li>3) Jl. Gowa Raya (St. Alauddin) is widened as 2-lanes to 4-lanes, L=6,550 m</li> <li>4) Industrial Estate Access Road is constructed as 2-lanes, L=3,250 m</li> <li>5) Total project is 58,395 Million Rupiah at 1988 prices</li> </ol>	
Necessity of Project	<ol style="list-style-type: none"> <li>1) Existing road network can not accommodate increased future traffic volume in 1994.</li> <li>2) This road network is economically and technically feasible.</li> <li>3) B/C and IRR are presented as 2.2 and 23.3% respectively.</li> <li>4) This road network encourages the regional development and the economic activity of Ujung Pandang area.</li> </ol>	
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<b>Fig. 8.2.8</b>
<b>Project Location Map Long Term Project (Stage I)</b>		
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>		

Project Name	Long Term Project (Stage II)					
Project Location Map						
Project Outline	<ol style="list-style-type: none"> <li>1) All road segments (1-17) are improved and constructed as 2-lanes or 4-lanes road.</li> <li>2) A part of Jl. Gowa Jaya (Urip Sumoharjo) is widened as 4-lanes to 6-lanes road.</li> <li>3) Total improvement and construction road length is 99,480 meters.</li> <li>4) Total project cost is 171,944 Million Rupiah at 1988 prices.</li> </ol>					
Necessity of Project	<ol style="list-style-type: none"> <li>1) Existing road network is can not accommodate increased future traffic demand in 2009.</li> <li>2) This road network is economically and technically feasible.</li> <li>3) This road network encourage the various development needs and economic activities of Ujung Pandang area.</li> <li>4) B/C and IRR are presented as 1.7 and 18.7% respectively.</li> </ol>					
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		<table border="1" style="width: 100%;"> <tr> <td style="width: 15%; text-align: center;">Fig. 8.2.9</td> <td style="text-align: center;">Project Location Map Long Term Project (Stage II)</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>JAPAN INTERNATIONAL COOPERATION AGENCY</b></td> </tr> </table>	Fig. 8.2.9	Project Location Map Long Term Project (Stage II)	<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>	
Fig. 8.2.9	Project Location Map Long Term Project (Stage II)					
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>						

### 8.3 Project Cost Estimate

#### 1) Cost Estimate

In Chapters 5 and 6, each segmental project cost is estimated. Based on this segmental project cost, the project cost of Urgent Action, Short Term and Long Term Plans are calculated in Million Rupiah at 1988 prices as shown below.

a) Short Term (1994) Project Cost	=	19,261 Million Rp
b) Long Term (1994) Project (Stage I) Cost	=	50,480 Million Rp
c) Long Term (2009) Project (Stage II) Cost	=	113,549 Million Rp
Total	=	183,290 Million Rp

The breakdown of the project cost of each plan is presented in Table 8.3.1. to Table 8.3.3.

**Table 8.3.1. Short Term Project Cost**

Unit: Million Rupiah at 1988 prices

Name of Project	Project Size	Project Cost	Remarks
1. Road Widening	15,850 m	7,915	Segment 13,15,3
2. Intersection Improvement	19 locations	1,146	
3. Pedestrian Facility Improvement	29 routes	4,960	
4. Road Rehabilitation	14 routes	2,043	
5. Bus Facilities Improvement	196 locations	843	
6. Becak Improvement	2 routes	112	
7. Traffic Regulation	4 locations	2,242	
Total		19,261	

**Table 8.3.2 Long Term Project (Stage I) Cost**

Unit: Million Rupiah at 1988 prices

Name of Project	Project Size	Project Cost	Remarks
Inner Ring Road Construction	9,950 m	11,844	Segment 1, 2, 3
Jl. Gowa Jaya (Urip Sumoharjo) Widening	27,000 m	18,770	13, 14
Jl. Gowa Raya (St. Alauddin) Widening	6,550 m	6,160	15, 16
Jl. Toll Widening (Prof. Dr. Ir. Sutami)	11,500 m	19,289	17
Industrial Access Road Construction	3,250 m	2,334	7
Total	58,250 m	58,395 <sup>*1</sup>	-7,915 <sup>*2</sup> 50,480 <sup>*2</sup>

Note :

- \*1 Total cost includes road widening project cost (7,915) in Urgent Plan.
- \*2 Net Short Term Project cost

**Table 8.3.3. Long Term Project (Stage II) Cost**

Unit: Million Rupiah at 1988 prices

Name of Project	Project Size	Project Cost	Remarks
Inner Ring Road Construction	9,950 m	13,817 <sup>*1</sup>	Segment 1, 2, 3
Middle Ring Road	12,920 m	21,456	4, 5, 6
Outer Ring Road Construction	17,100 m	23,285	7, 8, 9
Center Radial Road Construction	8,750 m	18,630	10, 11
South Radial Road Construction	5,710 m	27,798	12
Jl. Gowa Jaya Widening (Urip Sumoharjo)	27,000 m	31,566 <sup>*2</sup> 9,945 <sup>*3</sup>	13,14
Jl. Gowa Raya Widening (St. Alauddin)	6,550 m	6,160	15, 16
Jl. Toll Widening (Prof. Dr. Ir. Sutami)	11,500 m	19,287	17
Total	99,480 m	171,944 <sup>*4</sup>	-58,395 <sup>*5</sup> =113,549 <sup>*5</sup>

Note :

- \*1 Segment 1 is 4 lanes.
- \*2 Segment 13 is 6 lanes.
- \*3 Grade Separated Intersection Cost
- \*4 Total cost includes total project cost of Short Term Plan.
- \*5 Net Long Term Project Cost

## **8.4. High Priority Projects**

### **8.4.1 Basic Consideration**

In the previous sections, Short Term Projects, Long Term (Stage I) and Long Term (Stage II) Projects are proposed based on technical viewpoints, economical conditions and socio-economic aspects in Ujung Pandang area.

Usually, high priority is given to a project in consideration of technical, economic and political aspects. The high priority project should be consistent with the following basic consideration items :

- a) to keep in balance with increased future traffic demand.
- b) to meet the schedules of housing, industrial and other development.
- c) to formulate a road network configuration according to road functions and characteristics.
- d) to keep in balance with development policies of Indonesian Government.

### **8.4.2. High Priority Projects**

Taking into account the technical, economical and political aspects and basic consideration of a high priority, the Long Term Projects (Stage I) and Short Term Projects that is Traffic Management Projects are proposed as the high priority projects in the Study.

The high priority projects are presented as follows and their locations are illustrated in Fig. 8.4.1:

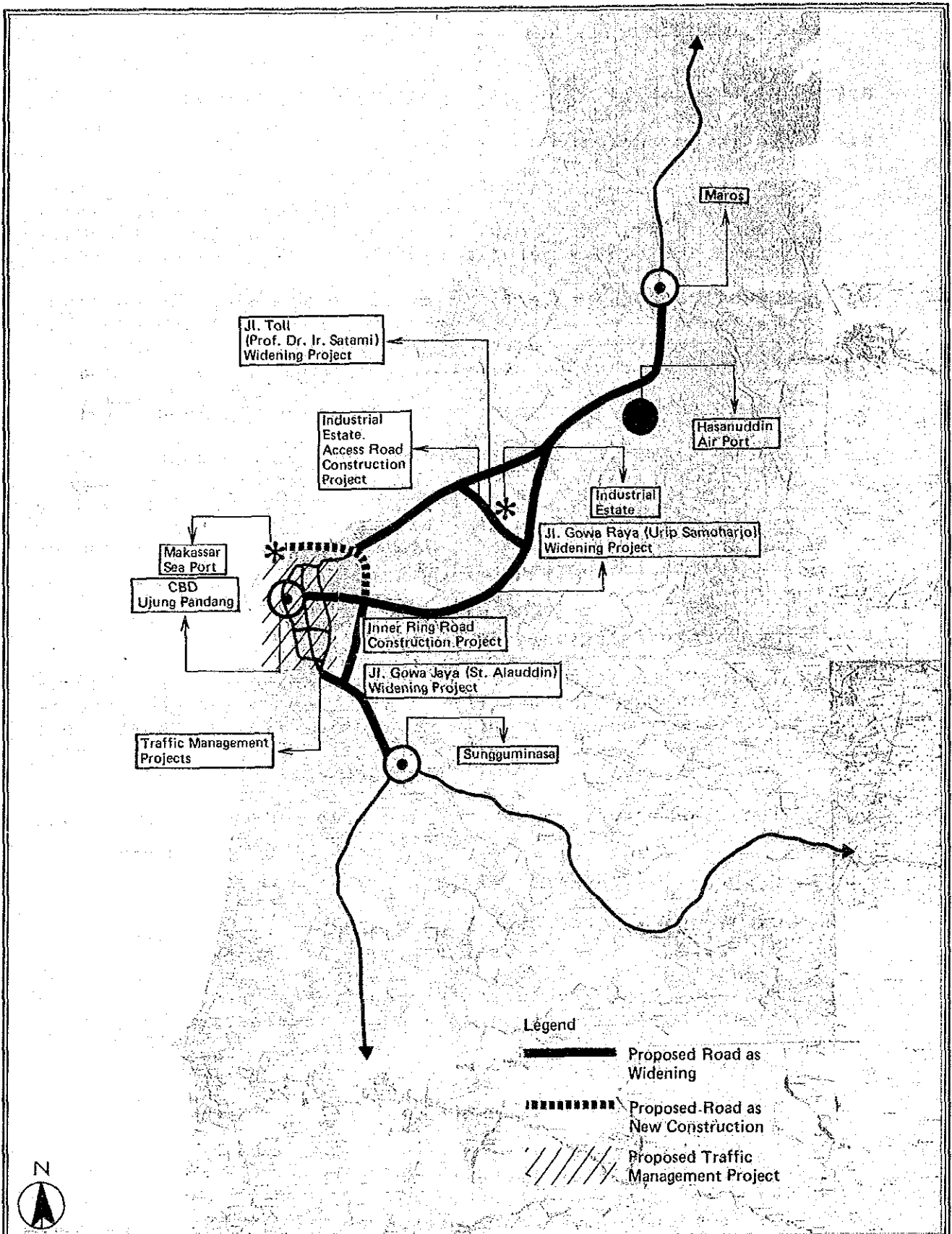
#### **1) Highway Development Projects**

- a) Jl. Gowa Jaya (Urip Sumoharjo) Widening Project
- b) Jl. Gowa Raya (St. Alauddin) Widening Project
- c) Jl. Toll (Prof. Dr. Ir. Sutami) Widening Project
- d) Inner Ring Road Construction Project
- e) Industrial Estate Access Road Construction Project

#### **2) Traffic Management Projects**

- a) Intersection Improvement Projects
- b) Road Rehabilitation Projects
- c) Pedestrian Facilities Improvement Projects
- d) Bus Facilities Improvement Projects
- e) Becak Transport Improvement Projects
- f) Traffic Regulation Improvement Projects





**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig.  
8.3.1**

**High Priority Project**

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