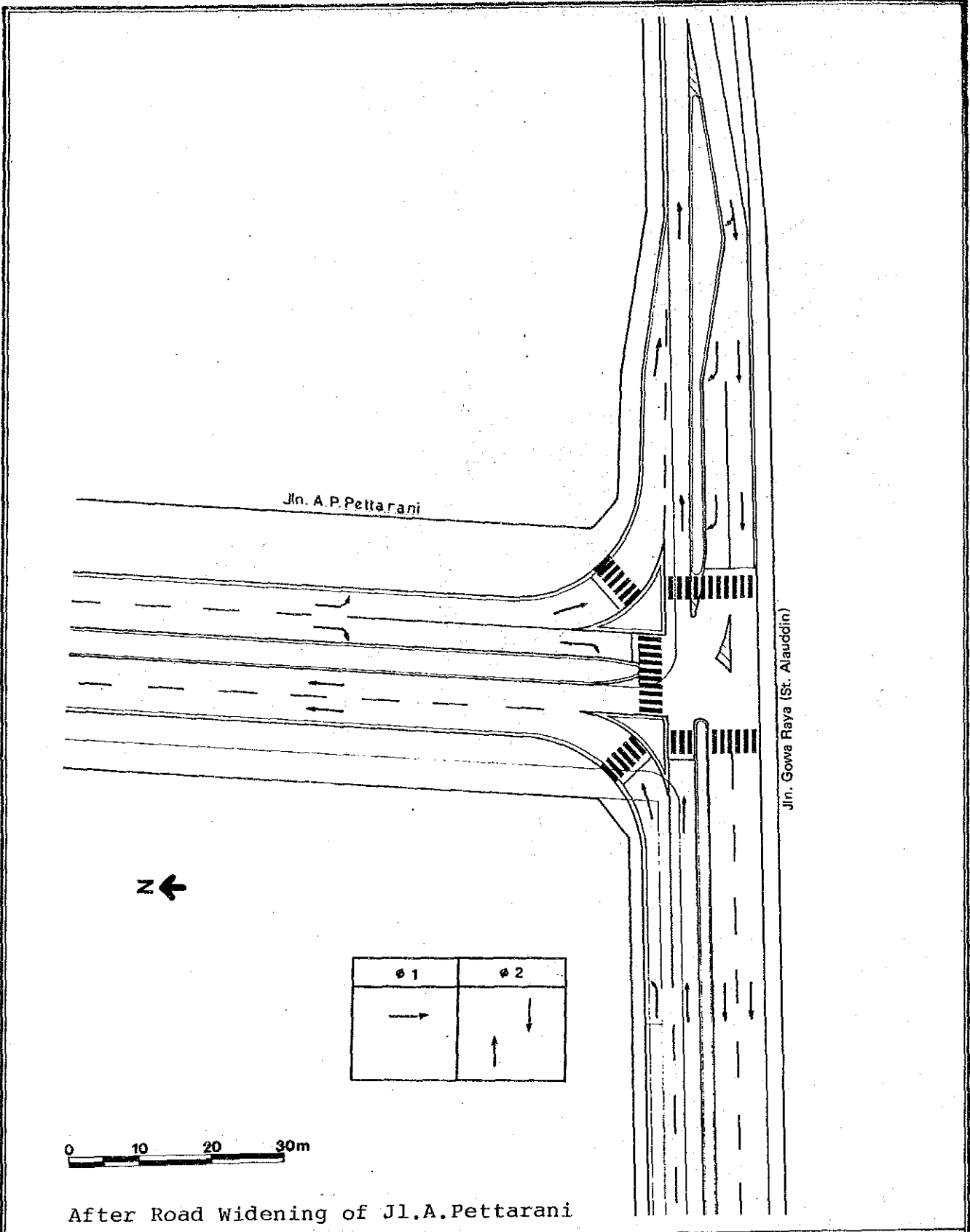


**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig.**  
6.4.15

**Improvement Plan for Intersection  
of Jl. Veteran - Jl. Landak**

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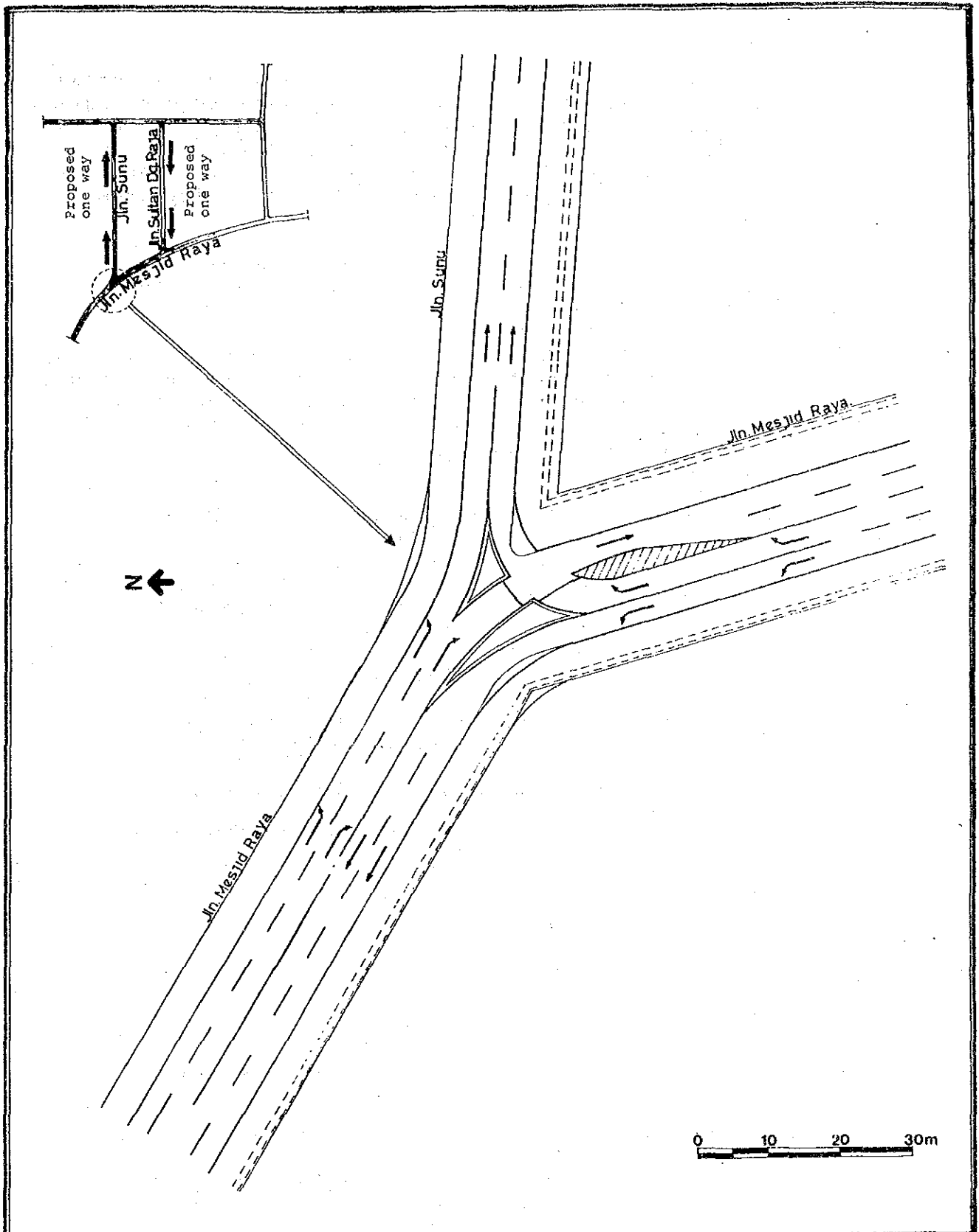
After Road Widening of Jl.A.Pettarani

UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY

Fig.  
6.4.16

Improvement Plan for Intersection  
of Jl. Gowa Raya (St. Alauddin)  
- Jl. A. Pettarani

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**UJUNG PANDANG AREA  
 HIGHWAY DEVELOPMENT STUDY**

**Fig.  
 6.4.17**

**Improvement Plan for Intersection  
 of Jl. Sunu - Jl. Mesjid Raya**

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tion. In the planning, in order to decrease dangerous conflicts in the intersection and to secure smooth traffic, it is proposed to make Jl. Sunu one way road and to improve channelization of this intersection. In addition, Jl. Sultan Dg. Raja is to be made into one way road to become a pair road with Jl. Sunu. Improvement plan is illustrated in Fig. 6.4.17

- (15) Intersections of Jl. Veteran - Jl. Monginsidi, Jl. A. Pettarani - Jl. Dg. Sirua and Jl. A. Pettarani - Jl. Hertasning

In order to avoid dangerous traffic conflicts, signals shall be installed at these intersections and provision of an exclusive right turn lane shall be done at these intersections as well as at the intersection of Jl. Veteran- Jl. Kerung - Kerung.

#### 6.4.5 Cost Estimation of Intersection Improvement Plan

The improvement cost (direct construction cost) for intersections is estimated based on unit cost quoted by a thousand Rupiah in 1988 prices. It includes the geometric improvement cost, replacement cost of signals and marking cost. The details of unit cost is described in the Section 5.9 "Long Term Plan".

Cost estimation for the intersection improvement on each selected intersection is shown in Table 6.4.2.

Table 6.4.2 Improvement Cost of Intersection

Intersection Name	Improvement Cost	Remark
1. Jl. Bandang/Jl. Ujung	41,382	
2. Jl. Bandang/Jl. Mesjid Raya	32,846	
3. Jl. Jend.A.Yani/Jl. Cokro-aminoto/Jl. Sudirman	4,852	
4. Jl. Mesjid Raya/Jl. Andalas	7,291	
5. Jl. Sudirman/Jl. Bawakaraeng	15,774	
6. Jl. Bawakaraeng/Jl. Latimojong	19,667	
7. Jl. Bawakaraeng/Jl. Veteran	32,635	
8. Jl. Mesjid Raya/Jl. Gowa Jaya	32,568	
9. Jl. Gowa Jaya/Jl. Andi Pettarani	238,589	
10. Jl. Veteran/Jl. Kerung-Kerung	23,048	
11. Jl. Ratulangi/Jl. Kakatua	3,324	
12. Jl. Veteran/Jl. Gowa Raya/Jl. Kumala	92,244	including installation of signal
13. Jl. Veteran/Jl. Landak	55,004	- ditto -
14. Jl. Rusa/Jl. Monginsidi	2,530	
15. Jl. Gowa Raya/Jl. Andi - Pettarani	66,601	including installation of signal
16. Jl. Sunu/Jl. Mesjid Raya	1,862	
17. Jl. Veteran/Jl. Monginsidi	60,548	including installation of signal
18. Jl. A. Pettarani/Jl. Dg. Sirua	60,548	- ditto -
19. Jl. A. Pettarani/Jl. Hertasning	60,584	- ditto -
<b>Total</b>	<b>851,861</b>	

### 6.4.6 Priority for Improvement

As a practical means for determination of priority for implementation of intersection improvement, following three criteria were adopted and examined. Then, priority was determined in consideration of three respective criterion combined together from the engineering view point.

#### (1) Saturation degree

The priority shall be placed according to the saturation degree, which shows the congested condition at intersection.

#### (2) Importance of intersection

The priority shall be placed according to the importance of the intersection in the road network and traffic management.

#### (3) Traffic accidents at intersection

The priority shall be placed according to frequency or number of traffic accidents occurred at the intersection.

After the careful examination based on above criteria, priority for intersection improvement was decided and shown in Table 6.4.3.

Table 6.4.3 Priority of Intersection Improvement

Road Name	Criteria	Saturation degree	Importance of Intersection	Accident	Priority
1. Jl. Bawakaraeng/ Jl. Veteran		●	●	●	①
2. Jl. Gowa Jaya Jl. A. Pettarani		●	●	●	
3. Jl. Mesjid Raya/ Jl. Gowa Jaya		●	●	●	③
4. Jl. Veteran/Jl. Landak		●	●	●	
5. Jl. Bawakaraeng/ Jl. Lattimojong		●	●	●	
6. Jl. Veteran/Jl. Rucilang/ Jl. Kunala		●	●	●	③
7. Jl. Sandang/Jl. Mesjid Raya		●	●	●	
8. Jl. Sandang/Jl. Ujung		●	●	●	
9. Jl. Veteran/Jl. Verung kerung		●	●	●	
10. Jl. Patolangi/Jl. Kabatu		●	●	●	④
11. Jl. Gowa Raya/ Jl. A. Pettarani		●	●	●	
12. Jl. Sunu/Jl. Mesjid Raya		●	●	●	
13. Jl. J. A. Yani/Jl. Cokro aminoto/Jl. Sudirman		●	●	●	
14. Jl. Sudirman/Jl. Bawa Karaeng		●	●	●	
15. Jl. Veteran/Jl. Mongin sidi		●	●	●	③
16. Jl. A. Pettarani/Jl. Dg. Sirua		●	●	●	
17. Jl. A. Pettarani/Jl. Hertanising		●	●	●	
18. Jl. Sunu/Jl. Mongin sidi		●	●	●	③
19. Jl. Mesjid Raya/ Jl. Andales		●	●	●	⑦

● High  
● Low

#### 6.4.7 Flyover Plan in Future

According to the estimation of traffic volume in 2009, traffic volume on Jl. Bawakaraeng and Jl. Gowa Jaya (Urip Sumoharjo) up to Hasanuddin University will be 69,000 - 94,000 veh/day. Therefore, by 2009, these roads should have 6 lanes to accommodate the estimated traffic volume.

In addition, there are other arterial road intersections with above two roads such as Jl. A.Pettarani and Middle Ring Road, which should also absorb large traffic volume (58,000 - 60,000 veh/day) in 2009.

In general, it is common to provide a flyover at the intersection where a wide road with four or more lanes cross an other wide road with six or more lanes from view point of traffic capacity and traffic safety. This flyover is normally constructed over the road which has large volume of both total and through traffic after considering physical condition of the intersection.

In this study, the flyover is planned and proposed at three locations as shown in Fig. 6.4.18. In addition, a sketch of typical flyover plan is illustrated in Fig. 6.4.19. The construction cost of three flyovers is estimated at 9,945 million Rupiah in total.

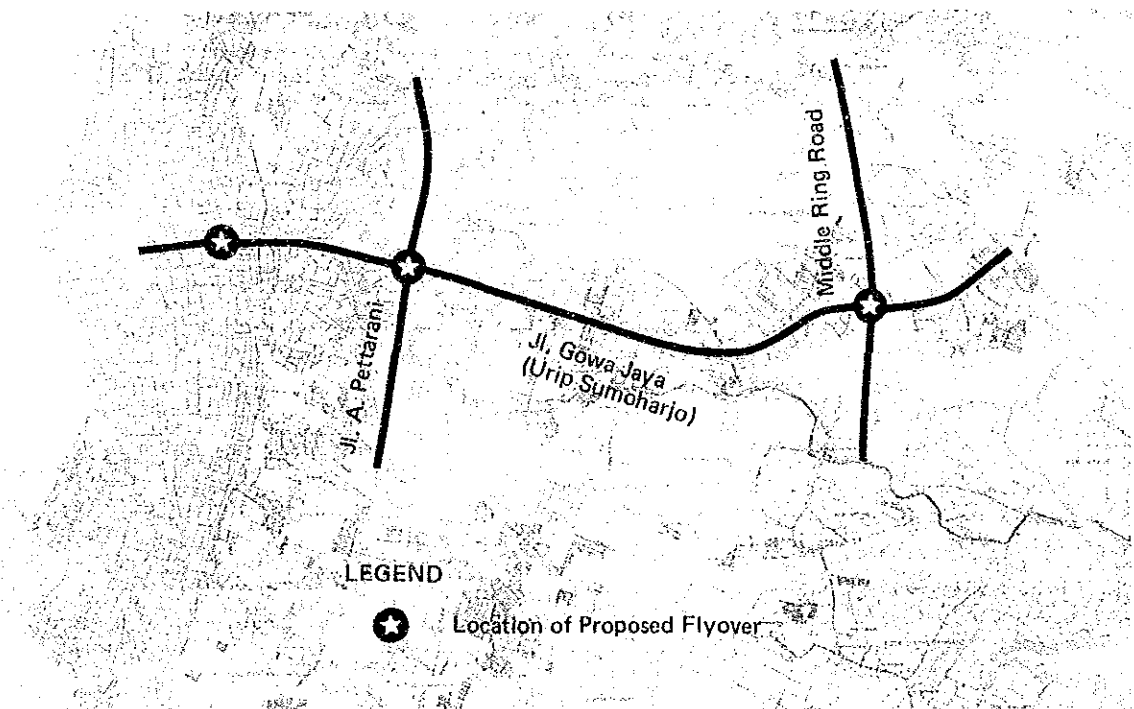
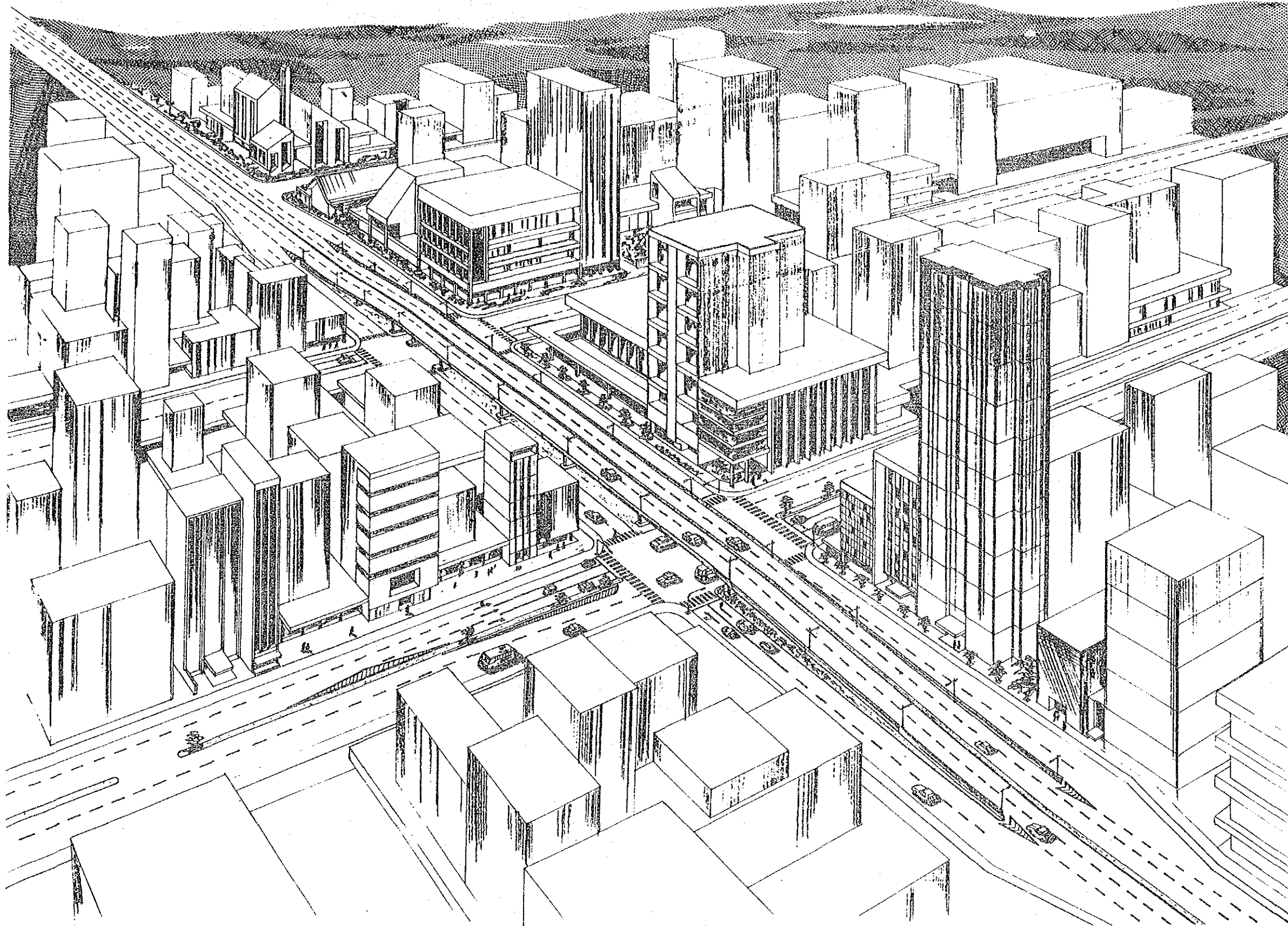


Fig. 6.4.18 Proposed Flyover Locations



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**Fig.**  
6.4.19

Imaginary Perspective of Flyover Plan

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#### 6.4.8 Future Improvement Plan

It is necessary to improve an intersection when it has following characteristics:

- a) Heavy congestion occur frequently. (saturation degree exceeds 0.9)
- b) Many traffic accidents occur.
- c) It has an important role in traffic management operation for a wide area including it.

When the improvement is planned, the following items shall be considered:

- a) Traffic volume on each approach lane
- b) Traffic composition
- c) Site condition
- d) Traffic safety
- e) Signal facilities

## 6.5 Road Rehabilitation Plan

### 6.5.1 Basic Guideline

Most of the main roads in Ujung Pandang are paved, but structural and pavement conditions of some of the roads can not be said satisfactory. Moreover, road shoulders are usually left unpaved, which leads to the mixed use of various vehicles on the carriageway because all vehicles tend to pass through the paved part. On the other hand, some roads located in the newly developing residential area such as Gunung Sari (Perumnas) are obliged to be closed in a rainy season due to surface flooding.

These road conditions are causing obstruction to the smooth flow of traffic and its immediate and effective solution shall be the rehabilitation of existing roads by means of improvement of road structure and pavement including shoulder.

### 6.5.2 Selection of Road Sections to be Rehabilitated

#### 1) Selection of Road Sections

It is desirable that all road sections which have bad pavement conditions are rehabilitated irrespective of road classification within the framework of road improvement scheme of the city. Therefore, in this study the road sections to be rehabilitated are selected based on the following considerations:

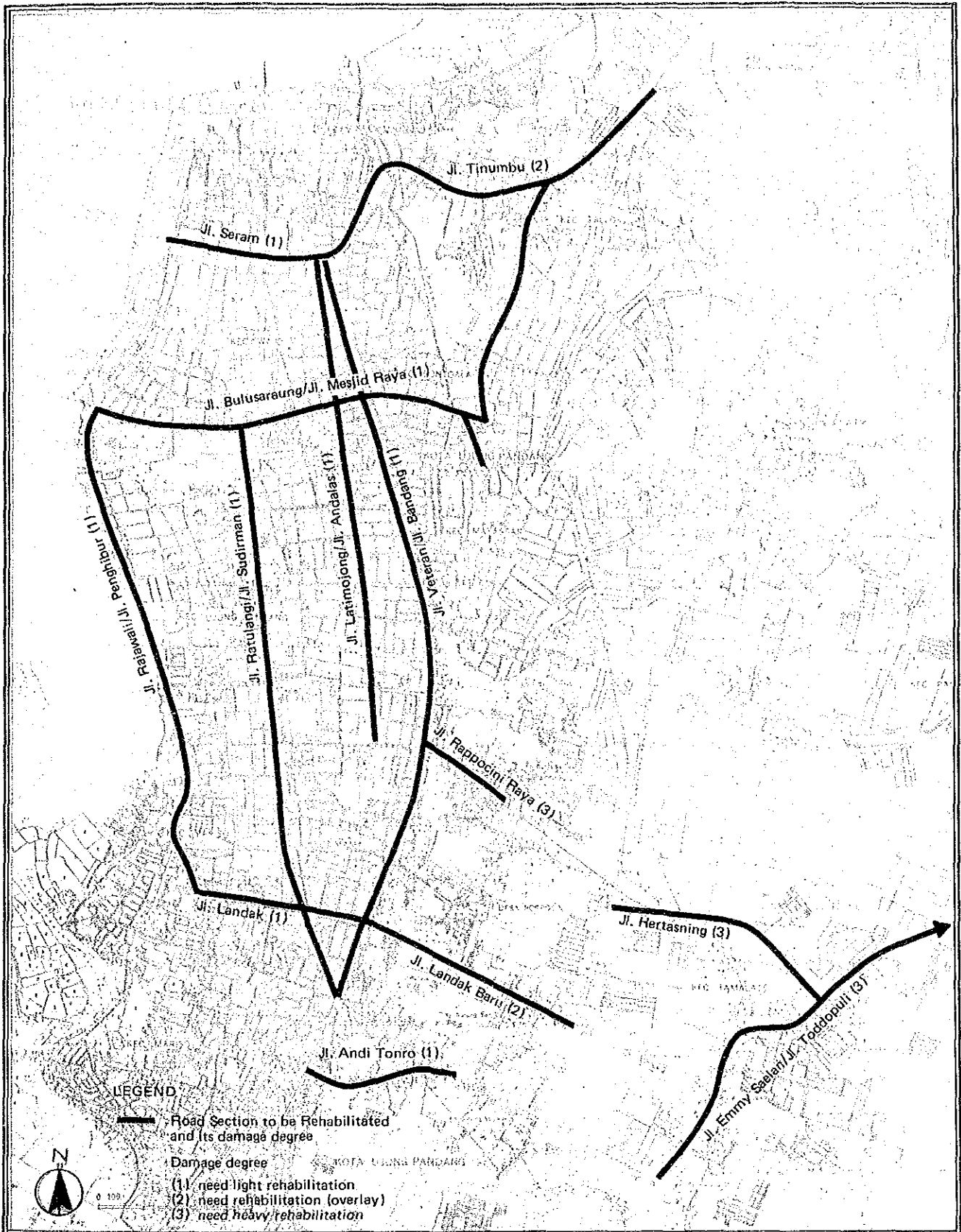
- a) The road sections which require urgent rehabilitation
- b) The important roads in the present road network
- c) The road sections which have heavy traffic volume

Based on the above mentioned considerations and careful reconnaissance survey, the selection of the road sections are carried out. Fig. 6.5.1 shows the selected road sections to be rehabilitated.

#### 2) Judgment of Damage Degree of the Road

In order to make the rehabilitation plan for each selected road section, it is necessary to judge the damage degree of the road at selected road sections. In this study, the damage degree of the road by visual judgment at the site can be classified into three types.

- a) The condition which needs a light rehabilitation as follows:
  - Fill up pot-hole
  - Patching
  - Surface treatment
  - Repair roughness near underground structure



**UJUNG PANDANG AREA  
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**Fig. 6.5.1**

**Road Rehabilitation Locations and Their Conditions**

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- Shoulder pavement.
- b) The condition which needs an ordinary rehabilitation such as over lay and partial reconstruction.
- c) The condition which needs a heavy rehabilitation such as reconstruction including raising subgrade.

The damage degree of selected road sections are indicated in Fig. 6.5.1.

### 6.5.3 Rehabilitation Plan

The suitable rehabilitation method for selected road sections are decided based on the analysis of damage degree of the road, traffic condition and physical site condition including flood condition in rainy season as described in Section 5.5.6. The suitable rehabilitation plan for selected road sections are summarized in Table 6.5.1. In addition, it is proposed that improvement/provision of road markings is carried out after implementation of rehabilitation for selected road sections.

**Table 6.5.1 Rehabilitation Plan for Selected Road Section**

Road Name	Rehabilitation Plan
1. Jl. Veteran/Jl. Bandang	- to maintain shoulder pavement - to repair roughness near culvert by parching - to install kerb
2. Jl. Ratulangi/Jl. Sudirman	- to pave the shoulder
3. Jl. Landak	- to carry out surface treatment
4. Jl. Rajawali/Jl. Penghibur	- to carry out surface treatment - to fill up some pot-hole - to improve roughness near culvert
5. Jl. Bulusaraung/ Jl. Mesjid Raya	- to pave shoulder
6. Jl. Latimojong/Jl. Andalas	- to repair roughness near drainage pipe
7. Jl. Seram	- to pave shoulder - to fill up some pot-hole - to repair roughness near culvert by patching
8. Jl. Sunu	- to carry out overlay in order to improve longitudinal roughness
9. Jl. Tinumbu	- to pave shoulder - to carry out overlay
10. Jl. Landak Baru	- to pave shoulder - to repair roughness near culvert by patching - to carry out overlay up to 200 m from Jl. Veteran
11. Jl. Rappocini Raya	- to cover cracking - to replace pavement - to raise subgrade (up 1m)
12. Jl. Hertasing	- to carry out pavement - to install pipe culvert (space 1m)
13. Jl. Emmy Saelan/Jl Toddopuli	- to raise subgrade (up 1.0 m) - to carry out pavement - to install pipe culvert (space 1m)
14. Jl. Andi Tonro	- to repair surface stripping - to maintain shoulder

#### 6.5.4 Cost Estimation of Road Rehabilitation Plan

The rehabilitation of the proposed roads will require the total amount of 1,518,764 thousand Rupiah. The rehabilitation cost (direct construction cost) for rehabilitation plan on each selected road is shown in Table 6.5.2. Rehabilitation cost are estimated based on unit cost as quoted by thousand Rupiah in 1988 prices. Unit cost is described in the Section 5.9.

Table 6.5.2 Road Rehabilitation Cost

Unit: thousand Rupiah  
1988 Prices

Road Name	Improvement Length (m)	Improvement Cost
1. Jl.Veteran/Jl.Bandang	4,940	192,152
2. Jl.Ratulangi/Jl.Sudirman	4,120	39,552
3. Jl.Landak	3,750	180,822
4. Jl.Rajawali/Jl.Penghibur	750	37,800
5. Jl.Bulusaraung/Jl.Mesjid Raya	1,830	8,784
6. Jl.Latimojong/Jl.Andalas	4,360	42,976
7. Jl.Seram	930	4,849
8. Jl.Sunu	1,780	108,224
9. Jl.Tinumbu	3,630	207,640
10. Jl.Landak Baru	770	12,936
11. Jl.Rappocini Raya	200	17,812
12. Jl.Hertasning	1,620	284,342
13. Jl.Emmy Saelan/Toddoppuli	3,210	346,632
14. Jl.Andi Tonro	1,230	34,243
Total	33,120	1,518,764

#### 6.5.5 Priority of Rehabilitation

The improvement plan for each selected road section is described in previous section. Here, as a practical means for determination of priority for implementation of road rehabilitation, following three criteria were adopted and examined. Then, priority is determined in consideration of three respective criterion combined together from the engineering viewpoint.

##### (1) Road classification

The priority shall be placed in order of the higher standard of road classification, artery to collector and to local road.

(2) Traffic volume

The priority shall be placed according to the traffic volume.

(3) Damage degree

The priority shall be placed according to the damage degree of the road.

After careful examination by above criteria, priority for road rehabilitation has been decided and as shown in Table 6.5.3.

Table 6.5.3 Priority of Road Rehabilitation

Road Name	Criteria	Road Classification	Traffic volume	Damage degree	Priority
1. Jl. Veteran/Jl. Bandung		●	●	●	①
2. Jl. Bulusaraung/Jl. Mesjid raya		●	●	●	
3. Jl. Ratulangi/Jl. Sudirman		●	●	●	②
4. Jl. Timunba		●	●	●	
5. Jl. Sunu		●	●	●	③
6. Jl. Landak		●	●	●	
7. Jl. Rajawali/Jl. Penghibur		●	●	●	
8. Jl. Landak baru		●	●	●	
9. Jl. Seran		●	●	●	
10. Jl. Rappocini Raya		●	●	●	④
11. Jl. Hertasing		●	●	●	
12. Jl. Emmy Saelan/Toddopuli		●	●	●	⑤
13. Jl. Andi Tosro		●	●	●	
14. Jl. Latimojong/Andalas		●	●	●	

● High  
●  
●  
● Low

### 6.5.6 Future Rehabilitation Plan

The pavements suffer damages from traffic loads, weathering conditions or superannuation of pavements themselves, and these damages would cause decrease in serviceability of pavements as well as disturbance for the smooth and safe traffic flows, if proper rehabilitation would not be carried out. In order to avoid these situations, it is necessary to rehabilitate the damage of pavements at appropriate timing and using suitable rehabilitation method.

It is necessary to have the criteria for evaluation of pavement damage in order to judge the rehabilitation timing and method. For an example, Table 6.5.4 shows damage type criteria for rehabilitation.

**Table 6.5.4 Damage Type Criteria for Rehabilitation (Asphalt Pavement)**

Road Classification	Item		Skid Resistance Coefficient	Longitudinal Roughness(mm)	Cracking Ratio(%)	Pot hole diameter (cm)
	Rutting Depth(mm)	Bump (mm) Abutment Culvert Box				
Highways with heavy traffic	30 - 40	60 60	0.25	4.0 - 5.0 (σ) (3 m profile)	30 - 40	20
Other highways	40	60 -	-	-	40 - 50	20

In addition, it is necessary to carry out the rehabilitation for pavement damage at appropriate timing and suitable method based on pavement condition obtained from daily visual assessment.

## 6.6 Pedestrian Facilities Improvement Plan

### 6.6.1 Planning Guideline

The present road traffic problems in Ujung Pandang City is pointed out in previous section. In Ujung Pandang, the average trip length by a pedestrian on urban roads is not very long. This is partly due to the local hot climate and to the discomfortness associated with walking because pedestrians often have to walk on unpaved shoulder and to make dangerous road crossings. In fact, many traffic accidents involving pedestrians have occurred on many roads in the city.

Taking into account road traffic problems, pedestrian behavior and careful reconnaissance survey, the following pedestrian facility problems are found out:

- a) Pedestrians are often obliged to walk on carriageway mixed with motorcycles and vehicles as well as becaks by lack of sidewalk along the roads. This is one of the causes to decrease the traffic capacity and to increase the traffic accidents.
- b) Pedestrians are crossing everywhere on the roads. This is also one of the causes to increase the traffic accidents and to decrease the traffic capacity of the roads.
- c) Pedestrians are walking on carriageway even though there are space for walking along the roads because this space is not properly maintained as sidewalk facility.
- d) The arterial roads and collector roads in urbanized area of Ujung Pandang City are deteriorating the beauty of roads and good environment of city perspective due to the shoulder space and outside of shoulder space being not well maintained.

In order to solve the above mentioned pedestrian facility problems, the following three (3) pedestrian facility provision plans are proposed:

#### (1) Sidewalk Provision Plan

The aims of this plan are as follows:

- To decrease the traffic accidents
- To increase the traffic capacity
- To promote the good environmental condition
- To utilize the road as multi purpose facility.

#### (2) Pedestrian Overpass Provision Plan

The aims of this plan are as follows:

- To decrease the traffic accidents
- To increase the traffic capacity



### (3) Pedestrian's Paradise Provision Plan

The aims of this plan are as follows:

- To utilize the good perspective place as pedestrians plaza
- To promote the civilian activities
- To increase the amusement aspect of civilians

The outline of the above mentioned proposed provision plans are described in the proceeding Sections 6.6.2 to 6.6.5.

### 6.6.2 Sidewalk Provision Plan

#### 1) Selection of Sidewalk Provision Site

Considering the purpose of this plan, traffic conditions in Ujung Pandang City and sidewalk conditions, the site selection criteria for provision of sidewalks are identified as shown below.

- a) Around the primary and secondary schools
- b) Around the park and market
- c) Along the arterial roads and collector roads
- d) Around the places where many traffic accidents occur
- e) Around the places where many pedestrians gather
- f) Around the historical monument for pedestrian walk network.

According to above criteria, careful reconnaissance survey, data collection and analysis, the sidewalk provision location sites are selected as shown in Fig. 6.6.1.

#### 2) Improvement Measure

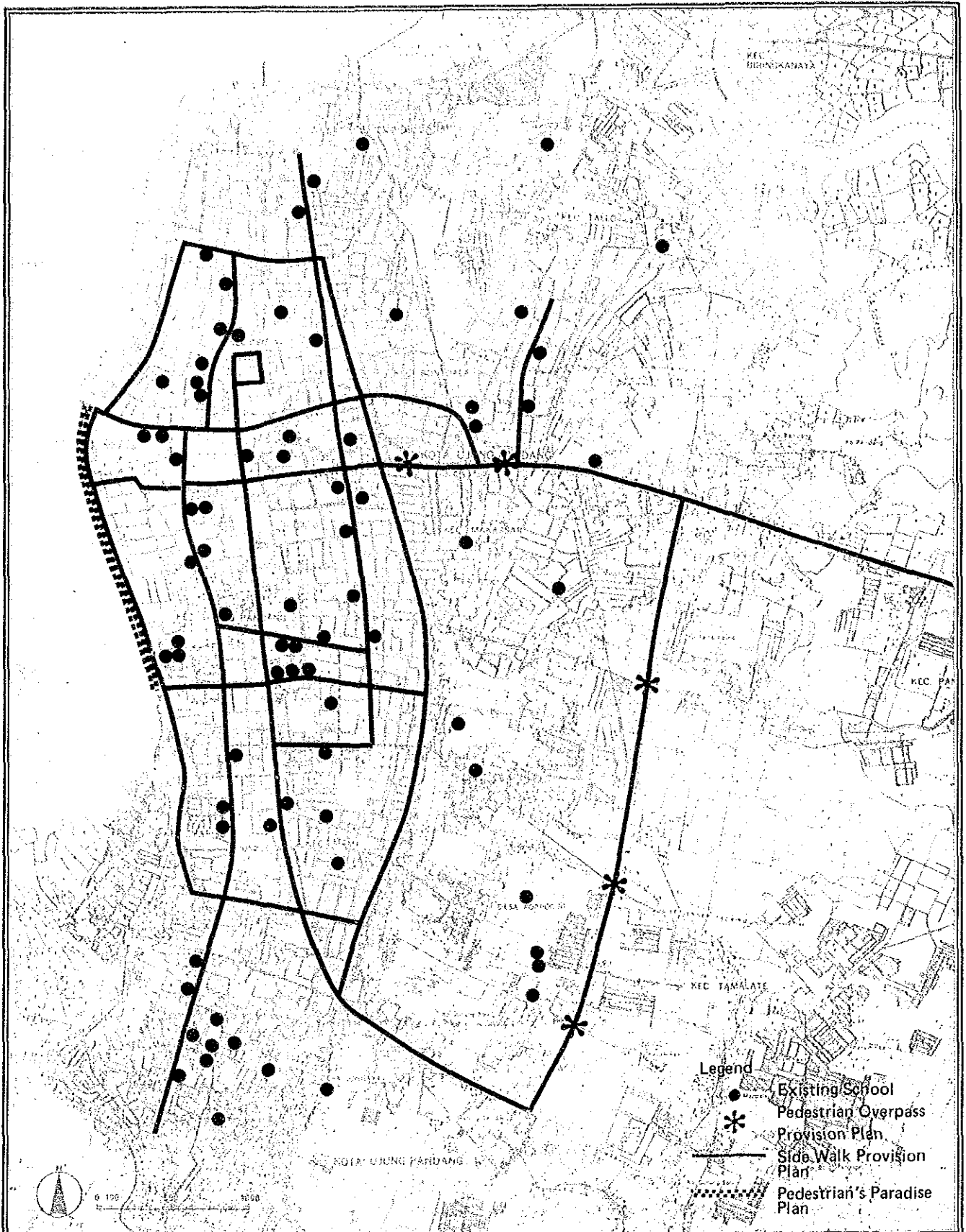
The sidewalk is provided on both sides of the selected roads by new construction, and some existing sidewalks are also improved by re-pavement.

##### (1) Sidewalk Width

The sidewalk width is determined based on the survey on right of way, carriageway width, and space of shoulder at selected locations.

##### (2) Pavement Type

There are two (2) pavement types for sidewalks; one is concrete block pavement and the other is cement concrete pavement or asphalt concrete pavement. The cement concrete pavement for sidewalks is adopted considering economical aspects and in view of easy maintenance. The sidewalk is separated from carriageway by concrete curb for protection of the traffic accidents.



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**Fig.  
6.6.1**

**Location of Pedestrian Facility  
Provision Plan**

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### (3) Cross-Section

The typical cross-sections of sidewalks on each selected location are adopted as shown in Fig. 6.6.2 and Fig. 6.6.3 considering above mentioned matters.

### 3) Construction Cost Estimate

Total construction cost of sidewalk provision plan is estimated as 3,464,504 thousand Rupiah in 1988 prices. The construction cost of selected locations is shown in Table 6.6.1.

**Table 6.6.1 Construction Cost of Each Location**

Unit: Thousand Rupiahs  
1988 Prices

Name of Road	Improvement Length	Unit Cost	Cost
1. Seram	920	28.2	25,944
2. Suiawesi	1,230	60.2	74,046
3. Irian	1,260	30.1	37,926
4. Andalus - Rusa	3,210	100.6	322,926
5. Veteran	4,940	86.5	427,310
6. A.Yani - Bulusaraung	2,180	46.5	101,370
7. Mesjid Raya	1,200	53.6	64,320
8. Pongtiku	950	77.1	73,245
9. Bawakaraeng	1,530	57.5	87,975
10. Rajawali	1,580	59.2	93,536
11. Penghibur	780	35.2	27,456
12. Pasar Ikan	870	78	67,860
13. Ujung Pandang	490	69.6	34,104
14. Cendrawasih - S. Riyadi	5,060	78	394,680
15. Sudirman	1,690	146.6	247,754
16. Ratulangi	1,490	88.4	131,716
17. Ratulangi	620	40.4	25,048
18. Gowa Jaya (U.Sumoharjo)	1,310	89.3	116,983
19. Gowa Jaya (U.Sumoharjo)	3,570	65.1	232,407
20. Saddang	970	63.0	61,110
21. Monginsidi	1,750	70.3	123,375
22. Lanto Dg Pasewang	590	64.9	38,291
23. Kakatua	740	68.6	50,760
24. Pettarani	540	48.9	24,939
25. Pettarani	3,770	114.7	432,419
26. Gowa Raya (St.Alauddin)	910	77.1	70,161
27. Gowa Raya (St.Alauddin)	240	79.0	18,960
29. Pattimura	290	111.9	23,451
<b>Total</b>	<b>45,170</b>		<b>3,464,504</b>

### 4) Priority of Provision

The sidewalk provision plan is described in previous section. Here, as a practical means for determination of priority of implementation of provision of sidewalks, following three criteria were adopted and examined. Then, priority is determined in consideration of three respective criterion combined together from the engineering view point.

#### (1) Road classification

The priority shall be placed in order of the higher standard of road classification, artery to collector and to local road.

Name of Road	Existing Typical Road Section	Improved Typical Road Section	Improved length [ m ]
1. Seram			920
2. Sulawesi			1,230
3. Irian			1,260
Andalas - 4. Latimojong - Rusa			3,210
5. Veteran			4,940
6. Akhmad Yani - Bulusaraung			2,180
7. Masjid Raya			1,200
8. Pongriku			950
9. Bawakaraeng			1,530
10. Rajawali			1,580
11. Penghibur			780

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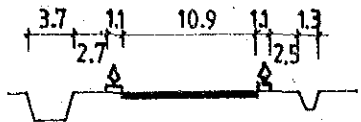
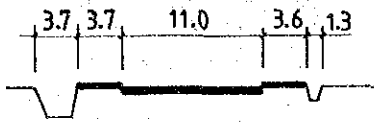
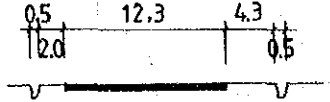
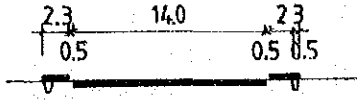
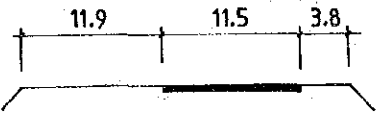
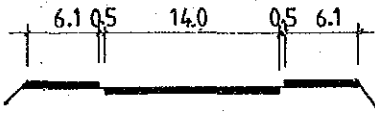
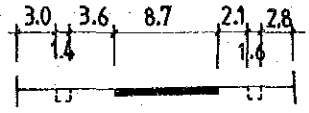
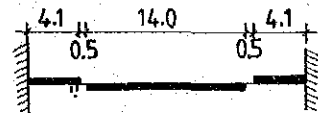
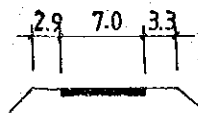
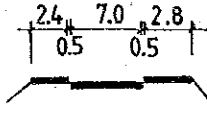
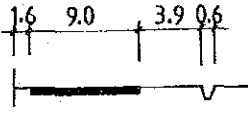
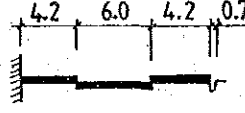
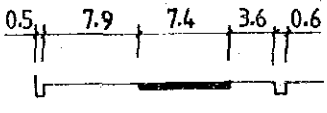
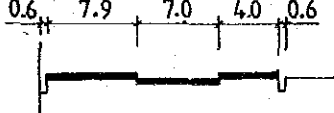
Fig.

6.6.2 (1)

Side Walk Improvement Measurement

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Name of Road	Existing Typical Road Section	Improved Typical Road Section	Improved length (m)
12. Pasar Ikan			870
13. Ujung Pandang			490
14. Cendrawasih - Slamet Riyadi			5,060
15. Sudirman			1,690
16. Ratulangi			1,490
17. Ratulangi			620
18. Gowa Jaya (Urip Sumoharjo)			1,310
19. Gowa Jaya (Urip Sumoharjo)			3,570
20. Sungai Sadang			970
21. Monginsidi			1,750
22. Lanto Dg. Pasewang			590
<b>UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY</b>		Fig. 6.6.2 (2) Side Walk Improvement Measurement	
<b>JAPAN INTERNATIONAL COOPERATION AGENCY</b>			

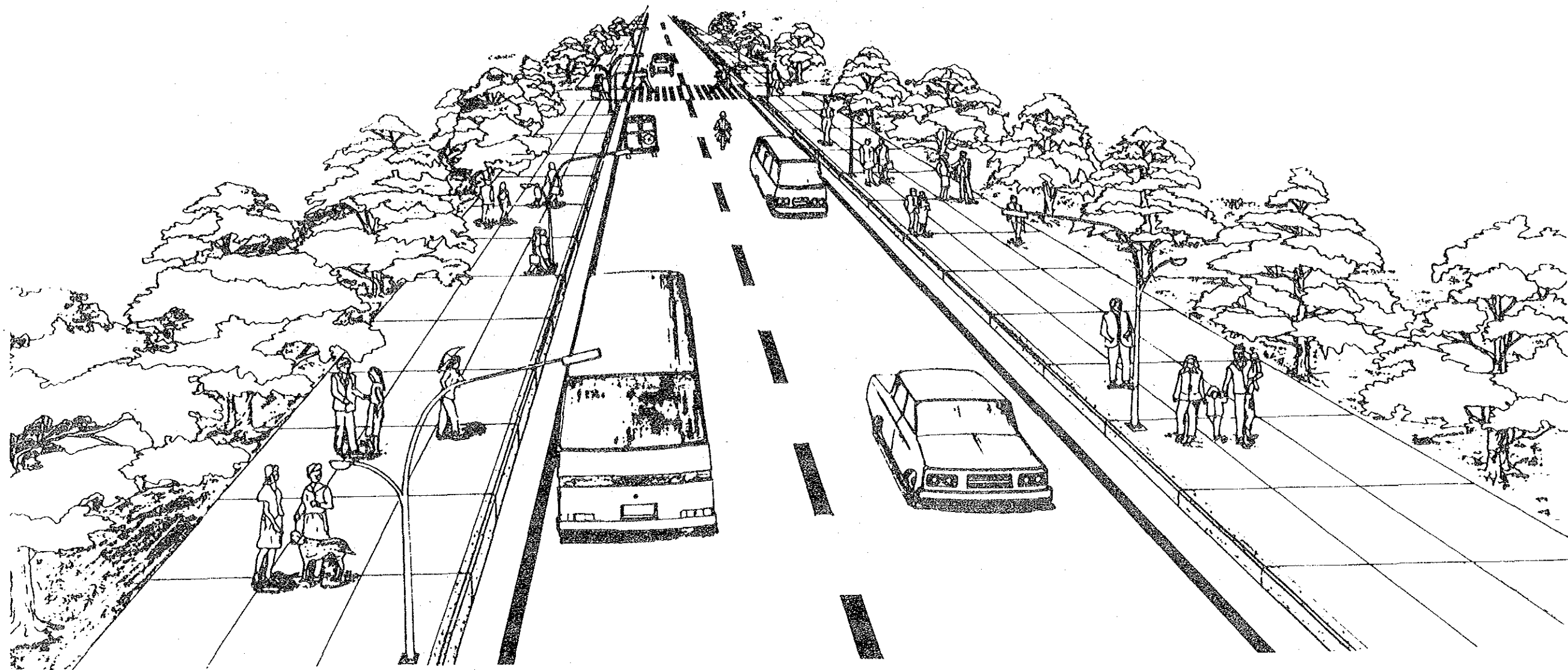
Name of Road	Existing Typical Road Section	Improved Typical Road Section	Improved length (m)
23. Kakaktua			740
24. Pettarani			510
25. Pettarani			3,770
26. Gowa Raya (St. Alauddin)			910
27. Gowa Raya (St. Alauddin)			520
28. Thamrin			240
29. Pattimura			290

**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig. 6.6.2 (3)**

**Side Walk Improvement Measurement**

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UJUNG PANDANG AREA HIGHWAY DEVELOPMENT STUDY

Fig.  
6.6.3

Imaginary Sketch After Provision of Side Walk

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(2) Traffic accident regarding pedestrian

The priority shall be placed according to the number of accidents regarding pedestrian.

(3) Pedestrian demand

The priority shall be placed according to the pedestrian demand on the road.

After careful examination by above criteria, priority for sidewalk provision was decided and shown in Table 6.6.2.

Table 6.6.2 Priority of Sidewalk Provision

Road Name	Criteria	Road Classification	Accident	Pedestrian demand	Priority
1. Jl. Sudirman-J. Ratu-langi		●	●	●	
2. Jl. Bawakaraeng raya		●	●	●	①
3. Jl. Gowa Jaya		●	●	●	
4. Jl. Rajawali-Jl. Penghibur, Jl. Pasar ikan		●	●	●	
5. Jl. Veteran-J. Bandang		●	●	●	②
6. Jl. A. Pettarani		●	●	●	
7. Jl. Gowa Raya		●	●	●	
8. Jl. A. Yani-J. Bulusa raung, Jl. Masjid Raya		●	●	●	
9. Jl. Latimojong-Jl. An dalas		●	●	●	③
10. Jl. Monginsidi		●	●	●	
11. Jl. Irian		●	●	●	
12. Jl. Kakatua-J. Landak		●	●	●	
13. Jl. Seram		●	●	●	
14. Jl. Cendrawasih		●	●	●	④
15. Jl. Ariefrate-Jl. Ka jaolalido		●	●	●	
16. Jl. Sungai Saddang		●	●	●	
17. Jl. L. Dg. Pasewang		●	●	●	⑤
18. Jl. Pongtiku		●	●	●	⑥
19. Jl. Sulawesi		●	●	●	

● High  
●  
● Low

## 5) Future Plan to be Considered

In the previous section, the sidewalk provision plans for short term action program are proposed based on minimum construction cost and maximum environmental consideration. These proposed sidewalk provision plans are not sufficient in the future for long term action program. When a future sidewalk provision plan is identified, following concepts will be considered:

- a) To increase the sidewalk quantity, in terms of length
- b) To improve the sidewalk quality

Regarding sidewalk quantity, the following concrete plan will be proposed:

- a) To provide the sidewalk on the collector roads and local roads.

Regarding sidewalk quality, following concrete plans will be proposed:

- a) To introduce a "Pedestrian Mall"
- b) To provide a "Community Street".

Imaginary plan of the "Pedestrian Mall" and "Community Street" are described below.

### (1) Pedestrian Mall

The mall is a level and shaded sidewalk encompassing a vast area which enables pedestrians to window-shop or walk in peace without being disturbed or endangered by traffic. It is restricted to pedestrian use only by prohibiting the entry of traffic but allows emergency entry by ambulances or fire engines. Amenities such as plant trees, scrubs, and street furnitures are introduced to provide the people with a low-cost leisure facilities giving a panoramic view of the surrounding street vista while relaxing on the benches.

### (2) Community Street

An innovative pedestrianised street concept found commonly amongst the residential areas in Japan. The street design takes into consideration of usage by both the community cars driven at low speed and pedestrians alike. Where possible and practical, the footpath is extended to mid-block alleys to provide a continuous pedestrian access. The concept introduces a part of the 'woonerf' concept originated in Holland. Ornamental and attractive settings are part and parcel of the community street concept to enhance its image as a unique and prominent landmark. The objectives are foreseeable with an introduction of unique street lamps and attractive paving blocks on carriageway and the sidewalk.

### (3) Pedestrian Path Network

In addition, it is recommended that the pedestrian path network, which connects special places such as historical places and amusement centers, should be considered in order to increase comfort of pedestrians including tourists in the future plan. The primary purposes of the network are :

- a) To revitalize the urban areas of Ujung Pandang and its economic viability by providing major linkages between core area of major activities.
- b) To enable pedestrians to window-shop or walk in peace without being disturbed or endangered by traffic.

In the pedestrian path network, the core areas of major activities such as Karebosi Park, Benteng and Losari Beach street shall be connected each other, and in order to increase the comfort of pedestrians, plans along the network shall also be provided.

It is recommended that the side walks at Jl. Penhgiburu are widened in accordance with development of water front and pedestrian's paradise plan in order to increase safety and comfort of pedestrians.

### 6.6.3 Pedestrian Overpass Provision Plan

#### 1) Selection of Pedestrian Overpass Provision Site

Considering the purpose of this plan, the site selection criteria are identified as shown below.

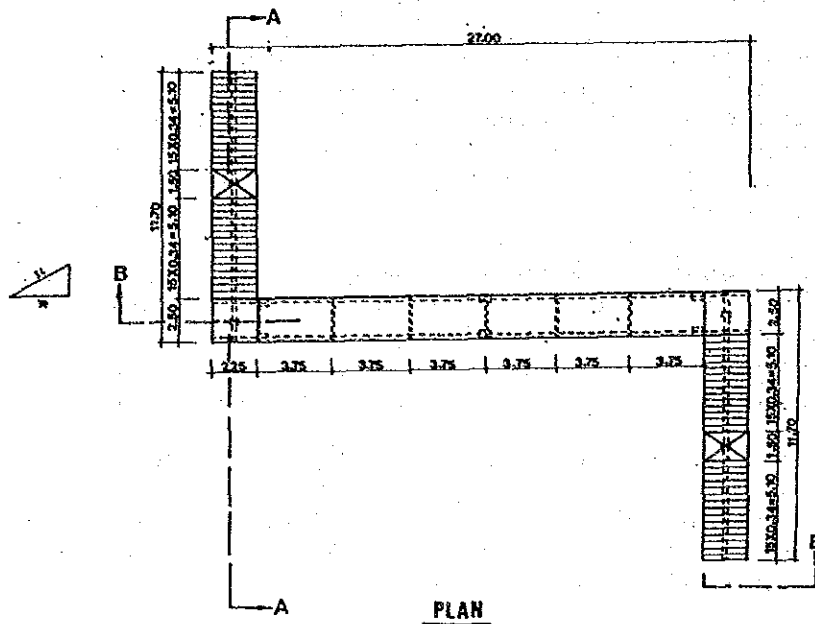
- a) To provide to the places where not only many pedestrians are crossing the road but also the traffic volume is high.
- b) To provide to the places where many traffic accidents occur.
- c) To provide to the places where crossing length is comparatively long.

According to above mentioned site selection criteria, the reconnaissance survey and data collection and analysis are carried out to find out the pedestrian overpass provision sites.

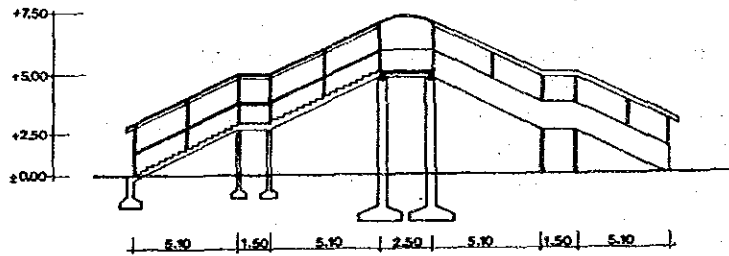
As the results of the examination, five (5) pedestrian overpass location sites are selected as shown in Fig. 6.6.1.

#### 2) Typical Pedestrian Overpass

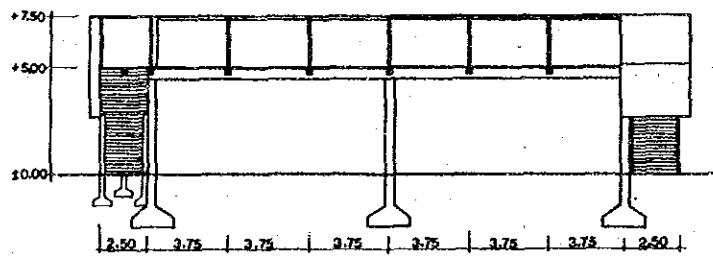
The typical pedestrian overpass is illustrated in Fig. 6.6.4.



**PLAN**



**A-A SECTION**



**B-B SECTION**

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HIGHWAY DEVELOPMENT STUDY**

**Fig. 6.6.4**

**Typical Pedestrian Overpass Design**

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### 3) Cost Estimate

The total cost of the pedestrian overpass is estimated as 222,140 thousand Rupiah in 1988 prices and each bridge cost is shown in Table 6.6.3.

**Table 6.6.3 Cost of Pedestrian Overpass**

Unit : Thousand Rupiah  
1988 Prices

No.	Items	Unit	Unit Cost	Volume	Cost
1.	Structure (concrete)	m <sup>3</sup>	354	112	39,648
2.	Fence	m	20	101	2,020
3.	Roof	m <sup>2</sup>	20	138	2,760
Sub-Total (One Pedestrian Overpass)					44,428
Total				5 sites	222,140

### 4) Priority of Implementation

In consideration of the site condition where pedestrian overpass is proposed, these overpasses are necessary to construct for improvement of pedestrian safety as soon as possible. Hence, it is desirable that these pedestrian overpasses are provided at the same time.

#### 6.6.4 Pedestrian's Paradise Plan

The "Makassar" is very famous in the world for good scenery especially for sun-set perspective. People usually go to the park or walk on the seaside road to enjoy the evening cool air. Every evening, many people come out together on Jl. Penghibur, running along Losari Beach to enjoy the evening cool air, eating at open snack stands lined up on this road or strolling lazily while looking at the sun-set view. Especially Saturday evening during 5:00 p.m. to 11:00 p.m., this seaside road is very crowded with families, young group or couples.

On the other hand, there is few amusement facilities in Ujung Pandang City. It is required that more amusement facilities are introduced in this city. Taking into account the above mentioned existing situation in Ujung Pandang City, the Pedestrian's Paradise Plan is proposed for enhancement of the evening recreation for the citizens, substituting reinforcement of the amusement facilities.

1) Selection of Site

The Jl. Penghibur is selected for this plan considering the purpose of the plan and the results of the reconnaissance survey. The selected site is illustrated in Fig. 6.6.1.

2) Outline of Plan

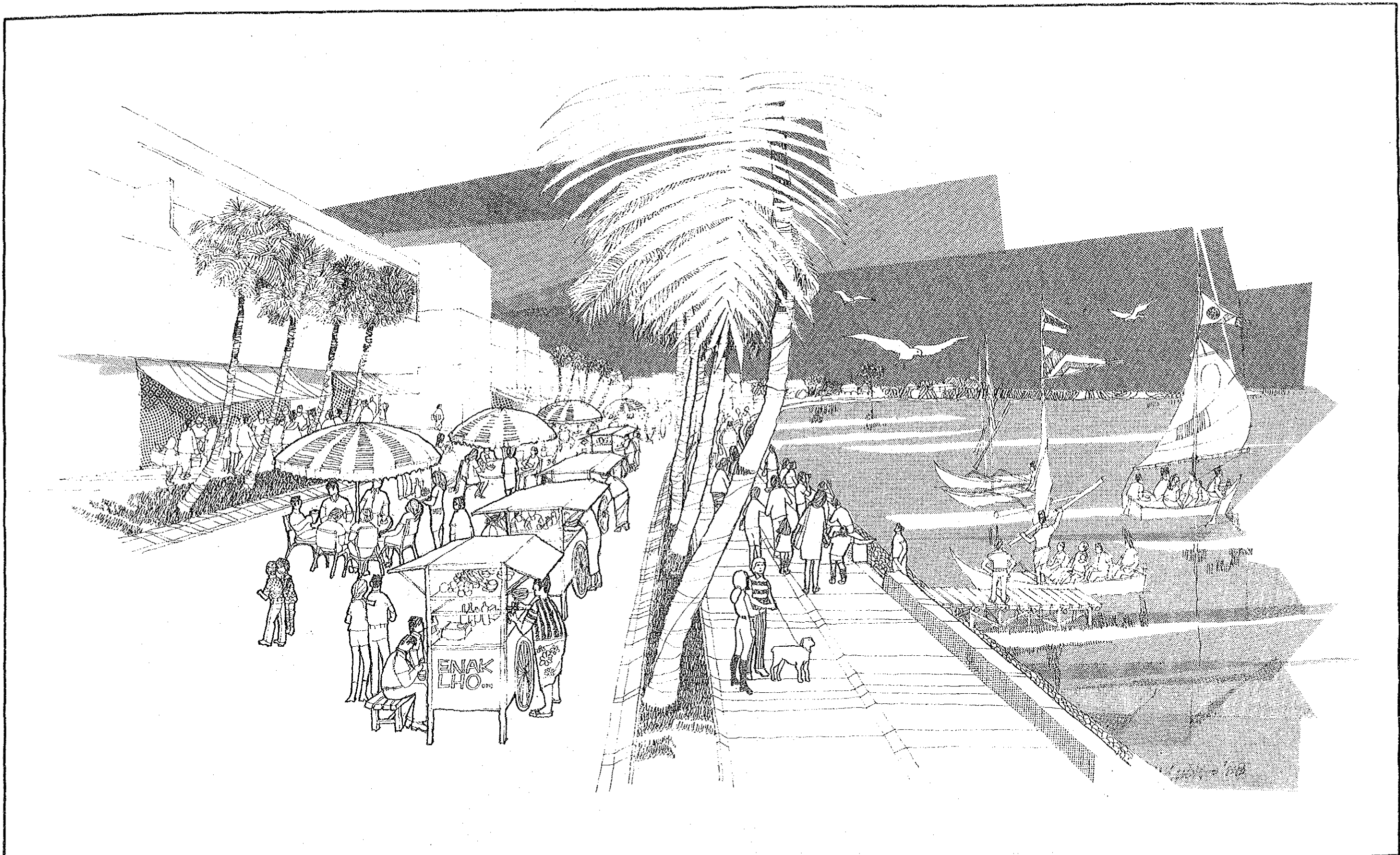
Contents of the plan are as follows:

- a) The becaks, bicycles, motorcycles and vehicles are prohibited to pass on the Jl. Penghibur.
- b) Prohibited section is from the Benteng Park to Jl. Monginsidi's intersection on the Jl. Penghibur.
- c) Prohibited time is from 5:00 p.m. to 10:00 p.m. on every Saturday.
- d) During 5 hours, people can use all the road space of Jl. Penghibur at their own disposals like enjoying evening cool air, eating-out or strolling without any fear of traffic accidents.

The imaginary perspective of this plan is shown in Fig. 6.6.5.

3) Construction Cost Estimation

The construction cost of the plan is nothing due to no improvement being required. However, many policemen are needed for traffic control and also for works of public relations.



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Fig.  
6.6.5

Imaginary Sketch of Pedestrian's Paradise

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## 6.7 Bus Facilities Improvement Plan

### 6.7.1 Transport System Consideration

#### 1) Short Term Plan

##### (1) Basic Consideration

Prior to the study of bus facilities improvement plan, it is required to make clear the existing public transportation system to formulate the future public transportation system. The population of the Ujung Pandang City in 1994, 2004 and 2009 were forecasted as 976,000, 1,312,000 and 1,520,000 respectively.

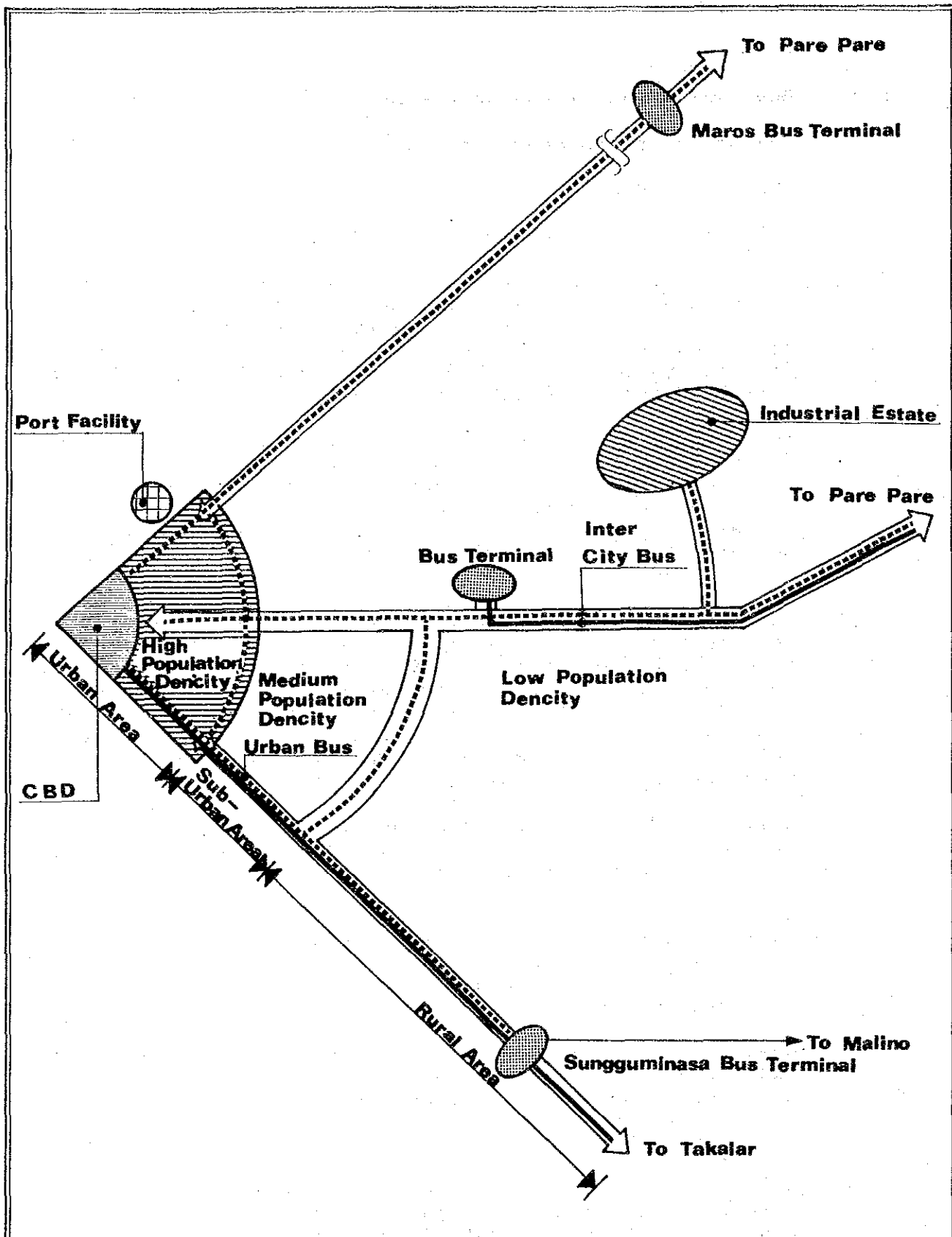
In view of further growth of motorization and limited urban space for road construction in the future, the improvement of public transportation would become an important measure to reduce traffic congestion. In this context, it would be necessary to consider bus related measures to encourage shift from private vehicle usage to bus ridership.

On the other hand, bus transport problems are often complicated. Most countermeasures do not normally produce immediate result as shown by an opening of a new road to alleviate traffic congestion. It is therefore a matter a fact that the solutions to bus transport problems need to be approached from the standpoint of a relatively long term undertaking. Various bus related measures must be implemented effectively at the same time, if not, the fundamental problems can never be solved. When the preparation of a bus transport improvement plan is carried out, the following two (2) tasks should be considered:

- a) To make clear the future role of bus transport
- b) To observe continuously the balance between the supply and demand of bus service vis-a-vis the overall traffic conditions and to implement various countermeasures efficiently.

However, in this study, preparation of Master Plan of the Ujung Pandang Area Highway Development is main task and improvement plan for an optimum solution of the public transport problems is not within the study's scope of work.

On the other hand, it is very important to introduce a strong reinforcement of public road transport system considering future growth in motorization. Therefore, in this study, one of the conceptual idea of the public transport system improvement plan is examined. The present public transport system of Ujung Pandang City is operated as described below and shown in Fig. 6.7.1.



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Fig.  
6.7.1

Present Bus Transport System

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- a) The urbanized area is served mainly by Becak, Pete-Pete and Urban Bus Systems.
- b) The sub-urban area is served mainly by Pete-Pete and Urban Bus Systems.
- c) The rural area is served mainly by Pete-Petes only.
- d) The intercity buses coming from northern parts of Ujung Pandang area stop at the Panaikang Bus Terminal.
- e) The intercity buses coming from southern and eastern parts of Ujung Pandang area are directly connected to the center of Ujung Pandang City.
- f) The urban bus routes are limited on a few roads and other areas are covered by Pete-Petes.

## (2) Basic Conceptual Plan

According to the above mentioned existing public transport system, and its problems as mentioned in previous section, following conceptual ideas regarding public transport system improvement plan shall be conceived.

- a) The number of becaks shall be decreased gradually taking into account decreasing traffic accidents and increasing traffic capacity.
- b) The number of pete-petes shall also be decreased and they shall be limited to operate within CBD and other selected areas taking into account decreasing the traffic accidents and increasing traffic capacity.
- c) The number of buses itself as well as bus routes should be strongly reinforced to operate in CBD, urban area, and suburban area taking into account the control of traffic demand in Ujung Pandang City, especially urbanized area.
- d) All intercity buses shall be terminated at a main bus terminal namely existing Panaikang Bus Terminal, and they can not pass through CBD or urbanized area.
- e) The bus facilities such as terminal facilities and bus stops shall be improved in order to increase bus services.

## 2) Long Term Plan

### (1) Basic Consideration

In accordance with the increase in the transport demand, public transport should be developed to provide a transport mode equally to all the people and to contribute to a decrease in the private vehicle use. Since the congestion degree in the year 2009 is estimated as 0.88, development of public transport should be carried out actively.

The present public transport is served by buses, mini-buses, microlets, pete-petes and becaks. These forms of public transport will remain in the future, however,

their roles may be changed in accordance with the following basic policy:

- a) Becaks will be gradually replaced by motorized vehicles such as buses, mini-buses, taxis, etc. Hence, becaks should be excluded from major roads and be limited to use only for short haul trips in a certain area.
- b) Bus size should be strategically selected in accordance with the transport demand. On the truck routes, pete-petes and microlets should be replaced by higher capacity buses. Accordingly, pete-petes and microlets should operate only for feeder routes. Taxi service will be enhanced in accordance with increasing taxi demand in the future.

In addition, for the purpose of enhancing public transport system, the following measures are to be considered:

- a) The function of existing major bus terminals will be changed.  
The intercity bus operation at Pasar Sentral, Panatikang and Pa'baeng-baeng should be shifted to the new terminals which will be constructed at the peripheral area of Ujung Pandang. Accordingly, those terminals are changed to exclusively urban bus use in the long term.
- b) The public transport capacity should be expanded by reorganizing the bus route pattern, increasing the service frequency, introducing exclusive bus lanes and replacing buses to higher capacity types.  
The reorganization of bus route network will be made by expanding the coverage area to the new residential zones and enhancing several trunk routes in conjunction with the construction of new terminals.
- c) The bus transport, however, has a limit in terms of transport capacity, since it is difficult to drastically expand the road spaces inside the built-up area. Hence, an introduction of a rail transit system might be examined to provide higher capacity of public transport in the future.

## (2) Basic Conceptual Plan

Based on the above mentioned basic consideration, following basic conceptual plan shall be conceived.

- a) Daya bus terminal at a developed sub-center, shall be utilized for intercity buses to/from the north and east directions via Maros, while Sungguminasa bus terminal shall be utilized for those to/from the south direction. These bus terminals are selected by the following reasons:

- i) In order to decrease traffic congestion in urban area, the intercity bus terminal shall be placed at boundary of urbanized area. Candidate bus terminal at Antang, however, is located near Sungguminasa bus terminal. Furthermore, its' function is enough for the intercity bus terminal.
- ii) According to the estimation of trips in 2009, their trips are about 9,900 trips per day. So, it will be necessary to establish two bus terminals, as one bus terminal planned for intercity buses has about 50<sup>1)</sup> bus berths.

The location site of Sungguminase bus terminal will be seleted as the same place as existing bus terminal, however, when the location site of Daya bus terminal will be selected, following study should be cuarried out.

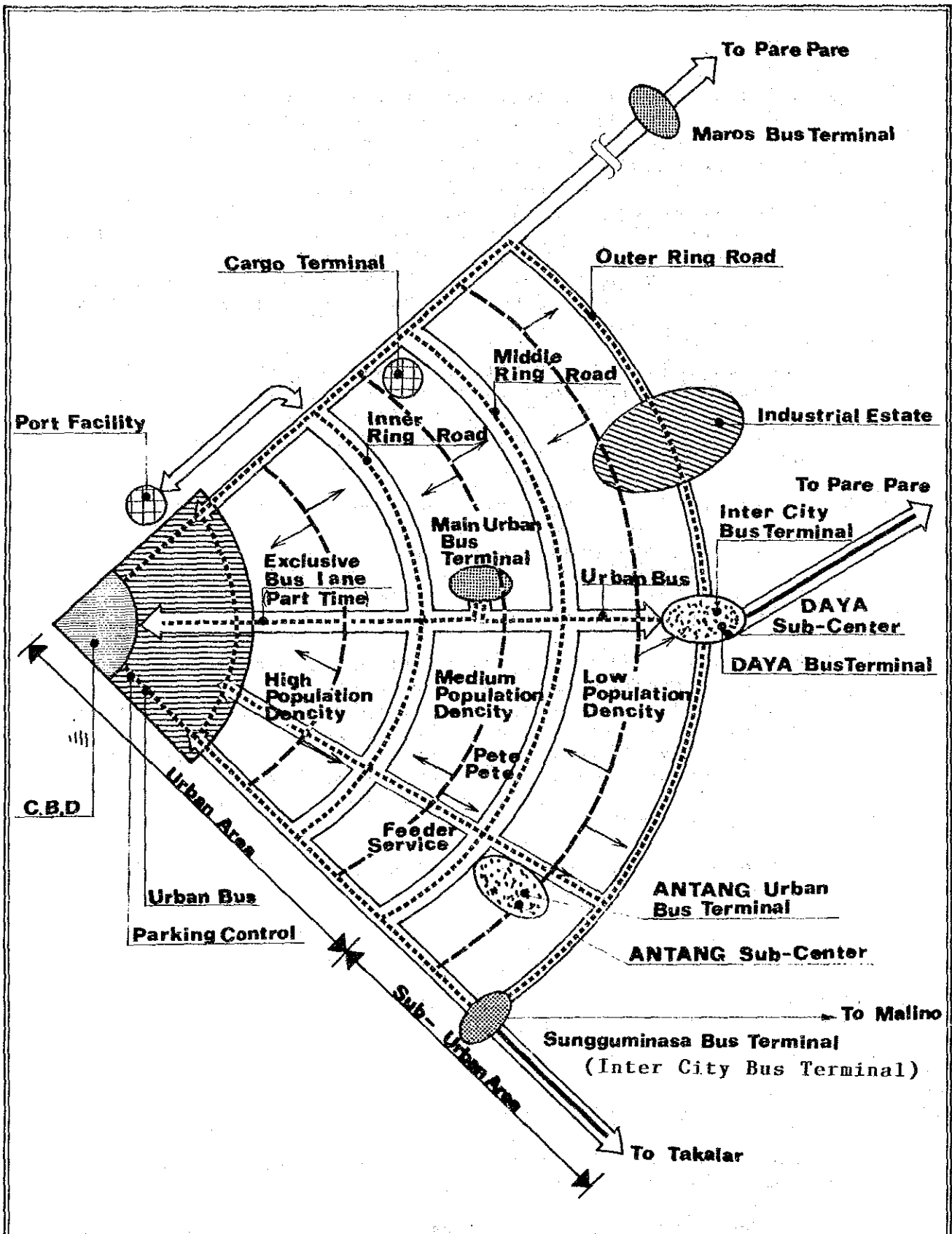
- i) Public transportation study especially bus transportation system.
  - ii) Retailled study for Daya sub-center.
  - iii) Relationship between bus terminal and Daya sub-center.
  - iv) Land acquisition survey.
- b) Panaikang bus terminal shall be used as a main urban bus terminal and the related urban bus routes shall be changed in accordance with volume of demand and policy of Ujung Pandang City regarding bus transport.
  - c) Exclusive bus lanes shall be provided on the trunk roads such as Jl. Gowa Jaya (Urip Sumoharjo) and Jl. Gowa Raya (St. Alauddin) in order to secure a regular bus operation.

Above mentioned conceptual plan in long term is illust-rated in Fig. 6.7.2.

---

1) This number is estimated based on the following asumptions :

- The Peak ratio of the number of arrivals is regarded as 10% of all.
- Departure/arrival frequency per one berth is 15times/hour.



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Fig. 6.7.2

Long Term Bus Transport  
System Conceptual Plan

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### 6.7.2. Planning Guideline of Bus Facility Improvement Plan

In order to solve the transport facility problems, bus terminal improvement plan and bus stop improvement plan are identified for the short term plan of the Study. The premises of preparation of these plans are as follows:

- a) Implementation of the proposed improvement plan should be completed by the year 1994 (within the period of short term plan) considering construction schedule.
- b) The proposed improvement plan should be made without land acquisition.
- c) Bus routes and location of the bus-stops should be kept same as the existing ones.

### 6.7.3 Selection of Locations to be Improved

In order to achieve the best effects by the short term improvement plans, certain road sections as well as traffic/transport facilities are selected for planning of improvement. The followings are the selected locations to be improved by the short term improvement plans, together with the reasons for the selection.

#### 1) Improvement of terminals

The following terminals are selected for preparation of improvement plans by reasons mentioned below.

##### (1) Terminal Panaikang

- a) To accommodate every intercity bus and mini-bus.
- b) To solve traffic congestions on Jl. Gowa Jaya (Urip Sumoharjo) related to buses, mini-buses and petepetes/microlets to/from this terminal.

##### (2) Terminal Sungguminasa

To secure the safety and the convenience for passengers.

##### (3) Pasar Sentral Sub-Terminal

- a) To solve traffic congestions in the terminal as well as on access roads.
- b) To secure the safety of pedestrians.
- c) To coordinate with the redevelopment plan of the Pasar Sentral.

##### (4) Pa'baeng-baeng Sub-Terminal

- a) To secure smooth traffic flows on Jl. Gowa Raya (St. Alauddin) and Jl. Kumala.

- b) To provide good facilities for transit passengers.
- c) To coordinate with Pasar Sentral Pa'baeng-baeng removal plan.

(5) Parang Tambung Sub-Terminal

To coordinate with Pasar Sentral Pa'baeng-baeng removal plan.

(6) Panampu Sub-Terminal

- a) To improve condition of terminal mainly affected by heavy rainfall.
- b) To provide good facilities for passengers.

(7) Pasar Panakkukang Sub-Terminal

To accommodate increasing number of buses and pete-petes/microlets according to the progress of housing development.

(8) Mangasa Roadside Terminal

To secure the smooth traffic flows on Jl.Gowa Raya (Urip Sumoharjo).

(9) Daya Roadside Terminal

To provide facilities for transit passengers.

2) Improvement of bus stops

(1) 90 bus stops on roads without paved shoulders

To secure the smooth traffic flow, when buses stop to load/unload passengers.

(2) 35 bus stops where many passengers waiting buses

To provide good waiting atmosphere.



#### 6.7.4 Improvement of Facilities

According to the planning concepts described in the Section 6.2.2, improvement plan of traffic/transport facilities are prepared and presented in this section. The contents of these improvement plans are summarized in Table 6.7.1.

**Table 6.7.1 Summary of Bus Facilities Improvement Plan**

Type of Facility	Location	Improvement Measures
Bus Terminal	Panaikang	- To control traffic flow - To provide bus berths and pedestrian facilities - Maintain pavement
	Sungguminasa	- To provide bus berths and pedestrian facilities - Maintain pavement
	Pasar Sentral	- To modify traffic flow - To provide bus stop facilities - To provide pedestrian facilities - To prohibit stopping pete-pete/microlet - To construct a pedestrian deck
	Pa'baeng-baeng	- To provide bus stop facilities - To provide pedestrian facilities
	Parang Tambung	- To rearrange the layout of bus bays - To pave the terminal area
	Panampu	- To pave the terminal area - To install bus berth - To provide drainage system
	Pasar Panakkukang	- To maintain pavement - To rearrange bus berths - To install box culvert at the entrance
	Mangasa	- To provide bus bays - To provide pedestrian facilities
	Daya	- To provide bus bays - To provide pedestrian facilities
	Bus Stop facility*	43 bus stops
183 bus stops		- To provide bus stop markings
64 bus stops		- To install shelter and bench

Note \* : Number of bus stops are counted as two stops at 1 bus stop locations.

### 6.7.5 Bus Terminal Improvement Plan

In order to solve the existing as well as expected future problems related to public transport terminals, the following improvement plans are proposed. The location of these terminals are shown in Fig. 6.7.3.

#### 1) Terminal Panaikang

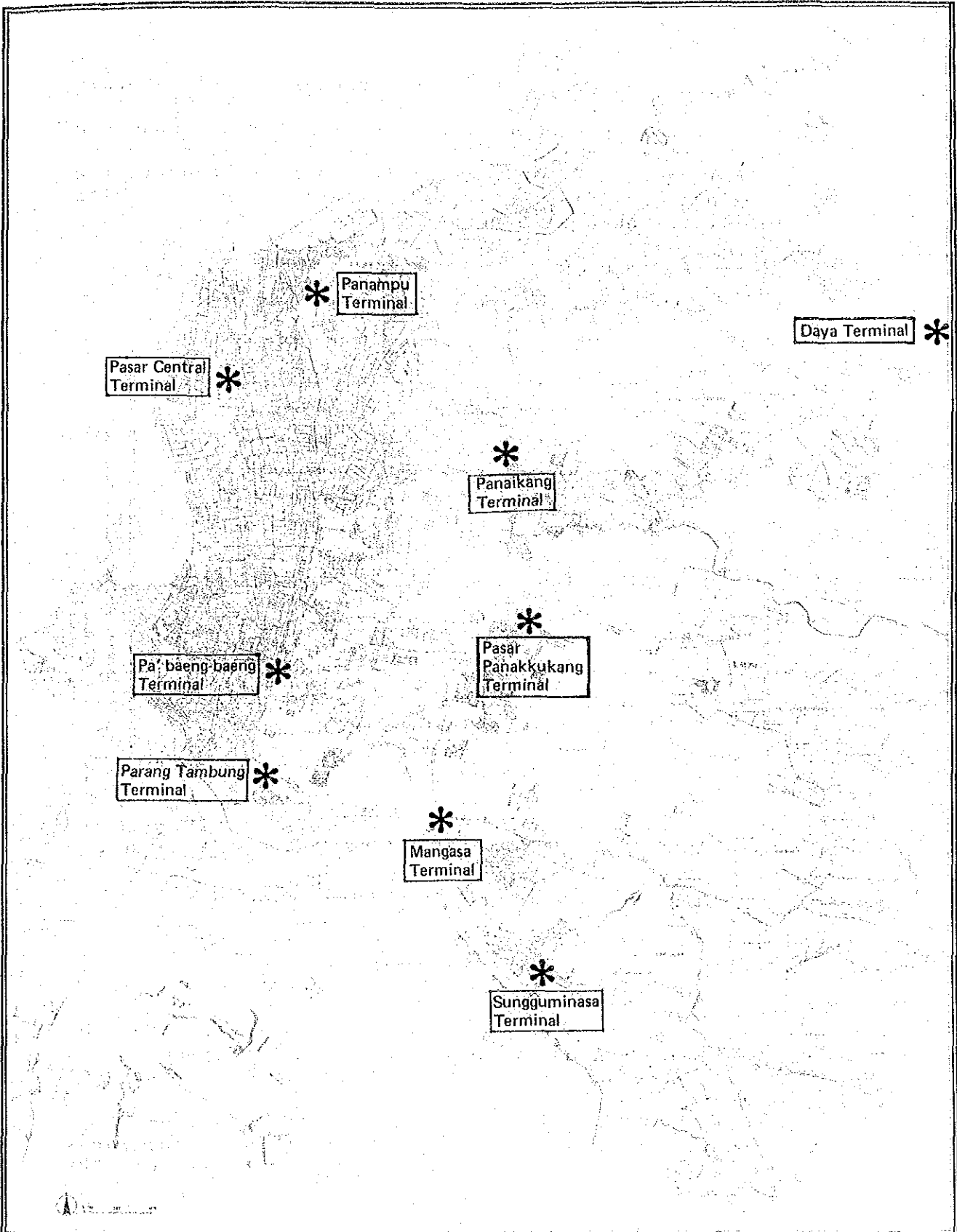
##### (1) Major problems

- a) There are two entrances and exits on Jl. Gowa Jaya (Urip Sumoharjo) in this terminal, and vehicles related to the terminal often affect the through traffic flow at both locations.
- b) Bus berth is not installed at this terminal.
- c) Urban buses do not call this terminal, but only stop at the outside of the terminal along Jl. Gowa Jaya (Urip Sumoharjo). This cause inconvenience for transit passengers between urban buses and intercity buses/mini-buses.
- d) The condition of pavement in this terminal is not good, as there are many pot holes and surface of pavement is rough.

##### (2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.4, while major improvement measures are described below.

- a) To control traffic flow to/from the terminal  
In order to avoid confusion of traffic flows on Jl. Gowa Jaya (Urip Sumoharjo), it is desirable to separate the entrance (west side) and the exit (east side). It is also proposed to install a traffic signal at the east side of exit.
- b) To change the circulation system in the terminal  
To secure the smooth traffic flow in the terminal after separation of the entrance and the exit, it is necessary to rearrange the circulation system of buses, mini-buses and pete-petes/microlets in the terminal.
- c) To install bus berths.  
In order to secure safety as well as convenience of passengers, it is proposed to install bus berths in 2 lots for urban buses.
- d) To install guard fences on waiting bays and bus berths as well as crosswalks.  
In order to prevent random crossings as well as jaywalkings of passengers in the terminal, it is desirable to control the movement of passengers. At the same time, it is necessary to provide crosswalks.
- e) To reroute DAMRI bus routes to stop this terminal  
To secure convenience for transit passengers, it is



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**Fig.**  
6.7.3

**Terminals to be Improved**

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desirable to reroute DAMRI bus routes to stop at this terminal.

- f) To maintain pavement of this terminal with concrete pavement.
- g) As a long term period, it is desirable to construct a terminal building at this terminal, together with facilities such as a shopping center, etc.

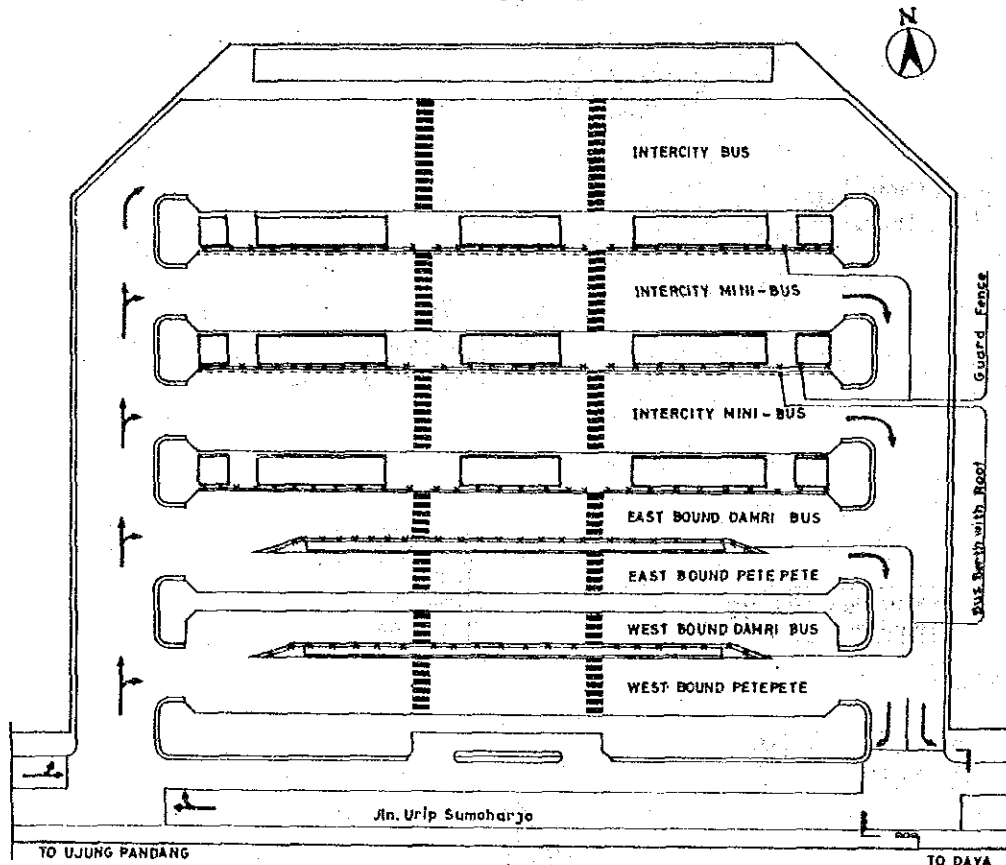


Fig. 6.7.4 Terminal Panaikang Improvement Plan

## 2) Terminal Sungguminasa

### (1) Major problems

- a) Facilities to secure safety of passengers in the terminal, such as cross walks, are not provided, even though the waiting bay is located at the center of this terminal.
- b) Bus berth is not installed at this terminal.
- c) Pavement in this terminal is not well maintained, including at the entrance and the exit of the terminal.

(2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.5, while major improvement measures are described below.

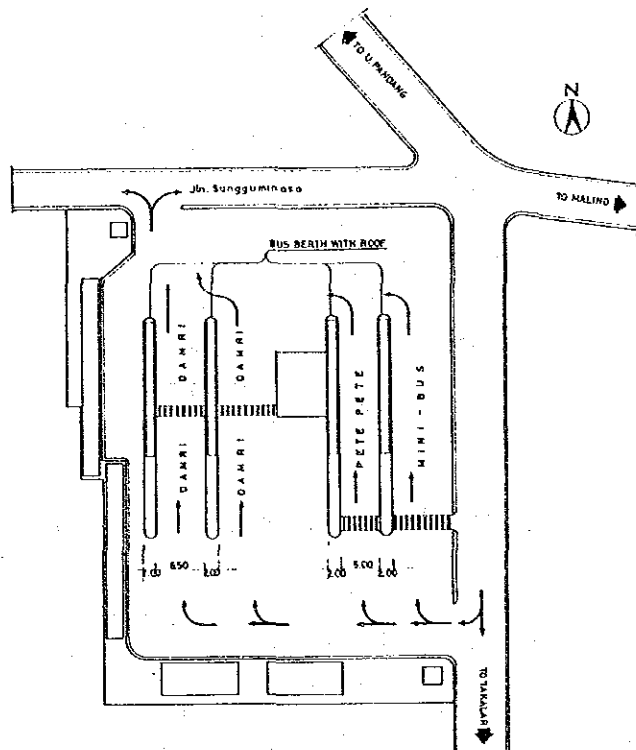


Fig. 6.7.5 Terminal Sungguminasa Improvement Plan

- a) To provide bus berths and pedestrian facilities.  
In order to secure safety as well as convenience of passengers, it is proposed to install bus berths together with sidewalks and crosswalks in the terminal.
- b) To maintain pavement of this terminal.

3) Pasar Sentral Sub-Terminal

(1) Major problems

Major problems related to this sub-terminal are schematically illustrated in Fig. 6.7.6 as described below.

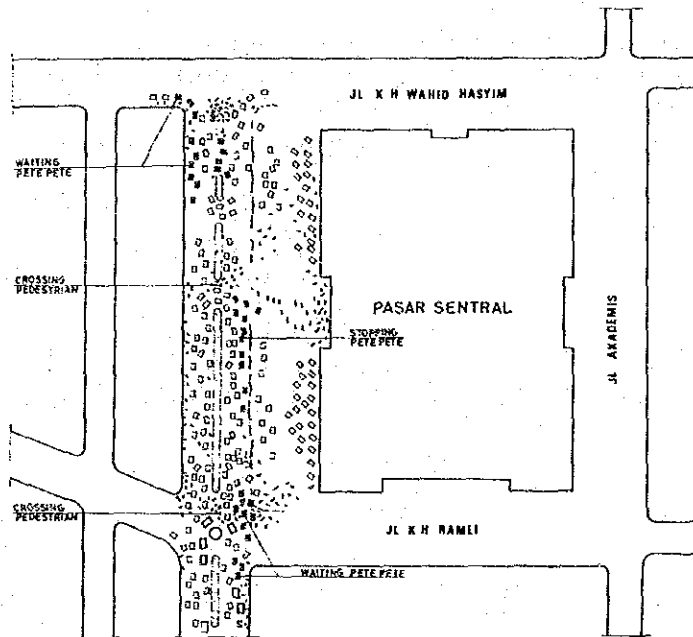


Fig. 6.7.6 Major Problems Related to Pasar Sentral Sub Terminal

- a) During morning and afternoon by 17:00, routing of pete-petes/microlets at this terminal is set as shown in Fig. 6.7.7, which is a result of survey done by the Study Team between 7:00 and 8:00. In this case, about 70% of them enter from the south entrance and have to make U-turn at the opening of the median, which is about 100m from the south entrance. Since the main entrance of the Pasar Sentral is located near this point, many pete-petes/microlets load/unload passengers around here. Hence they formulate a queue and this queue sometimes extended up to the Jl. Cokroaminoto to disturb other vehicles.
- b) Between 17:00-24:00, a half of this terminal is opened for vendors as Pasar Malam, hence 70% of pete-petes/microlets make U-turn at the roundabout south of this terminal. Therefore, many pete-petes/microlets have to queue up on Jl. Cokroaminoto, though the number of pete-petes/microlets is decreased after 17:00.
- c) Near the south and the north exits of terminal, many pete-petes/microlets stop rather long time to wait passengers. These stopping pete-petes/microlets is one of the causes of queuing pete-petes/microlets entered from the south entrance.

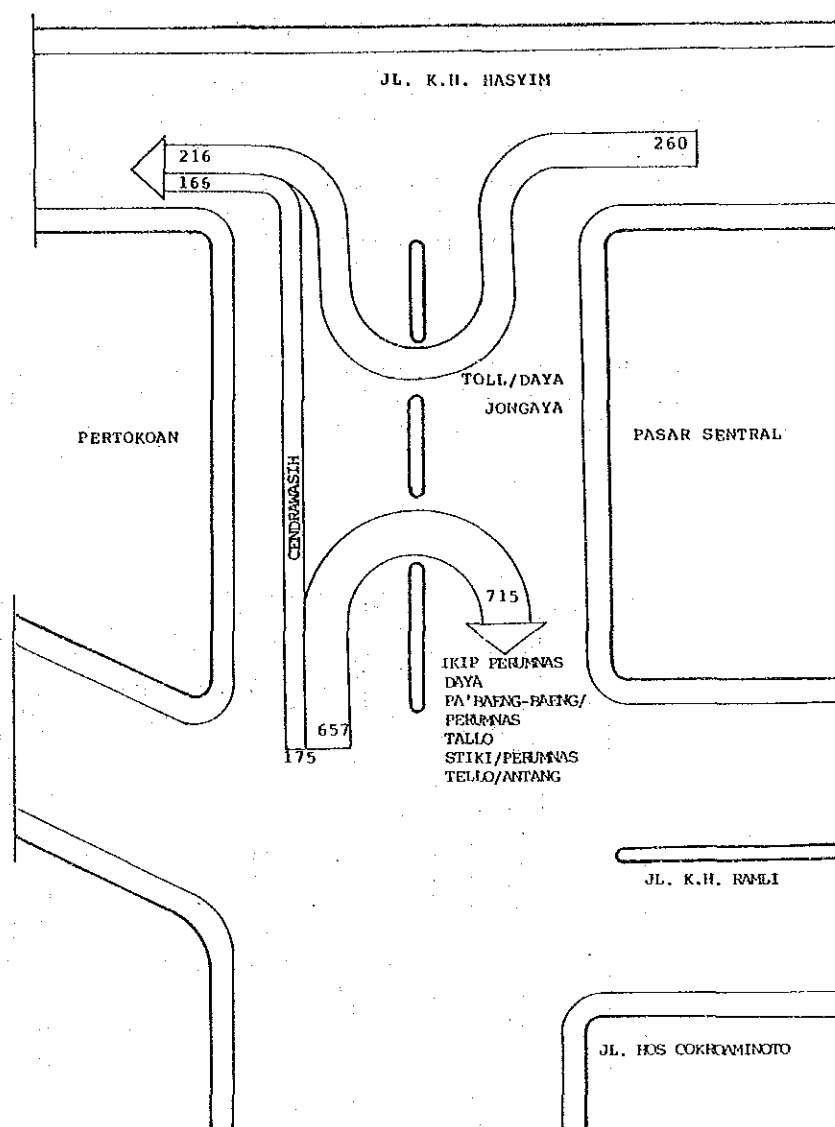


Fig. 6.7.7 Turning Movement of Pete-petes/Microlets in Daytime

- d) Since the surrounding area of this sub-terminal is one of the busiest commercial area, including the Pasar Sentral, many people gathered either by pete-petes/microlets or other transport mode and walking around. These people often cross the carriageway of this sub-terminal and face the conflict with pete-petes/microlets.
- e) Many pete-petes/microlets park in the parking area of the Pasar, together with other vehicles related to the Pasar.
- f) Pavement in this terminal is not well maintained, hence there are many pot holes, which cause drastic slowing down of the driving speed of pete-petes/microlets.

## (2) Major improvement measures

Since the problems in this sub-terminal are serious, and the redevelopment project of this terminal might be implemented in the near future, improvement of this sub-terminal should be carried out step by step. In addition, the redevelopment of Pasar Sentral is desirable to be implemented at an early stage.

### STEP 1

Improvement plan of this terminal in the Step 1 is illustrated in Fig. 6.7.8, while major improvement measures are described below.

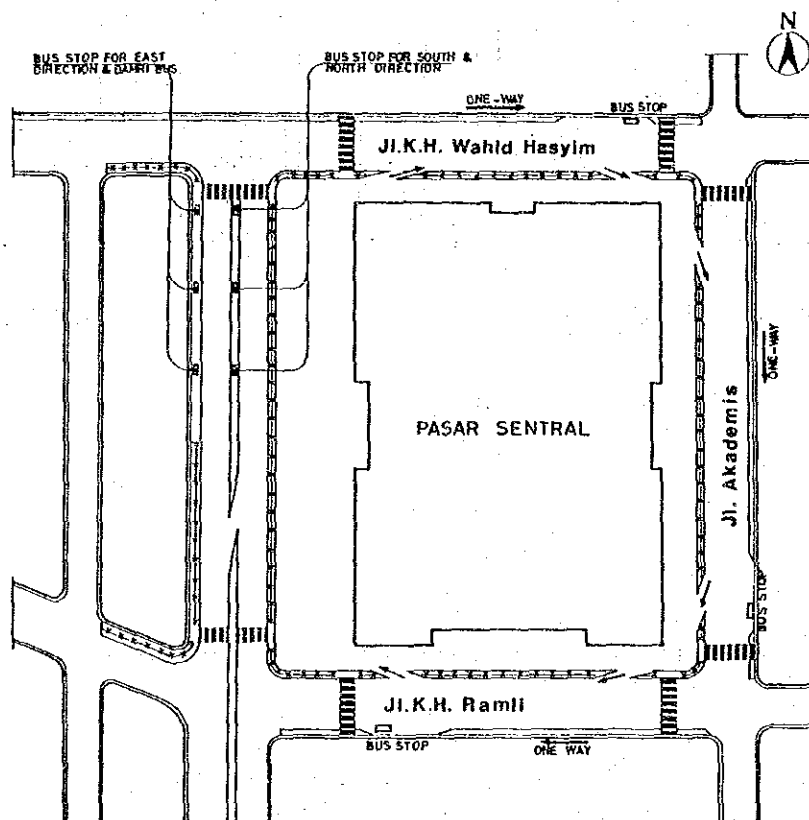
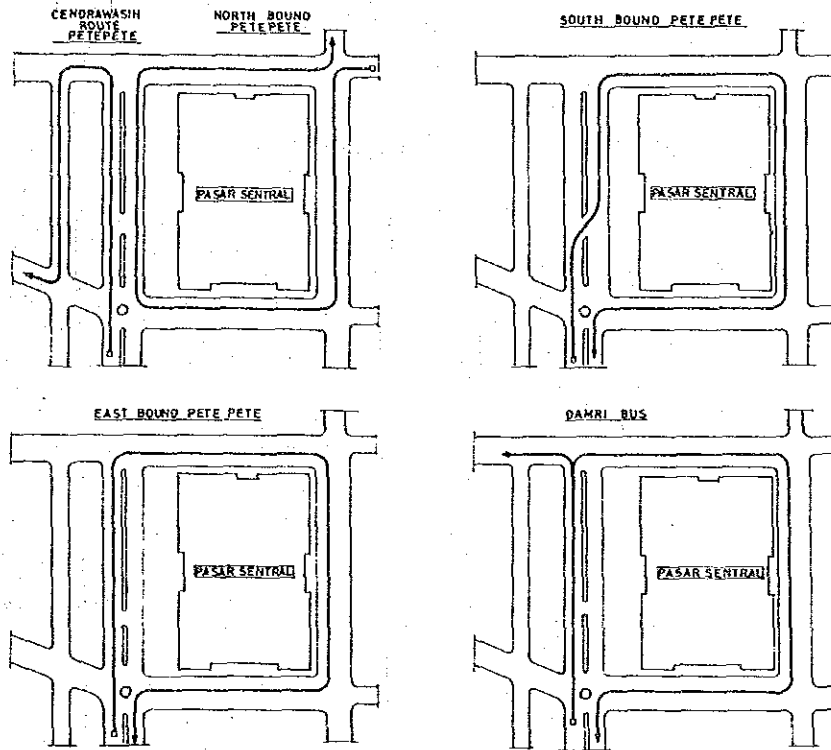


Fig. 6.7.8 Pasar Sentral Sub Terminal Improvement Plan (Step 1)

- a) To change Jl. Hasyim, Jl. Akademis and Jl. K.H. Ramli into one-way roads and to formulate a clockwise circulation system around the Pasar Sentral, together with this sub-terminal.
- b) To modify the routes of pete-petes/microlets as well as DAMRI bus routes, as illustrated in Fig. 6.7.9.
- c) To rehabilitate the pavement of this terminal.



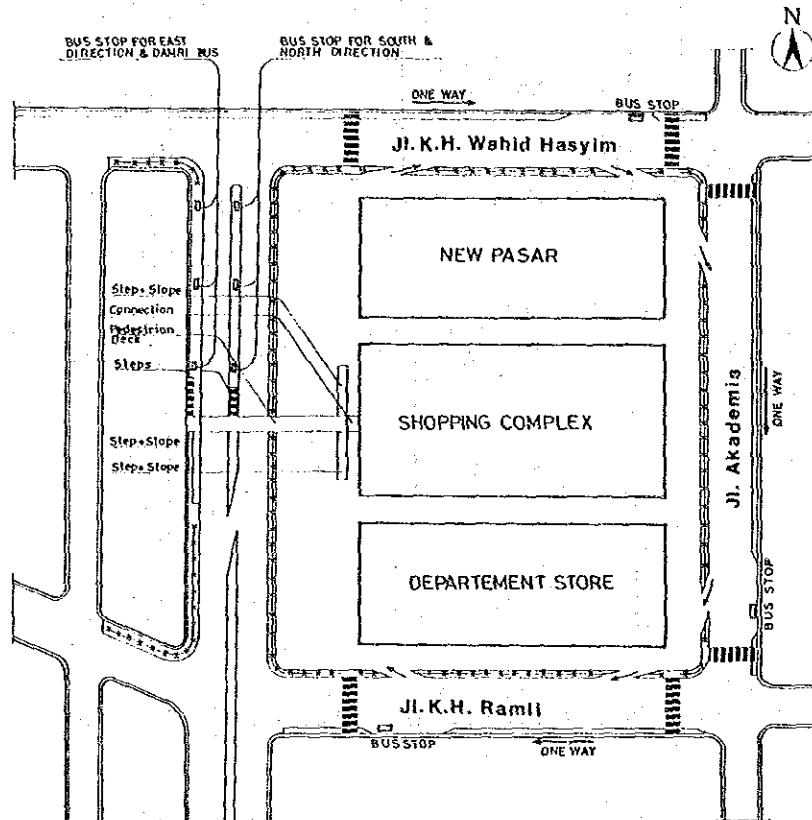


**Fig. 6.7.9 Proposed Routing of DAMRI Buses and Pete-petes/Microlets**

- d) To provide bus stops by direction in this terminal.
- e) To provide bus stops around the Pasar Sentral near each entrance for the convenience of passengers.
- f) To install a sidewalk at the west side of the sub-terminal, together with demolition of street vendors in this area and surrounding areas.
- g) To prohibit stopping of pete-petes/microlets at a place other than bus stops.
- h) To install a divider around the parking spaces of the Pasar Sentral in order to clearly segregate vehicles.
- i) To install a guard fence on a divider mentioned above as well as the sidewalks at the west side of the terminal in order to prevent random crossings of pedestrians.
- j) To provide crosswalks at the north and the south end of this terminal.
- k) To shift the Pasar Malam to the parking space of Pasar Sentral.

## STEP 2

Improvement plan of this terminal in the Step 2 is illustrated in Fig. 6.7.10, while major improvement measures are described below.



**Fig. 6.7.10 Pasar Sentral Sub-Terminal Improvement Plan (Step 2)**

- a) To construct a pedestrian deck with provision of good walking environment for pedestrians, such as roofs, slopes for handicapped or aged people, flower pots, benches, etc., at the north and the south end of the sub-terminal. This pedestrian deck should be connected with the redevelopment of building.
- b) To limit the number of pete-petes/microlets enter this sub-terminal by rerouting of DAMRI bus routes. Instead of that, installation of bus berths for DAMRI buses in this sub-terminal is proposed.
- c) To provide parking space for private vehicles according to the design of redevelopment building.

#### 4) Pa'baeng-baeng Sub-Terminal

##### (1) Major problems

- a) Majority of south bound pete-petes/microlets and intercity buses/mini-buses load/unload passengers at the opposite side of Pasar Sentral Pa'baeng-baeng along Jl. Gowa Raya (St. Alauddin). These vehicles often stop a long time to wait passengers even on the carriageway and obstruct the through traffic flow.
- b) A bus stop of the south bound urban bus is located too far from the Pasar Sentral Pa'baeng-baeng.
- c) Many jaywalking pedestrians are observed on Jl. Gowa Raya (St. Alauddin) near the Pasar, mainly due to stopping pete-petes/microlets as well as becaks on the shoulder.
- d) Majority of north bound pete-petes/microlets load/unload passengers along Jl. Kumala. These vehicles often stop a long time to wait passengers even on the carriageway and obstruct the through traffic flow.

##### (2) Major improvement measures

This sub-terminal is functioning as one of the most busy transit terminal of pete-petes/microlets, urban buses and intercity mini-buses at present. Since function of transit at this place is considered to continue in the future, it is desirable to provide adequate facilities for buses and pete-petes/microlets transit passengers at this location.

On the other hand, removal of functions in Pasar Sentral Pa'baeng-baeng to the Pasar Sentral Parang Tambung is almost definite to consider the progress of the drainage canal construction project. Therefore, passenger demands related to the Pasar in this sub-terminal is supposed to be drastically decreased in the near future.

To consider above facts, it is proposed to change the function of this sub-terminal to the transit terminal by only providing sufficient bus stop facilities. On the contrary, it is also proposed to improve terminal facilities in the Pasar Parang Tambung mentioned later to accommodate increasing passenger demand. Improvement plan of this terminal is illustrated in Fig. 6.7.11, while major improvement measures are described below.

- a) To install bus stop facilities for southbound buses and pete-petes/microlets along Jl. Gowa Raya (St. Alauddin).
- b) To install three lots of bus stop facilities for north bound and other buses and pete-petes/microlets along Jl. Kumala.
- c) To prohibit a long time waiting at bus stops and random stopping of pete-petes/microlets.

- d) To provide sufficient pedestrian facilities to prevent pedestrians from conflicts with vehicles.

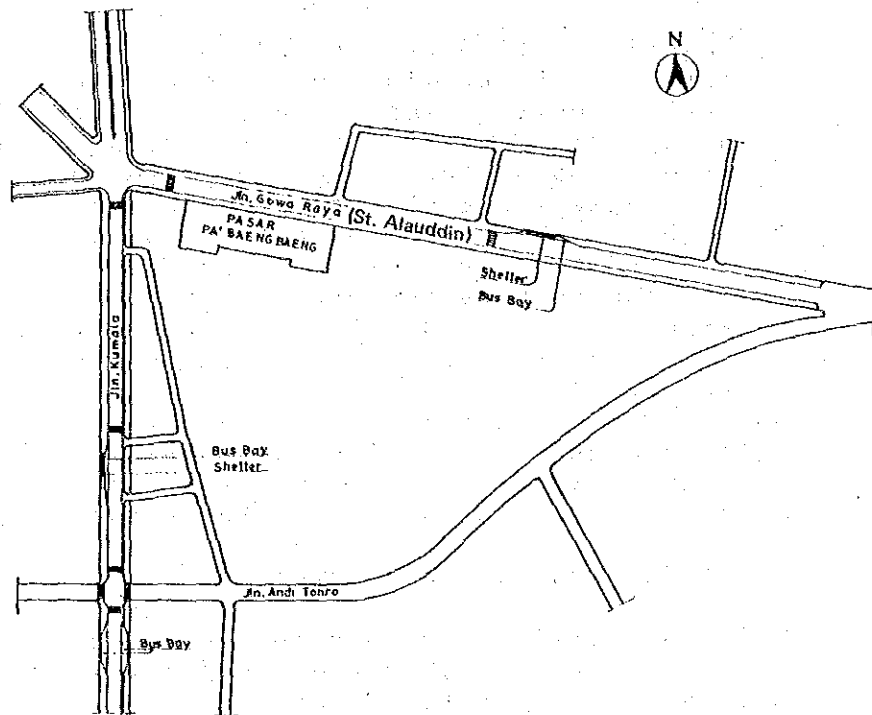


Fig. 6.7.11 Pa'baeng-baeng Sub-Terminal Improvement Plan

5) Parang Tambung Sub-Terminal

At present, this terminal is not functioning at all due to the delay of removal of function of Pasar Sentral from Pa'baeng-baeng to here. As it is already mentioned, however, that this removal program might be proceeded in the near future, and it will be necessary to utilize this sub-terminal. To cope with this situation, some improvements are required.

(1) Major problems

- a) There are two entrance/exit in this terminal and one of them (east side) is also the main entrance road of housing estate. If both of these entrance/exit will be used, pete-pete/microlet traffic will affect local traffic of this housing estate.
- b) Four pete-pete/microlet bays with width of about 2.2m each are installed using dividers. To consider the function of Pasar Sentral, i.e. passengers with much goods, which will cause rather long loading/unloading time of passengers, this layout of pete-pete/microlet bays is considered to be inadequate.
- c) The terminal space as well as access roads are not paved.

(2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.12, while major improvement measures are described below.

- a) To limit the entrance/exit of this terminal only at the west side.
- b) To rearrange the layout of bus bays in order to allow taking over by petes-pete/microlets themselves as well as to accommodate ordinary size buses in future and installation of shelter at bus bays is proposed.
- c) To pave the entire terminal area including access roads.

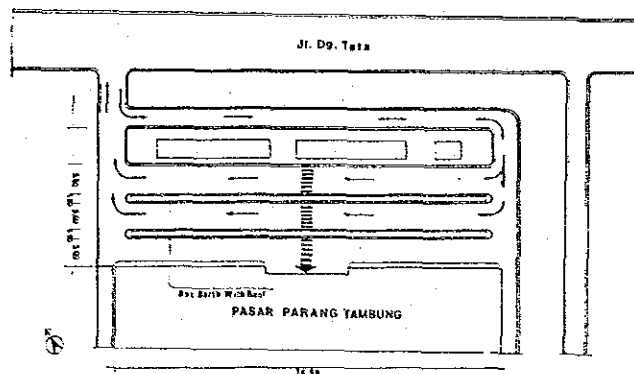


Fig. 6.7.12 Parang Tambung Sub-Terminal Improvement Plan

6) Panampu Sub-Terminal

(1) Major problems

- a) The whole terminal area is not paved and it becomes muddy if there is heavy rainfall.
- b) The ground level of this sub-terminal is about 35cm below the level of Jl. Tinumbu, while no drainage is installed. Hence, this terminal is often flooded together with the Pasar in the rainy season.
- c) Bus stop facility as well as facilities for waiting passengers are not installed.

(2) Major improvement measures

Improvement plan of this terminal, together with cross sections showing the proposed drainage system, is illustrated in Fig. 6.7.13, while major improvement measures are described below.

- a) To pave the whole terminal area.
- b) To provide U-gutters and box culverts along Jl. Tinumbu as well as the Pasar and shops.
- c) To install a bus berth for turning buses.
- d) To install facilities for waiting passengers.

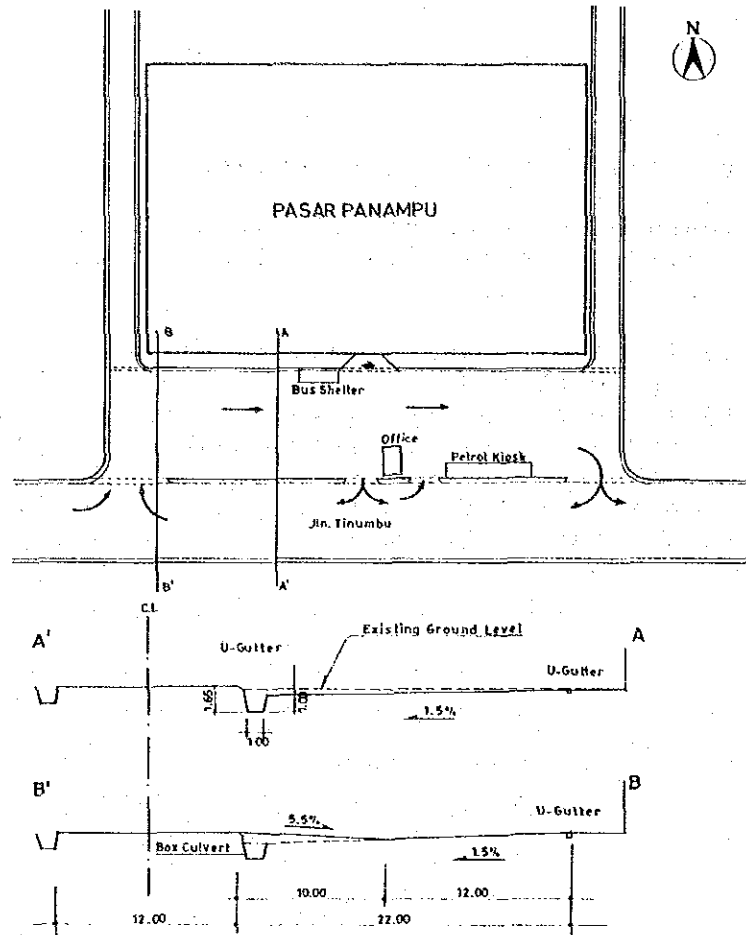


Fig. 6.7.13 Panampu Sub-Terminal Improvement Plan

#### 7) Pasar Panakkukang Sub-terminal

At present, this sub-terminal is not functioning at all, since housing estate development has not been completed. However, together with the progress of housing development, passenger demand at this terminal is supposed to be rapidly increased. Therefore, improvement of this terminal is also necessary.

##### (1) Major problems

- a) The pavement in this sub-terminal as well as access roads are not well maintained.
- b) Four pete-pete/microlet bays with width of about 2.2m each are installed using dividers. To consider the function of Pasar Sentral, i.e. passengers with much goods, which will cause rather a long loading/unloading time of passengers, this layout of pete-pete/microlet bays is considered to be inadequate.
- c) At the entrance of this terminal, two small bridges are installed over the drainage U-gutters, however, these bridges are too narrow for ordinary size buses.
- d) The location of an existing bus stop on DAMRI bus route is too far from the terminal. In addition, there is no facility for waiting passengers at this bus stop.

(2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.14, while major improvement measures are described below.

- a) To maintain the pavement of this sub-terminal as well as access roads.
- b) To install two bus berths for DAMRI buses and pete-petes/microlets, together with provision of roofs and benches for waiting passengers.
- c) To install box culverts instead of U-gutters at the entrance of this terminal.

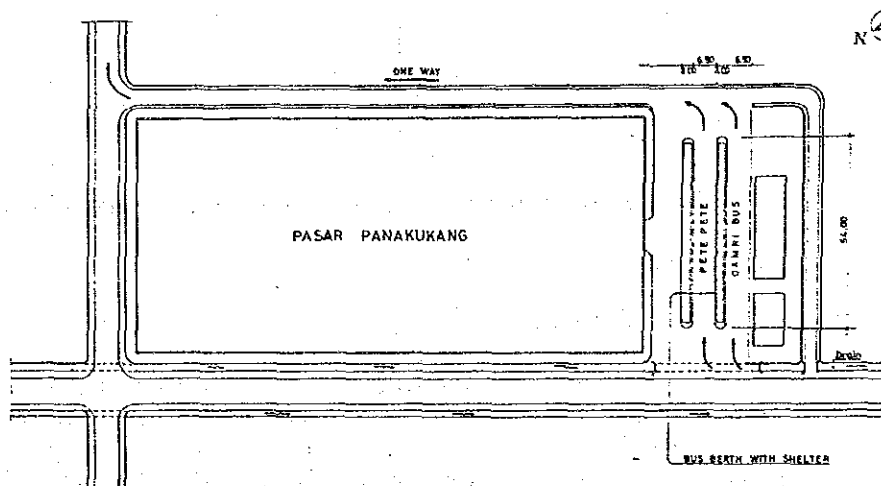


Fig. 6.7.14 Pasar Panakkukang Sub-Terminal Improvement Plan

8) Mangasa Roadside Terminal

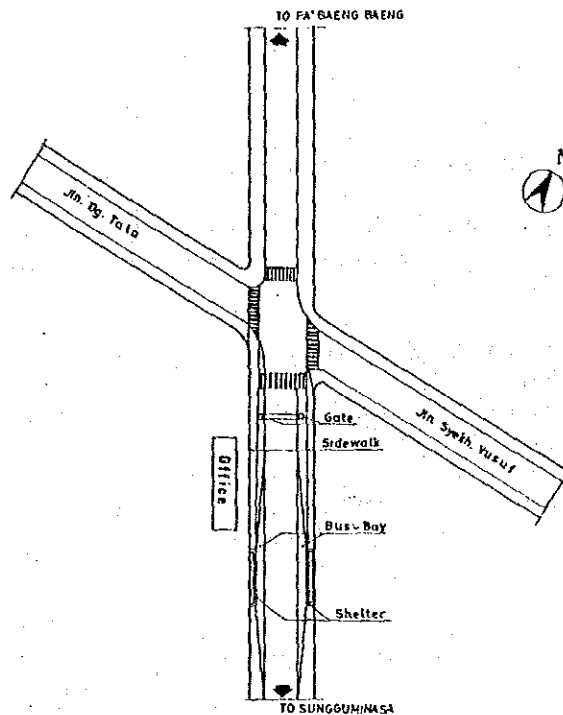
(1) Major problems

- a) No bus bay as well as no shelter are installed at bus stops of this terminal.
- b) Some pete-petes/microlets stop a long time to wait passengers along Jl. Daeng Tata, which obstruct through traffic flow.
- c) Sidewalks are not installed on Jl. Gowa Raya (St. Alauddin), even though traffic volume is heavy.

(2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.15, while major improvement measures are described below.

- a) To provide bus bays, shelters and benches at bus stops along Jl. Gowa Raya (St. Alauddin).
- b) To prohibit long time stopping pete-petes/microlets along Jl. Daeng Tata.
- c) To install sidewalks and an additional crosswalk on Jl. Gowa Raya (St. Alauddin).



**Fig. 6.7.15 Mangasa Roadside Terminal Improvement Plan**

9) Daya Roadside Terminal

(1) Major problems

- a) Every lot of this roadside terminal is not paved, which causes inconvenience for drivers as well as for passengers.
- b) Sidewalks and crosswalks are not installed on Jl. Perintis Kemerdekaan, even though traffic volume is heavy.

(2) Major improvement measures

Improvement plan of this terminal is illustrated in Fig. 6.7.16, while major improvement measures are described below.

- a) To provide bus bays along Jl. Perintis Kemerdekaan by paving shoulders, together with provision of facilities for waiting passengers.
- b) To install sidewalks and crosswalks around bus bays.

**6.7.6 Future Bus Terminal Development Plan**

The future bus terminal development plan should be examined based on the future role of bus transport and the balance between the supply and demand considering overall traffic conditions as mentioned in Section 6.7.1. As described before in Section 6.7.1, above mentioned future bus transport study is not included in the scope of this study. Therefore, in this section, just conceptual plan for the future bus terminal development is described as follows:



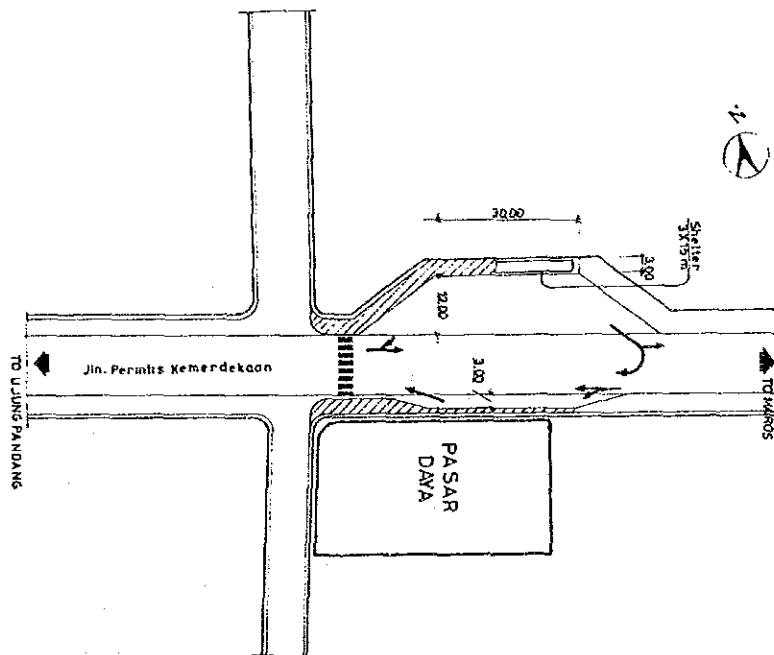


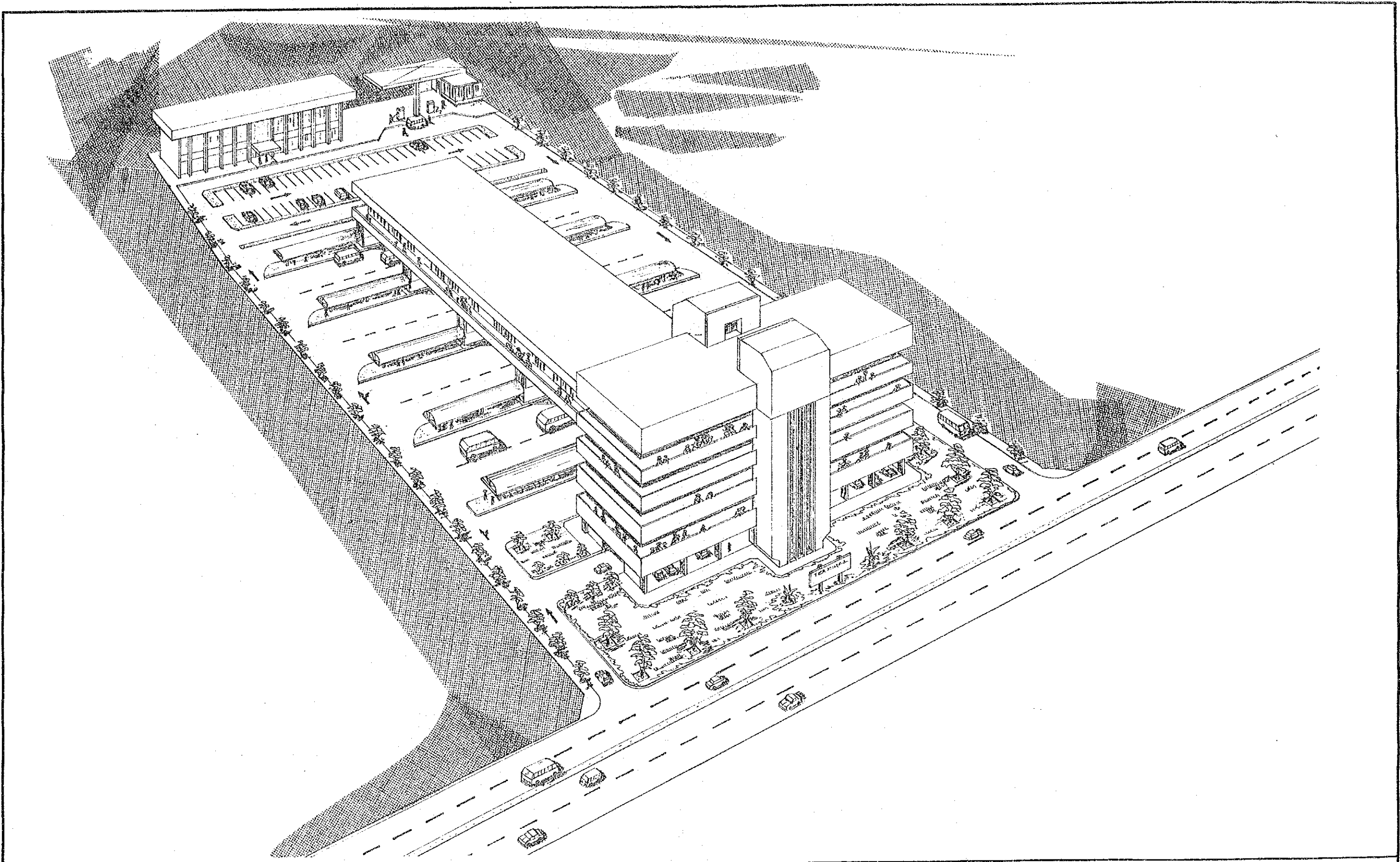
Fig. 6.7.16 Daya Roadside Terminal Improvement Plan

- a) In order to accommodate all the future intercity buses, the existing Daya bus terminal should be developed as the main bus terminal for transfer of the passengers from intercity buses to the urban buses. This terminal will not only contribute to alleviate traffic congestion on Jl. Urip Sumoharjo, but also support the development of Daya sub-center. Therefore, following functions should be required.
- \* Bus center for intercity bus operations
  - \* Bus center for urban bus operations
  - \* Shopping center for waiting or transfer of passengers
  - \* Waiting rooms
  - \* Gasoline stand and bus maintenance office
  - \* Bus bays with shelter
  - \* Car parking for private vehicles

The imaginary plan of main bus terminal based on above mentioned function is illustrated in Fig. 6.7.17.

- b) The existing Panaikang bus terminal should be improved so as to function as a main urban bus terminal. Accordingly, this terminal will have all the functions above except intercity bus service.
- c) The sub-terminal should be constructed at Antang at the same time of development of sub-center. The function of this sub-terminal is to serve urban buses for Antang area.





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**Fig.**  
**6.7.17**

Imaginary Sketch of Daya Bus Terminal Development Plan

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### 6.7.7 Bus Stop Facilities Improvement Plan

#### (1) Major problems

- a) About 55% of bus stops are located along roads with unpaved shoulders. At these bus stops, buses stop on the carriageway and obstruct through traffic flows.
- b) At the remaining bus stops along roads with paved shoulders, however, pavement markings to indicate the existence of bus stops are not provided. Hence, ordinary vehicles often park at bus stops, which force bus drivers to load/unload passengers on the carriageway.
- c) Shelters to provide comfortableness for waiting passengers under the hot climate as well as heavy rain fall are installed only at a limited bus stops.
- d) Benches for waiting passengers and information on bus operation, such as bus routes and time schedule, are not provided at bus stops.
- e) Bus stops for the pete-petes/microlets are not fixed at specific points.

#### (2) Major improvement measures

The desirable plan of bus stop facilities are illustrated as perspectives in Fig. 6.7.18 and 6.7.19, while details of improvement measures are described below.

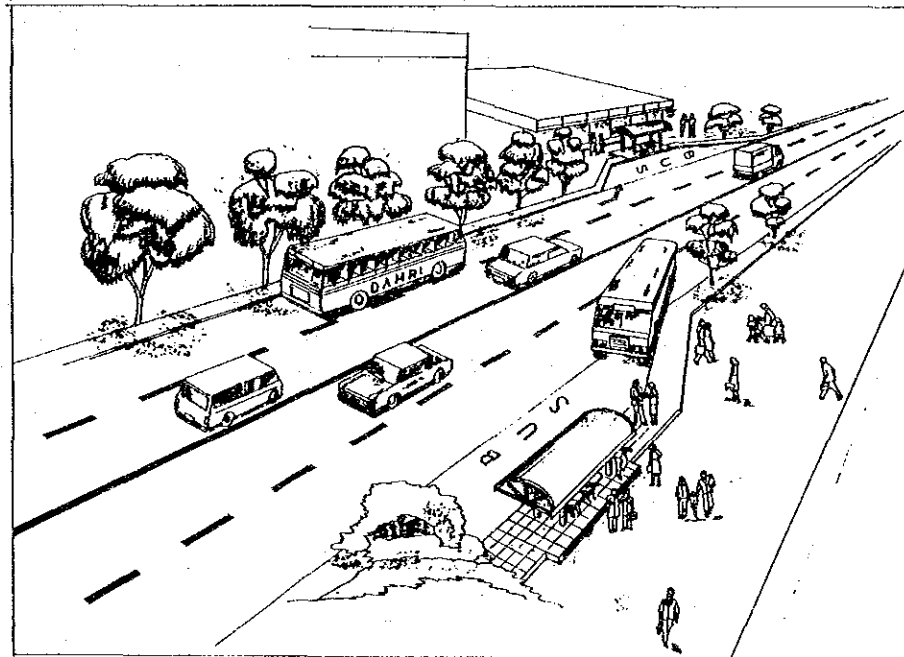
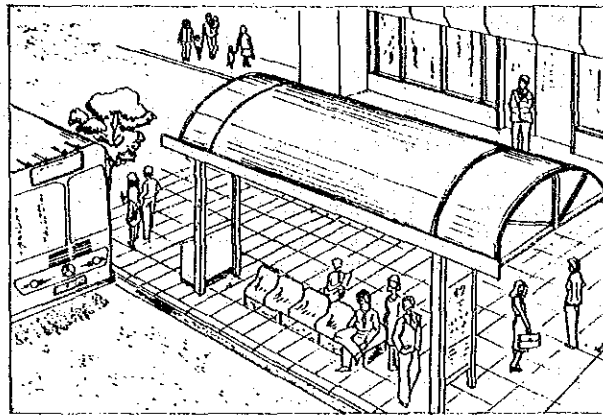
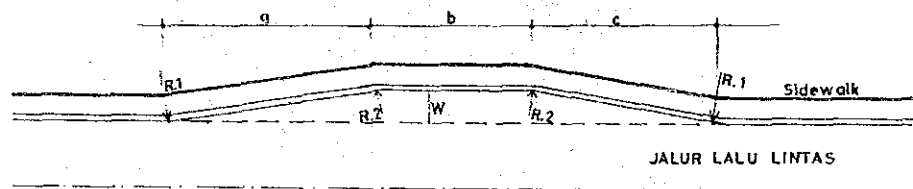


Fig. 6.7.18 Example of Bus Bays with Installation of Shelters



**Fig. 6.7.19 Example of a Bus Shelter and Benches for Waiting Passengers**

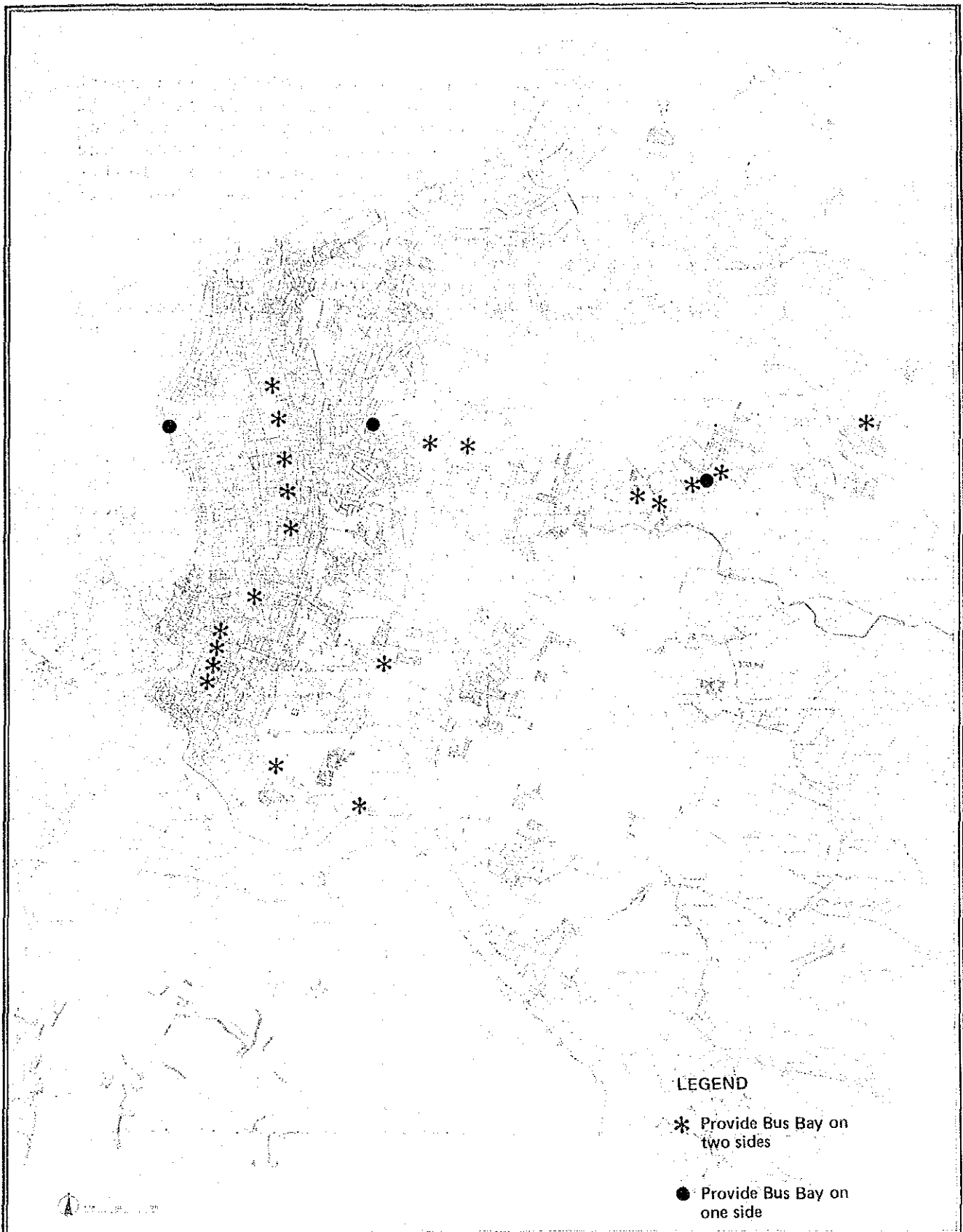
- a) In order to secure smooth traffic flows on primary and secondary arterial roads, it is desirable to provide bus bays along these roads. For the time being, pavement of unpaved shoulders only at bus stops according to the BINA MARGA design standard (53 m is the minimum bus bay length including taper length, as shown in Fig. 6.7.20) are desirable. These bus stops are counted 43 in the Study Area, as shown in Fig. 6.7.21.
- b) In parallel with the installation of bus bays, it is also proposed to provide necessary pavement markings to clarify bus stops, including existing bus stops along roads with paved shoulders. These bus stops are counted 183 in the Study area.



Dimension in Meter

	a	b	c	w	R1	R2
Minimum	20	13	20	3	18	12
Absolute Minimum	10	13	13	2.75	10	12

**Fig. 6.7.20 BINA MARGA Design Standard for Bus Bay**



**LEGEND**

- \* Provide Bus Bay on two sides
- Provide Bus Bay on one side

**UJUNG PANDANG AREA  
HIGHWAY DEVELOPMENT STUDY**

**Fig.**  
**6.7.21**

**Location of Bus Stops to  
Provide Bus Bay**

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- c) In order to encourage people to use public transport system under the hot climate or heavy rain fall, it is requisite to provide good environment for waiting passengers. Therefore, provision of shelters and benches at bus stops with many passengers are desirable. These bus stops are counted 64, as shown in Fig. 6.7.22.
- d) It is also proposed to indicate time schedule of buses and destinations at every bus stop.
- e) In order to solve problems caused by stopping petepetes/microlets, it is desirable to control stopping of them only at bus stops, especially on arterial roads.

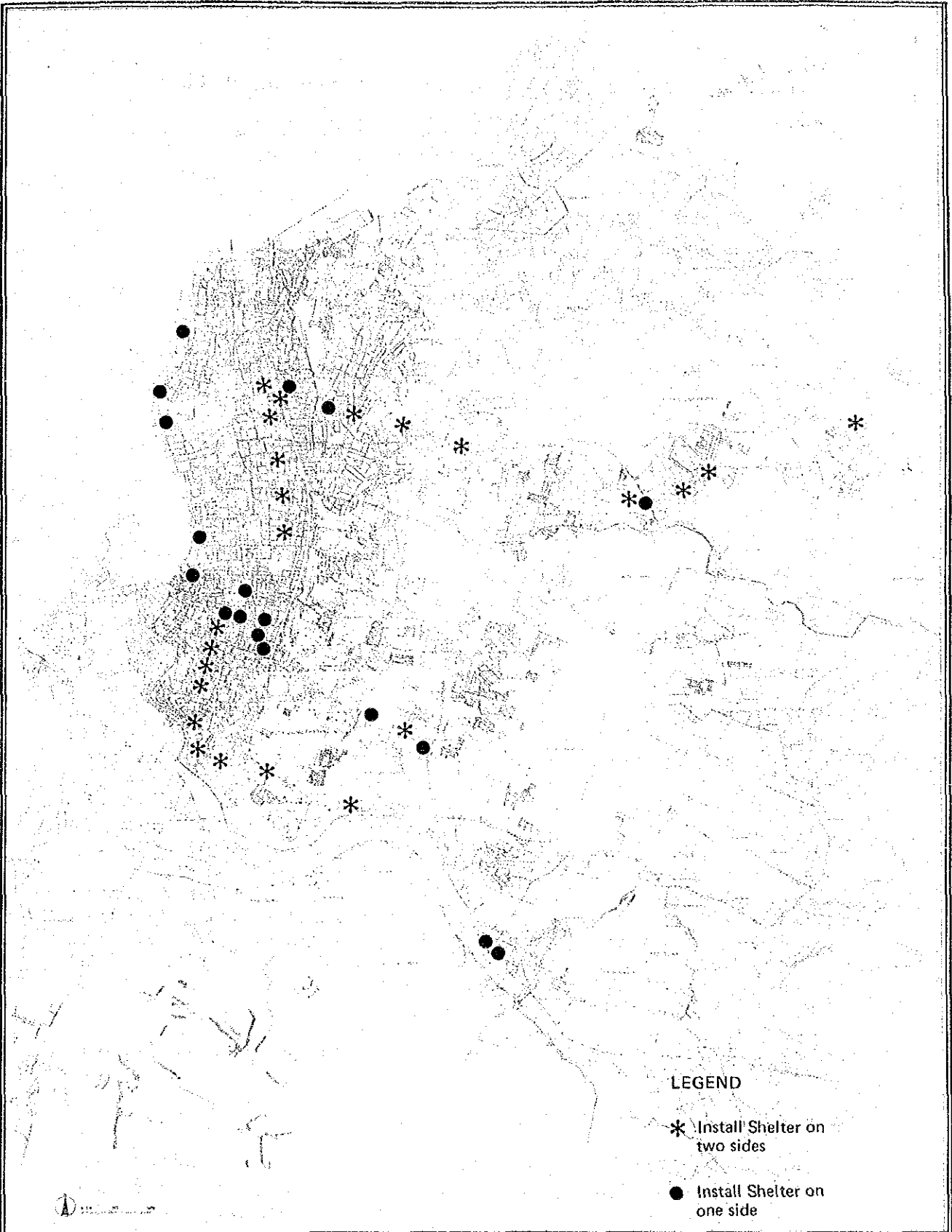
### 6.7.8 Cost Estimate

The improvement plan for bus terminal and bus stop facilities are described in previous sections. Here, the improvement cost (direct construction cost) of these plans are estimated based on unit cost as quoted by thousand Rupiah in 1988 prices. The improvement cost of bus terminals and bus stops is shown in Table 6.7.2 and Table 6.7.3 respectively.

**Table 6.7.2 Bus Terminal Improvement Cost**

Bus Terminal Name	Improvement Cost	Unit Thousand Rupiah 1988 Prices	
		Remark	
1. Panaikang	81,952		
2. Sungguminasa	28,874		
3. Pasar Sentral	92,253		Step 1
	55,942		Step 2
4. Pa'baeng-baeng	16,458		
5. Parang Tambung	38,862		
6. Panampu	66,660		
7. Pasar Panakukang	78,809		
8. Mangasa	7,357		
9. Daya	19,628		
<b>Total</b>	<b>486,795</b>		





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**Fig.**  
6.7.22

**Location of Bus Stop to  
Install Shelter**

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**Table 6.7.3 Bus Stop Facilities Improvement Cost**

UNIT:      Thousand Rupiah

Items	Quantity	Cost
Provision of Bus Bay	43	72,240
Privision of Bus Bay markings	183	32,200
Installation of Shelter	64	23,044
Bench	64	8,700
Total		136,184

### 6.7.9 Priority of Improvement

#### 1) Bus terminal

There are numerous factors or criteria to determine the priority of bus terminal improvement such as scale, function, frequency of arrivals and departures, number of passengers, types of operating buses, and various service facilities with which the terminal should be installed.

Also, there are variation of criteria to be applied depending upon the nature and conditions of each terminal, which need a separate study solely intended for bus terminal improvement or development. Therefore, in this study, priority is placed mainly from engineering viewpoints based on field reconnaissance and limited data on the physical condition of each bus terminal.

Through discussions with the counterparts, the Study place the first priority on Pasar Sentral Terminal judging from its function, the greatest number of bus users and bus operational frequency and the physical conditions of its service facilities such as lay out of berth, bus bay, pavement, etc.


Table 6.7.4 shows the priority of bus terminal improvement.

#### 2) Bus stop

The implementation of these plan shall be carried out at selected bus stops at the same time, because the improvement of bus stops is an urgent work from the view point to secure smooth traffic flow at bus stop and to increase bus services.

**Table 6.7.4 Priority of Bus Terminal Improvement**

Terminal Name	Criteria	Function	Bus frequency	No. of Bustrian Terminal Users	Priority
1. Pasar Central	●	●	●	●	①
2. Panaikang	●	●	●	●	②
3. Pa'baeng-baeng	●	●	●	●	③
4. Sungguminasa	●	●	●	●	④
5. Daya	●	●	●	●	⑤
6. Mangasa	●	●	●	●	⑥
7. Panampu	●	●	●	●	⑦
8. Pasar Panakkukang	●	●	●	●	⑧
9. Parang Tambung	●	●	●	●	⑨


 High  
 Low

## 6.8 Becak Transport Improvement Plan

### 6.8.1 Becak Transport Problems

The following becak transport problems are identified by the field surveys on road traffics, road conditions and becaks which were carried out by the Study Team in July, 1988.

#### (1) Becak accidents

According to the traffic police department, approximately one hundred becak accidents were recorded during 1986 and 1987 in Ujung Pandang. It seems that the actual number of becak accidents are much more than recorded.

#### (2) Decrease of traffic capacity

It seems that becak traffic is giving adverse effects to the traffic capacity of the road to decrease, even though these effects can not be quantitatively identified.

#### (3) Decrease of travel speed

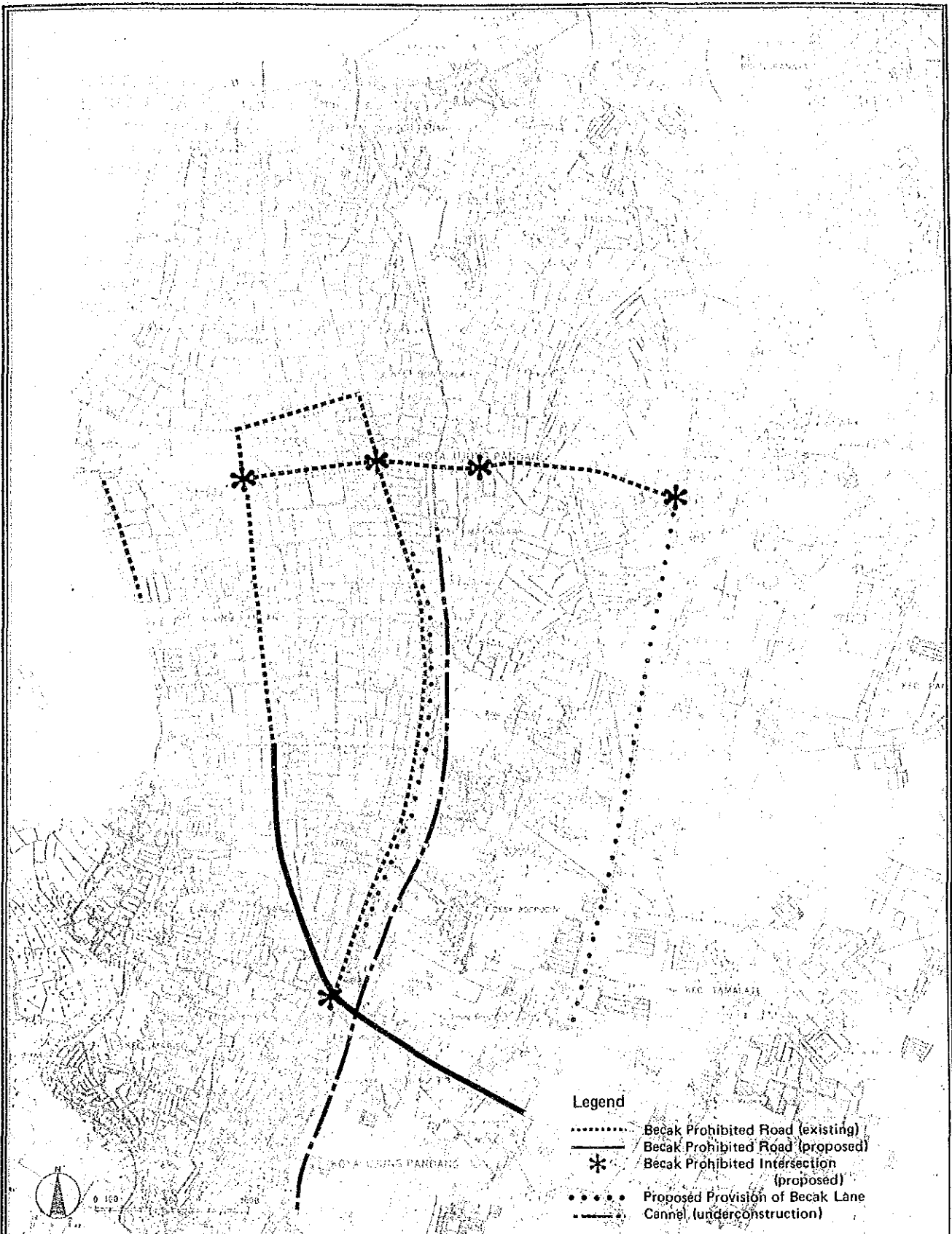
The travel speed of motorized vehicles is quite different from that of non-motorized vehicles. That travel speed survey conducted by the Study Team reveals that an average travel speed of motorized vehicles in urban area of Ujung Pandang is 21 km/h, while that of becaks is 10 km/h. Therefore, on those roads having heavy traffic, becak traffic causes decrease of travel speed of motorized vehicles.

### 6.8.2 Planning Strategy

In order to solve the above mentioned problems in Ujung Pandang, the most effective measure shall be to control the becak traffic in the urbanized area. There are two (2) types of control of the becak traffic:

- a) To close some of the road sections to becak traffic.
- b) To segregate becak traffic from motorized traffic on some of the roads or road sections by installation of separator.

There are a few examples of the effective control of the becak traffic. In Jakarta the capital of Indonesia, the becak traffic is closed to some districts and major roads. Also, in Penang City in Malaysia, becak traffic is limited within the special area like historical place mainly serving for tourists.



**UJUNG PANDANG AREA  
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**Fig.**  
6.8.1

**Becak Improvement Plan of Step 1**

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Taking into account the problems and measures regarding becak traffic above mentioned, it is vital for Ujung Pandang like Jakarta and Penang, to control the becak movement in the urban area of the city in order to secure smooth flow of traffic of the motorized vehicles and to contribute to traffic safety.

In this connection, to apply becak control measures, it is proposed that such control shall be executed not at once in all the urban area, but in the selected zones step by step, in recognition of the fact that the becak is still one of the most popular transportation modes in this city.

To control phasing is also proposed as follows:

- a) 1st phase : Selection of certain road sections and intersections where becak traffic is prohibited
- b) 2nd phase : Selection of certain zones where becak traffic is prohibited
- c) 3rd phase : Complete prohibition of becak traffic within urban area.

It is to be noted that in application of this control more extended services of public transportation shall be provided by buses or microlets.

### **6.8.3. Basic Concept for Planning**

The becak traffic control is to be carried out from the following view points:

- (1) To secure the function of arterial road

The main function of the arterial road is to accommodate intercity traffic while the role of local roads is to give access to the residents from either arterial or collector roads. In order to secure the main function of the arterial roads, the becak traffic is to be closed to this kind of roads and is permitted and limited within the local road.

- (2) To decrease becak accident

Becak traffic accidents occur and are concentrated at intersections. Therefore, it is desirable that becak movements is prohibited at major intersections in the urban area of the city to prevent such accidents. Just same as securing the arterial road function, becak movements are to be restricted within certain limited zones.

#### 6.8.4 Planning

Based on planning strategy, basic planning concept and examination of becak survey results, becak control plan is proposed as shown below.

This plan consists of three (3) steps:

1) Step 1 : Strengthening of traffic regulation to becaks

The becak shall be prohibited to enter the arterial roads and major/busy intersections as soon as possible. The prohibited roads and intersections are illustrated in Fig. 6.8.1.

The no-entry sign for becaks shall be installed around these intersections and appropriate segments of the roads. On the other hand, in order to secure becak service at Jl. Veteran and Jl. A. Pettarani, one-way becak lane shall be set as shown in Fig. 6.8.2. Becak lane width is designed to be 2.5 m in consideration of the fixed width of becaks and allowance for its mutual overtaking. The sketch of Jl. Veteran with becak lane is illustrated in Fig. 6.8.3.

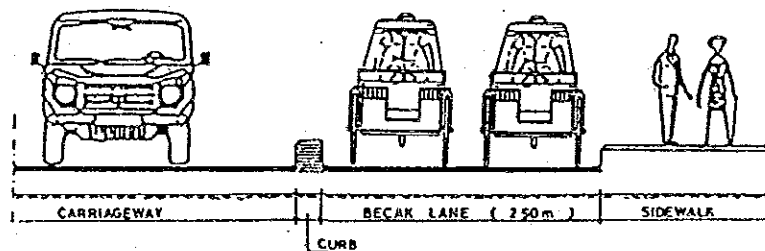


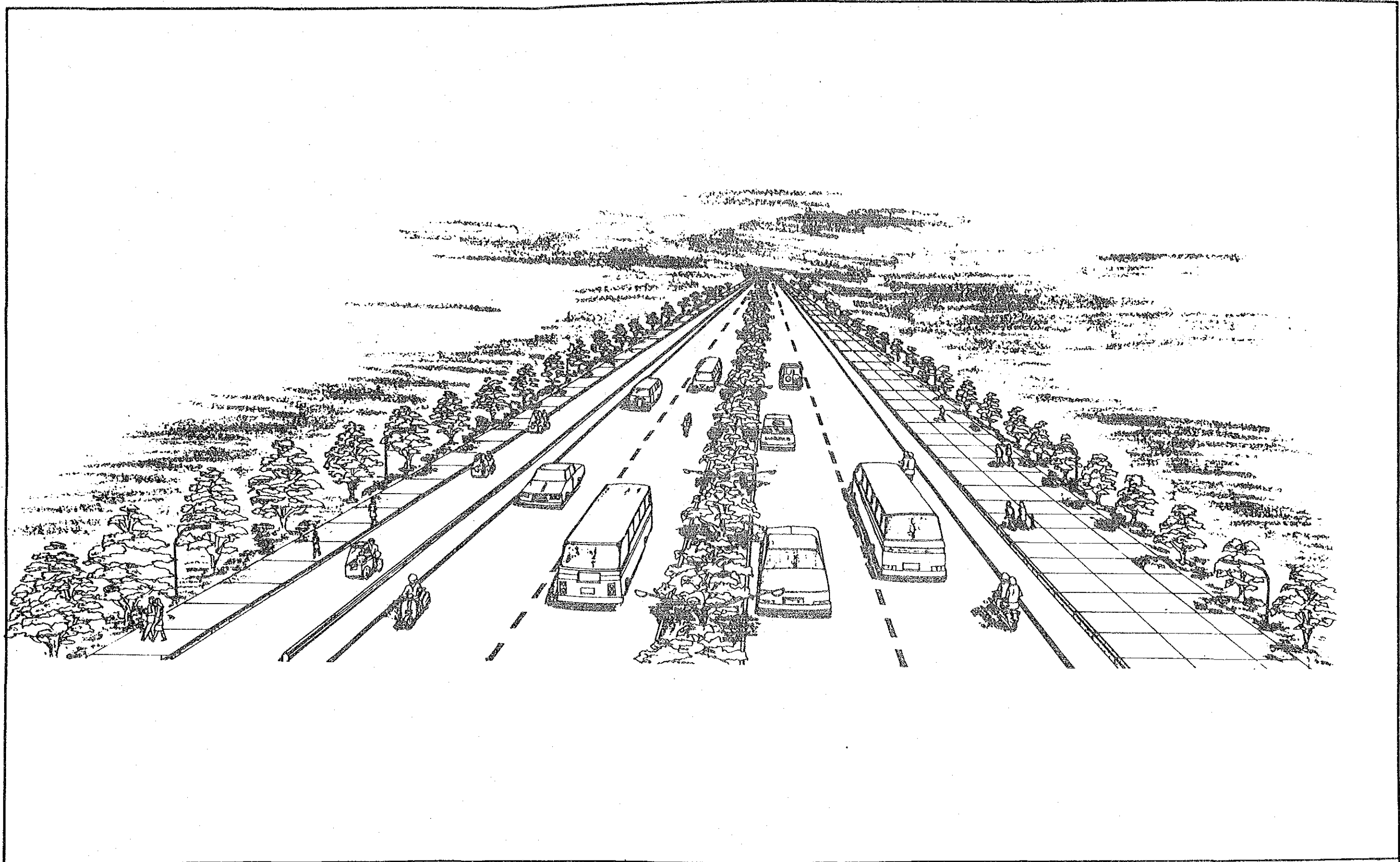
Fig. 6.8.2 Typical Cross-Section of Becak Lane

Although there exists a traffic regulation to prohibit entry of becaks to the arterial roads, this regulation is not strictly followed by many becak drivers. This causes unnecessary traffic accidents as well as obstacles to smooth flow of traffic on the arterial roads. Therefore, it is suggested to strengthen the enforcement of this regulation by the traffic police with application of some penalty to the becak drivers to achieve its original objective.

In addition, proposed becak lane on Jl. Veteran and Jl. A. Pettarani should be converted to a sidewalk, when the Inspection Road along the new canal under construction at this stage will be completed, since becak traffic will be able to utilize this Inspection Road, instead of those two roads.







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Fig.  
6.8.3

Imaginary Sketch of Provision of Becak Lane

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HIGHWAY DEVELOPMENT STUDY**

**Fig.  
6.8.4**

**Becak Improvement Plan of Step 2**

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## 2) Step 2 : Provision of becak movement limited zone

Later on, when the above mentioned measures have been found to be successful, a stricter control of becak movements, by which the becak movements are limited within each zone as shown in Fig. 6.8.4, is proposed. The area of each zone is decided by average trip length of becaks (about 1.8 km) which was obtained from becak movement survey.

## 3) Step 3 : Extension of bus transport service

Active extension of bus (including microlet) transport services is strongly recommended to those areas where the means of public transport have been performed by becaks. This extension means expansion of service routes to those local roads being not covered so far, and increase of service frequency.

It is also recommended that when the congestion degree of respective collector road exceeds 0.8 - 0.9, the traffic regulation to prohibit becak's entry to such roads shall be applied. In addition, the becak traffic is prohibited within urban in this step. However, it is recommended that some becak traffic would remain solely to promote tourism and their movements shall be fixed within certain road sections.

The becak problem is serious under present traffic conditions. Therefore, it is recommended that above plan shall be implemented as soon as possible starting from the first step.

### 6.8.5. Cost Estimation of Becak Improvement Plan

The improvement cost (direct construction cost) for becak improvement plan is estimated based on unit cost (See 5.9) as quoted by thousand Rupiah in 1988 prices. Improvement cost consists of the cost to provide the becak lane and no-entry signs for becak on arterial roads and major intersections.

Cost estimation for the becak improvement plan is shown in Table 6.8.1.

**Table 6.8.1 Cost for Becak Improvement Plan**

Unit: Thousand Rupiah  
1988 Prices

Cost Estimated Items		Length (m) Quantity (pc)	Cost
Provision of becak lane	Jl. Veteran	2,370	48,704
	Jl. A.Pettarani	4,180	12,223
Sub-Total			60,927
Provision of no-entry sign	type I*	136	6,800
	type II*	44	15,400
Sub-Total			22,200
Total			83,127

\* Type I pedestal type

\* Type II overhung type