# THE REPUBLIC OF INDONESIA

# REPORT
# ON
# FEASIBILITY STUDY
# OF
# NEW RAILWAY LINE FOR CENGKARENG AIRPORT

July, 1983

JAPAN INTERNATIONAL COOPERATION AGENCY

(JICA)

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# PREFACE

In response to the request of the Government of the Republic of Indonesia, the Government of Japan decided to conduct a feasibility study on the Project to construct a New Railway Line linking the city of Jakarta with the Cengkareng Airport to be opened in December 1984, and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA sent to Indonesia the study team headed by Mr. Akira Tachibana, Director of the Japan Railway Technical Service in September 1982 under the guidance of the Supervisory Committee chaired by Dr. Hideo Nakamura, Professor of the University of Tokyo.

The team held discussions with the officials concerned of the Government of the Republic of Indonesia on the Project and conducted a field survey over a period of three months in Indonesia. Subsequently, further studies were made in Japan and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

July 1983

Keisuke Arita
President
Japan International Cooperation Agency

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# CHAPTER 1 INTRODUCTION

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## 1.1 Background for Study

As the result of brisk industrial and economic activities in recent years, the city of Jakarta and its suburbs are industrialized on a large scale with housing construction, now achieving socio-economic growth to a remarkable extent with resultant concentration of population.

Today, because of rapid increases in the air traffic demand the existing two airports of Halim and Kemayoran appear to be no longer capable of absorbing such demand increases. Such being the circumstance, the Government of Indonesia has embarked construction of the Jakarta International Airport Cengkareng in the suburbs of Jakarta. It is scheduled to be completed in 1984.

A heavy traffic jam as seen in the city of Jakarta and its surroudings rises to serious problems such as air pollution and traffic accident due to congestion of the traffic and concentration of emission gas. Besides those problems, there is a global concern of energy saving, to which Indonesia can stand in no way at any exceptional position.

All those problems taken into consideration, it is certainly a urgent task of vital importance to construct a new access railway system at the earliest possible date from the city center of Jakarta to the new airport and its vice versa.

## 1.2 Comparison between Medium Size Transportation System as the Airport Access Transport and Conventional Railway

In recent years, the surface traffic facilities such as surface cars and buses in large or local medium cities are declining their functions gradually in the face of problems such as increased time for trip and difficulty in regular operation with punctuality because of road traffic congestion resulting from increase in the number of vehicles. In the meantime, the medium transit system as represented by the monorail and

any other new alternative traffic system has become highlighted, in place of the urban high-speed railway system by viaduct or underground track because of difficulty in land acquisition and high construction costs, though it remains unaffected by any road traffic congestions in the least.

An attempt to employ the monorail for the airport access traffic system originated from the Tokyo Monorail which was constructed as the means of access to Haneda Airport in Tokyo. This system seems to be moving into brisk demand. Recently, there is a plan to construct the monorail starting from the nearest railway station to the Osaka International Airport as the traffic means of access.

Table 1.2.1 shows main facilities of medium transit now being operated in Japan. The medium scale transit system including the monorail and the new access traffic system may be featured by the following points as compared with the conventional railway system.

(1) The system is primarily purposed to relieve congestion of the urban traffic. It is designed with viaduct construction so as to make use of road separation belts and rivers as the right-of-way. Construction costs are relatively high as shown in Table 1.2.1.

(2) In terms of maximum speed, the system is lower than the conventional railway.

(3) High costs are required for maintenance of tire and turnout.

(4) It is impossible to utilize the existing railway network because the new system is built up independently.

Table 1.2.1 Major Medium Scale Transit Systems in Japan

| Type | Line | City | Length in km | Construction cost (bil. Rp) | Construction cost per km (bil. Rp) | Commercial start up date | No. of passengers (Estimated) (1,000/day) | Capacity/car (No. of cars in train set) | Running headway |
|---|---|---|---|---|---|---|---|---|---|
| New transportation system | Nanko Port Town | Osaka | 6.9 | 102 | 15 | 1981, 3 | 72 (1990) | 75 (4) | 1'30"∿3' |
| | Port Island | Kobe | 6.4 | 104 | 16 | 1981, 2 | 68 (1985) | 75 (6) | 2'30"∿5' |
| | Tokadai | Komaki | 7.9 | 61 | 8 | 1987 | 43 (1990) | 70 (4) | 2'40"∿6' |
| Monorail | Kokura | Kita-Kyushy | 8.7 | 127 | 15 | 1984 | 102 (1995) | 112 (4) | 3'∿6' |
| | Yamanote | Chiba | 17.7 | 211 | 12 | 1987 | 119 (1990) | 110 (4) | 2'15"∿5' |
| | Tokyo Monorail | Tokyo | 13.0 | - | - | 1964 | 80 | 127 (4∿6) | 7' |
| | Osaka Monorail | Ikeda | 13.5 | 148 | 11 | 1986 | 107 | 120 (4) | 3'∿10' |

Both railway system and new traffic system as the means of access to Cengkareng Airport may be compared as shown in the following Table.

Table 1.2.2 Comparison between the Medium Capacity Transportation Modes and Railways

| | Transportation capacity (1,000 persons a day) | Speed (km/h) | Cost of construction, double track (bil. Rp) | Maintenance | Utilization of railway network | Evaluation |
|---|---|---|---|---|---|---|
| Railway | 250 | 100 | Approx. 4.5/km | Easy | Applicable | o |
| Medium size transportation modes | Upper limit 50 ∿ 100 | 60∿80 | 7.5 ∿15/km | Partially difficult | Not applicable | × |

As shown above, it is conceivable that the railway system would be better suited as the means of access to Cengkareng Airport by due reference to the result of comparison in respect of traffic volume, speed, construction cost, maintenance and railway network utilizability.

Costs of maintenance, operation and management of medium size transportations are shown in the following table.

Costs of Maintenance, Operation
and Management of Medium Size Transportations

Unit: Million Rp

| Line / Item | Mono-rail | | New transportation system | |
|---|---|---|---|---|
| | Tokyo Mono-rail | Shonan Mono-rail | Kobe New trans-portation | Osaka Nanko-Line |
| Track maintenance | 714 | 111 | 308 | 151 |
| Power feeding maintenance | 360 | 139 | 635 | 293 |
| Car maintenance | 835 | 221 | 833 | 546 |
| Operation | 1,203 | 521 | 789 | 1,346 |
| Station staff employee and others | 1,089 | 215 | 1,014 | 1,141 |
| Management of maintenance, operation and general affairs | 2,882 | 484 | 1,054 | * 42 |
| Depreciation amount | 2,098 | 551 | 3,127 | 5,382 |
| Total | 9,181 | 2,242 | 7,760 | 8,901 |
| Number of passengers million/year | 26.7 | 8.5 | 24.2 | 7.5 |
| Total length of track | 25.4 | 6.6 | 9.3 | 13.5 |
| Length of line | 13.0 | 6.6 | 6.4 | 6.6 |
| Car-kilometer (1,000 km) | 5,542 | 1,051 | 3,790 | 3,166 |
| Train-kilometer (1,000 km) | 1,149 | 449 | 631 | 791 |
| Number of employees | 338 | 93 | 126 | 144 |

Source: Ministry of Transportation, Japanese Government (Year 1981)

Rate : 670 Rp = $1 = ¥270.-

* General management cost is not included, of which amount is earmarked in the budget of Osaka City Metro.

1.3 Role of New Access Railway to Airport

(1) Whilst the size of aircraft is being enlarged to learger jumbo so as to absorb ever-increasing demand for air traffic, any large international airport all over the world is confronted with such problems as prolonged time length to be required for access transport to or from the airport and difficulty in the security of operational punctuality because of chronic road traffic congestion on the way from the city center to the airport.

To solve this current problem, the railway system is introduced as the means of access to and from the airport as shown in Table 3.1.1.

(2) The followings are the reasons for introduction of the access railway as the new system.

i) To introduce the railway system to cope with increased access time and uncertainty about operational punctuality, both of which may arise from road traffic jam.

ii) To introduce the railway system in advance to provide for future possible increase of demand for access transport.

iii) To introduce the railway system with the objects to shorten access time to the airport over a long distance and to secure operational punctuality.

iv) To introduce the railway system so as to carry passengers within a far and wide range through the existing railway network, even though the railway may be considered as unnecessary in view of the present necessity of railway for access transport.

At the present situation, for a single reason or plural reasons combined out of the those aforestated, the new access railway system is being planned for construction. That is to say, it can be said that the railway system is introduced for the sake of required advantages such as mass transit, high speed and operational punctuality.

(3) It is estimated that annual total of air passengers utilizing Cengkareng Airport would reach 32 million by 2000 A.D.

The functional role to be performed by the New Airport Railway System is to carry, not only air passengers, but also any other passengers to and from the airport including airport workers and visitors safely, comfortably, rapidly in a short time and punctually in accordance with the operation diagram.

The New Airport Access Railway provides its excellent access service to airport passengers within the whole metropolitan area of Jakarta by use of the existing railway network.

(4) If the New Airport Access Railway can fulfil the foregoing functional role as designed, it will contribute much toward reduction of traffic accidents, easement of air pollution, oil saving and time cutting and, eventually, toward growth of the nation's economy.

(5) In order to make it possible for the New Airport Access Railway to demonstrate its functional role, the following matters should require special consideration.

i) Bus service must be provided in the closest tie-up between the airport station and the airport terminal building so that required waiting time by passengers can be reduced to most minimum.

The station platform and the bus structure must be designed elaborately for convenience of easy exchange of passengers from bus to railway or its vice versa.

ii) No intermediate station is constructed between the junction station with the existing line and the airport station because of needs to comply with legislative restriction upon the development scheme along the route and to secure rapidity in the running speed of trains as the access railway.

iii) The New Airport Access Railway must be designed with the optimum method of linkage to the existing railway network, so that it can pass through a great number of stations where passengers to the airport may be emerging and absorb all those passengers spreading far and wide.

iv) The New Airport Access Railway must be so designed as to enable passengers to proceed to Bekasi, Bogor and Merak by minimum times of exchange of trains. Special consideration must be paid to the station facilities and the method of connection with the existing lines for convenience of train exchange.

Table 1.3.1 Airport Access Railways of The World

| Region | Country | City | Airport | Type of access railway |
|---|---|---|---|---|
| Europe | United Kingdom | London | Heathrow | Subway |
| | | London | Gatwick | National Railways |
| | France | Paris | de Gaulle | " (plus bus) |
| | | Paris | Orly | " (plus bus) |
| | West Germany | Frankfurt | Frankfurt | National Railways |
| | | Düsseldorf | Düsseldorf | National Railways |
| | | München | Riem | " (plus bus) |
| | Switzerland | Zürich | Koten | National Railways |
| | Netherlands | Amsterdam | Schiphol | National Railways |
| | Belgium | Brussels | National | Private Railways |
| | Austria | Wien | Schwechat | National Railways |
| | Spain | Barcelona | Barcelona | Private Railways |
| North America | United States | New York | Kennedy | Subway (plus bus) |
| | | New York | Newark | Amtrack (plus bus) |
| | | Washington | National | Subway (plus bus) |
| | | Boston | Logan | Subway (plus bus) |
| | | Cleveland | Hopkins | Subway |
| Asia | Japan | Tokyo | Haneda | Private Railways (monorail) |
| | | Tokyo | Narita | Private Railways (plus bus) |
| | | Sapporo | Chitose | National Railways |

## 1.4 Purpose of Study

The purpose of this study is divided largely into the following two items.

(1) To conduct feasibility study for construction of the New Airport Railway System to connect together both Jakarta City and Cengkareng Airport

(2) To perform detailed design for the airport terminal station and other railway facilities

With respect alternative routes for construction of the New Airport Railway System, ten (10) alternative routes as detailed in Chapter 5 have been evaluated from various aspects. Finally, after such comparative study, two (2) alternatives of either Route A or Route C with the greatest advantages have been studied to a depth of details.

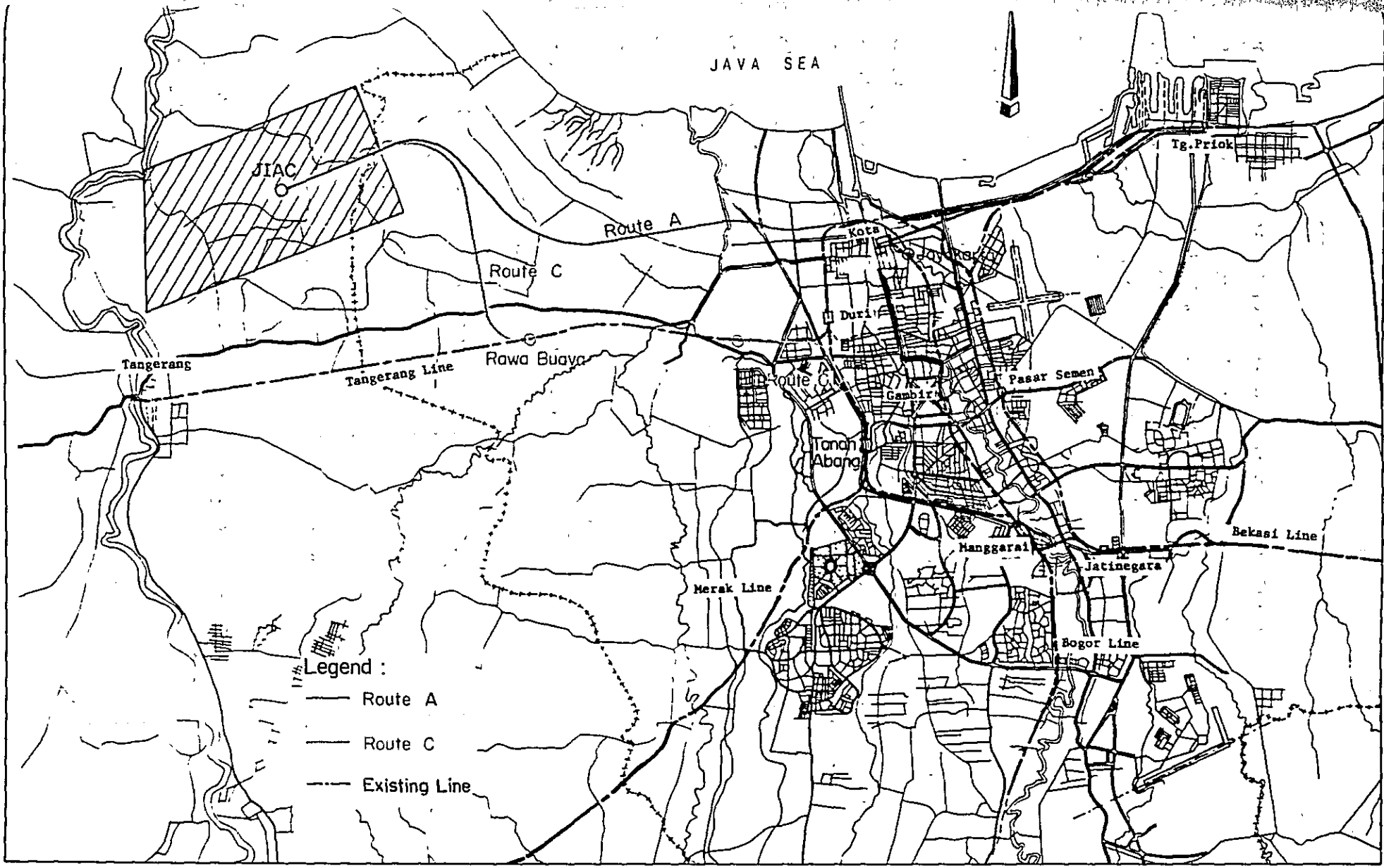
Route A and Route C may be outlined respectively as follows.

Route A:

This route is approached to the Western Line at Kota Intan Station after passing through the north-western part of Jakarta starting from east side of the airport. Then, the route runs in parallel with the Western Line and joins the Central Line after flying over the existing railway lines by viaduct near Kota Station. Trains are operated up to Jatinegara Station via Sawah Besar, Gambir, New Cikini and Manggarai.

Route C:

This route gets into the junction with Rawa Buaya Station on the Tangerang Line after running to south from the airport and goes further to south after branching from the Tangerang Line near Grogol until it finally joins the Western Line. Trains are operated up to Jatinegera Station via Rawa Buaya, Tanah Abang, Dukah and Manggarai.


JAVA SEA
JIAC
Route A
Route C
Tangerang
Tangerang Line
Rawa Buaya
Kota
Duri
Gambir
Pasar Semen
Tanah Abang
Manggarai
Jatinegara
Tg.Priok
Bekasi Line
Bogor Line
Merak Line
Legend :
Route A
Route C
Existing Line

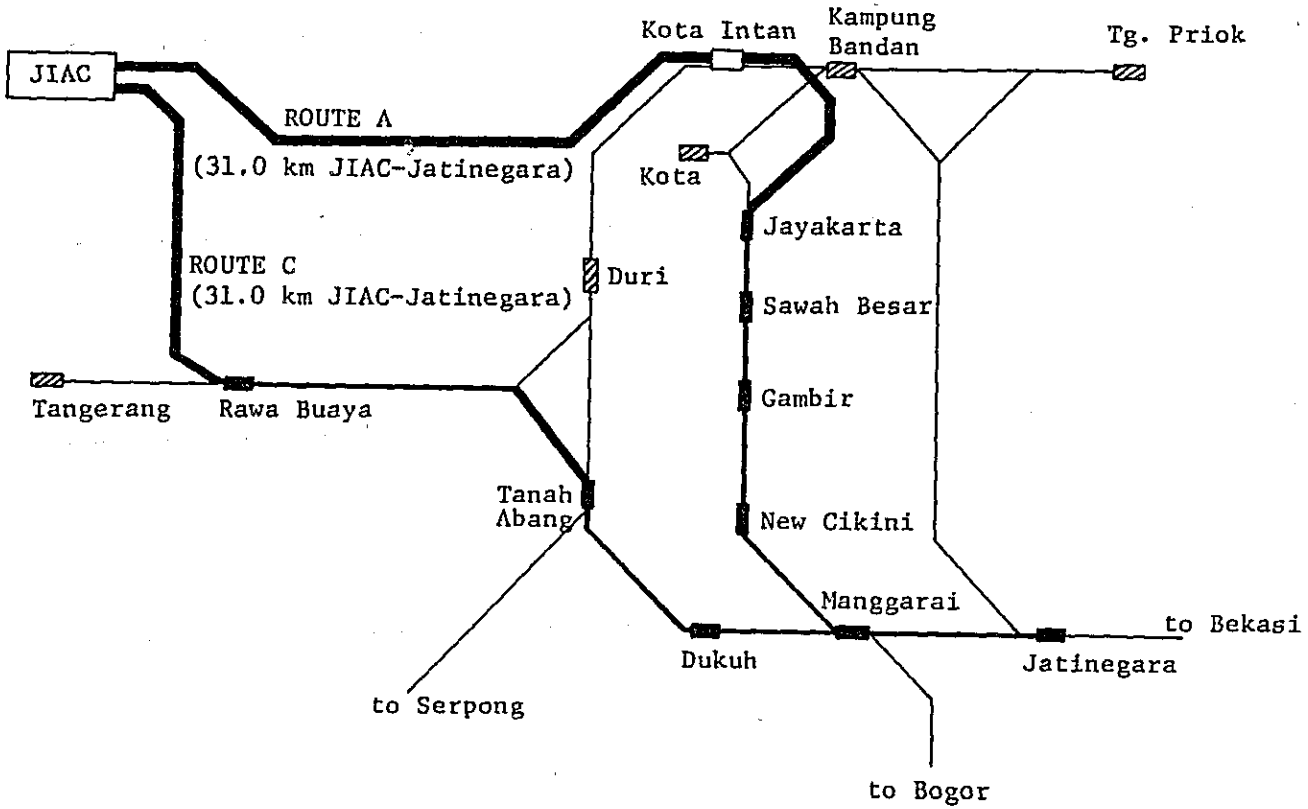



Fig. 1.4.2 Sketch of Route A and Route C

## 1.5 Study Process

The total process of study may be divided largely into seven (7) phases as specified hereunder.

(1) Phase 1: Preparatory works in Japan

Review of collected data,
Review of survey strategies,
Preparation of Inception Report

(2) Phase 2: Site survey works in Indonesia

Site survey works were conducted for a period of about three (3) months from September 2 to November 27, 1982, covering the following major work items.

a. Presentation, and briefing and discussion of Inception Report

b. Discussing with and hearing from governmental authorities and agencies concerned

c. Geological survey

d. Route reconnaissance

e. Interview survey of existing airport

f. Collection of pertinent information and data

g. Formulation of basic conception

h. Alternative plan for route and airport station

i. Comparative study of alternatives

j. Hearing from and discussion with authorities and agencies concerned on each alternatives

k. Preparation of memorandum

On closing of site survey works the memorandum was presented, together with its briefing, to the Steering Committee of the Indonesian side.

(3) Phase 3: Domestic works for preparation of Interim Report in Japan

Domestic works for preparation of the Interim Report continued from December 1982 to middle of January 1983, covering the following items:

a. Precise check of demand forecast

b. Review of railway construction plan and cost estimation

c. Calculation of E.I.R.R.

(4) Phase 4: Presentation and briefing of Interim Report

Presentation and briefing were carried out in Indonesia for a period of two weeks from January 17 to 31, 1983.

° Briefing on Interim Report

The joint steering committee meeting attended by both Indonesian and Japanese representatives was held for presentation and briefing of Interim Report. On that occasion, the change of policy for land use was announced officially by the Indonesian side.

As the result, therefore, no consent was obtained in respect of the proposed routes, though the proposal for the airport terminal station was mutually agreed to between the both parties. With this result in mind, the Study Team tried to collect necessary data and general concept from governmental authorities and agencies concerned for further while the Team members were staying in Indonesia. And, with respect of proposed routes it was agreed that two alternatives of Route A and Route C should be taken up for further studies.

(5) Phase 5: Domestic works for preparation of Interim Report II in Japan

Interim Report II was drafted as it became necessary to make review of this study due to change of basic conditions.

Domestic works for preparation of Interim Report II were carried out for a period from February to the latter part of March, 1983. The contents of works are as follows.

a. Revision in basic conception

After completion of briefing on Interim Report, it became impossible to develop the wayside zone of the proposed routes in accordance with the governmental basic policy for land use announced by the Indonesian side. Therefore, the basic conception for the New Airport Access Railway was revised to serve the sole purpose of carrying only those passengers related to the airport as the main role of the New Airport Railway System.

That is to say, all the intermediate stations on the route, not to mention of those stations to be situated in the development-restricted zone, were deleted from the original design conception so that trains can be operated at high speed without stoppage at every station.

However, there remained, as originally been planned, some necessary stations for junction with the existing lines.

b. Review of traffic demand forecast

On the basis of revised basic conception, traffic demand forecast was reviewed.

c. Review of railway facility plan and cost estimation

d. Calculation of E.I.R.R.

(6) Phase 6: Presentation, briefing and discussion of Interim Report II

Presentation of Interim Report II, together with briefing and discussion, was made in Indonesia for a week starting from March 20 to March 26, 1983.

The joint committee meeting was held between both Indonesian and Japanese representatives by presentation, briefing and discussion of Interim Report II. Then, decision was made as to the basic guideline for preparation of the Draft Final Report.

(7) Phase 7: Domestic works for preparation of Draft Final Report

The following works were carried out during the period of the latter part of March to the corresponding part of May, 1983.

a. Review of railway facility plan

b. Preparation of Draft Final Report

## 1.6 Organization

Listed hereunder are members involved of Steering Committee on the Indonesian side and counterpart experts and also members of Supervisory Committee and Study Team on the Japanese side.

## Supervisory Committee Members

Chairman: Dr. Hideo NAKAMURA
Professor
Department of Civil Engineering
University of Tokyo

Member: Mr. Shunsuke OGATA
Special Assistant to the Director
International Affairs Division
Civil Aviation Bureau
MOT

Member: Mr. Koichi AOKI
Director of the Designing Department
Japan Railway Construction Public Corporation

Member: Mr. Norio FUKUSHIRO
Senior Officer of Shinkansen Facility Section
National Railway Department
Railway Supervision Bureau
MOT

Member: Mr. Satoru ONOYAMA
Senior Officer for International Cooperation
Railway Supervision Bureau
Ministry of Transport (MOT)

Coordinator: Mr. Mikio TASHIRO
Social Development Cooperation Department
Japan International Cooperation Agency

## Study Team Members

Mr. Akira TACHIBANA
Team Leader
Executive Director
Japan Railway Technical Service (JARTS)

Mr. Tadashi KUME
Member (City and Regional Planning)
Adviser to JARTS

Mr. Nobuhiro KOYAMA
Member (Transport Demand Forecasting)
Adviser to JARTS

Mr. Satoshi TAKEDA
Member (Train Operation Planning)
Adviser to JARTS

Mr. Shinji YAMANE
Member (Railway Location)
Assistant to Director
Tokyo Office
Japan Railway Construction Public Corporation (JRCC)

Mr. Kiyoshi EDO
Member (Railway Location)
Assistant to Director
Shinkansen Construction Office
JRCC

Mr. Kohhei MURATA
Member (Structure Planning)
Adviser to JARTS

Mr. Hideo SHIBUYA
Member (Station Planning)
Assistant to Director
Research and Planning Division
Tokyo 3rd Construction Office
Japanese National Railways (JNR)

Mr. Toshiyuki SHIRAISHI
Member (Topographical Surveying)
Adviser to JARTS

Mr. Ikujiro KIKUTA
Member (Planning for Construction Execution)
Chief Engineer
JARTS

Mr. Masatoshi HONMA
Member (Terminal Station Planning)
Adviser to JARTS

Mr. Shinichi SAKABE
Member (Terminal Station Planning)
Adviser to JARTS

Mr. Hiroshi WATANABE
Member (Electrification Planning)
Adviser to JARTS

Mr. Takashi NISHIDA
Member (Signal and Telecommunication Planning)
Tokyo Systems Development & Construction Office
JNR

Mr. Kazumi HONNABETA
Member (Rolling Stock and Workshop planning)
International Department
JNR

Mr. Junji BAN
Member (Economic and Financial Analysis)
Adviser to JARTS

Mr. Masashi UCHIYAMA
Member (Aerial Photo Surveying)
Adviser to JARTS

Mr. Akira MAKI
Member (Geological Surveying)
Adviser to JARTS

## Steering Committee Members

| | | |
|---|---|---|
| 1. | Ir. Giri S. Hadihardjono MSE: | Directorate General of Land Transport and Inland Waterways |
| 2. | Gatot Soedjantoko: | Directorate General of Land Transport and Inland Water ways |
| 3. | Ir. Wuryanto: | Directorate General of Air Transportation |
| 4. | Hajadi: | Jakarta International Airport Ceng-Kareng |
| 5. | Sampoerna Rafioedin: | Indonesian State Railways |
| 6. | Drs. Darmawan: | Board of National Development Plan (Bappenas) |
| 7. | Nurdin Manurung: | Directorate General of Bina Marga |
| 8. | Agung Alfian: | Birro I Department of Transportation |
| 9. | Ir. Pantiarso: | Jabotabek Railway Porject |
| 10. | Ir. Soeparto: | Jabotabek Railway Project |
| 11. | Sampoerna Rafioedin: | Indonesia State Railways |
| 12. | M. Arief: | Department of Transportation |
| 13. | Ir. Bambang S.P.: | Directorate General of Cipta Karya |
| 14. | Abdul Razak Ad: | Directorate General of Bina Marga |
| 15. | Ir. Parlindungan Tarigan: | Directorate General of Land Transport and Inland Waterways |
| 16. | Marjono: | Jabotabek Railway Project |
| 17. | Kenang: | Indonesian State Railways |
| 18. | Wahjudi: | Indonesian State Railways |
| 19. | Ir Budihardjo Sukmadi: | Region Planning and Development Board of DKI Jakarta |
| 20. | Bachtiar M.: | Department of Transport, Communication and Tourism |
| 21. | Thamrin S.H.: | Department of Communication, Transportation and Tourism |
| 22. | Mr. Yulvi: | Department of Communication, Transportation and Tourism |
| 23. | Ir. Wahyono: | Research and Development of Land Transport and Inland Waterways |

## Indonesian Counterpart Experts

| | | | |
|---|---|---|---|
| 1. | Ir. Djauhari P. | Project Officer | PHB. DRAFT |
| 2. | Ir. Marnalom | Civil Engineer | PHB. DRAFT |
| 3. | Ir. Satriyo K. | Civil Engineer | JABOTABEK |
| 4. | Ir. Nico Diajasinga | Civil Engineer | JABOTABEK |
| 5. | Tohir Kartabrata | Train Operation | JABOTABEK |
| 6. | Ir. Heru Sasongko | Train Operation | JABOTABEK |
| 7. | Ir. Sutan Helmy | Electrification Planner | JABOTABEK |
| 8. | Marjono | Electrification Planner | JABOTABEK |
| 9. | Ir. Nugroho | Station Planner | JABOTABEK |
| 10. | Ir. M. Hidayat | Telecommunication Planner | JABOTABEK |
| 11. | Sumartojo | Rolling Stock & Workshop | JABOTABEK |
| 12. | Ir. Djoko Muljanto | Rolling Stock & Workshop | JABOTABEK |
| 13. | Darman Manulang | Economist | JABOTABEK |
| 14. | Ir. Djohan Effendi | City Planner | ANGK. KOTA |
| 15. | Ir. Parlindungan T. | Traffic Demand Forecast | PHB. DRAFT |
| 16. | Ir. Bilkio | Traffic Demand Forecast | PHB. DRAFT |
| 17. | Ir. Kistubaka | Air Terminal Planner | PHB. UDARA |
| 18. | Yunus | Administrator | PHB. DRAFT |
| 19. | Slamet | Administrator | PHB. DRAFT |
| 20. | Sri Ratna Mutiarawati | Administrator | PHB. DRAFT |

# CHAPTER 2 LAND USE

# CHAPTER 2 LAND USE

## 2.1 Existing Situations of DKI Jakarta

### 2.1.1 Physical Conditions

#### (1) Geography

The Study area is situated in the northwest region of Java Island, and its northern side facing the Java Sea is a flat plain. Towards the south it gradually rises to form the Prancak Plateau, from which many rivers flow to the sea forming an alluvial plain of very wide rice fields.

Jakarta City is situated near the Equator, being 6° in the south latitude and 107° in the east longitude. It is located partly on the alluvial plain at the mouth of the Ciliwung River and partly on the diluvium plateau of the southern Jakarta.

Since the 17th century, the river banks have been constructed or improved and canals excavated to keep the river flowing smoothly.

#### (2) Climate

The climate is described as tropical. Average monthly temperature varies only from 26.2°C to 27.4°C and the hourly fluctuation is much greater than that during the month.

The average yearly rainfall varies from about 2,000 mm near the coast to about 4,000 mm in the mountains. The greater part (approx. 80%) of the yearly rainfall takes place during the wet season, generally from November until May, with predominantly north-westerly winds. January is the wettest month with about 25% of the annual precipitation. The five months of the dry season, with predominantly north-easterly winds, are characterized by long dry spells, with the month of August on an average, receiving the minimum monthly rainfall (±3.5% of the yearly total).

The rainfall is characterized by high intensities and low occurrence probability, or in other words, heavy storms interspaced with long dry periods even in the wet season. The very high rainfall intensities during thunder-storms often are sharply localized. It has been observed that rainfall is generally concentrated in the afternoons and evenings, with 60 to 80% falling between 14:00 and 21:00 hours.

### 2.1.2 Socio-economic Situations

#### (1) Administrative regency in DKI Jakarta

DKI Jakarta is the capital of the Republic of Indonesia and the center of social and economic activities for the country.

It is divided into 5 wilayah (cities) and these cities are further divided into 30 Kecamatan which are in turn subdivided into 237 Kelurahan.

#### (2) Population

DKI Jakarta had a population of 6.5 million in 1980 which was 4.6% of whole the nation. The growth rate of population for DKI Jakarta is about 3.5% per annum, 1.5% of which is considered to be brought about by the migration into Jakarta. The rate of growth for the nation was 2.1% per annum between 1973 and 1980. The gross population density shows a high rate of 99 persons per hectare.

During the years 1973 to 1980, the population growth rates for BOTABEK (Kabupatens of Bogor, Tangerang and Bekasi, and Kotamadya Bogor) and JABOTABEK (DKI Jakarta and BOTABEK) were recorded to be 4.7%/yr. and 4.0%/yr.

Table 2.1.1 Population Growth in DKI Jakarta

| Year | Population 1/ (1,000 persons) | Growth rate (%/yr.) | Density 2/ (persons/ha) |
|---|---|---|---|
| 1973 | 5,142 | | 80.1 |
| | | 3.8 | |
| 1974 | 5,336 | | 83.1 |
| | | 9.1 | |
| 1975 | 5,554 | | 86.5 |
| | | 5.4 | |
| 1976 | 5,856 | | 91.2 |
| | | 1.8 | |
| 1977 | 5,959 | | 92.8 |
| | | 2.3 | |
| 1978 | 6,094 | | 94.9 |
| | | 2.4 | |
| 1979 | 6,239 | | 95.9 |
| | | 4.2 | |
| 1980 | 6,503 | | 99.2 |

Notes: 1/ The population added to DKI Jakarta by border change is taken from data provided by DKI Municipal Office, and the census population for each year is adjusted for the population figure for the city limits in 1980.

2/ Adjusted Population/Area (1980).

(3) Economic Development

DKI Jakarta shows a Rp 500,000 per capita income, which is more than the national average of Rp 286,000.

Real growth of the economy in DKI Jakarta has developed at a high rate of 10.2% p.a. and nominal growth at about 29.4% p.a., while real growth of the national economy has developed at a rate of 6.8% p.a.

Table 2.1.2 Economic Development in DKI Jakarta

| | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|
| Regional income 1/ (in billion Rupiah) | 880 | 1,180 | 1,446 | 1,685 | 2,449 | 3,190 |
| Per capita income 1/ (in thousand Rupiah) | 166 | 213 | 249 | 281 | 392 | 500 |
| Gross regional domestic product 2/ (in billion Rupiah) | 1,037 (100%) | 1,152 (100%) | 1,260 (100%) | 1,344 (100%) | 1,527 (100%) | 1,686 (100%) |
| 1. Agriculture | (2.09) | (1.52) | (2.23) | (1.94) | (1.73) | (1.59) |
| 2. Mining and Quarrying | - | - | - | - | - | - |
| 3. Manufacturing | (11.12) | (13.23) | (12.38) | (11.91) | (12.40) | (12.85) |
| 4. Construction | (4.42) | (4.98) | (5.18) | (5.38) | (5.25) | (6.22) |
| 5. Electricity, Gas & Sanitary water | (1.81) | (1.55) | (1.59) | (2.53) | (2.67) | (2.51) |
| 6. Transport & Communication | (7.58) | (7.71) | (7.53) | (7.51) | (7.93) | (7.97) |
| 7. Wholesale & Retail trade | (47.76) | (48.81) | (48.17) | (48.35) | (46.95) | (43.92) |
| 8. Banking & Other financial institution | (9.13) | (6.98) | (7.80) | (7.72) | (8.45) | (8.75) |
| 9. Ownership of dwellings | (2.89) | (2.74) | (2.61) | (2.51) | (2.28) | (2.13) |
| 10. Public administration | (10.16) | (9.50) | (9.64) | (9.24) | (9.28) | (11.28) |
| 11. Services | (3.04) | (2.95) | (2.87) | (2.89) | (2.52) | (2.78) |

Source: Regional Income of Jakarta 1975-1980, Jakarta Statistical Office

Note: 1/ at current prices

2/ at 1975 constant prices

(4) Car Ownership

In DKI Jakarta, about 760 thousand motor vehicles were registered in 1980, about 60% of which are motorcycles and 30% sedans, while in Indonesia 70% of the vehicles are motorcycles and about 20% sedans. The annual growth rates of registered motor vehicles are 8.4% and 14.8% on an average in DKI Jakarta and in Indonesia, respectively.

It was calculated that the vehicle ownership rate per one thousand capita was 117 and the one excluding motorcycle was 51.

Table 2.1.3 Registered Number of Vehicles in DKI Jakarta

Unit: 1,000 vehicles

| Year | Motor cycle | Passenger cars | Truck | Buses | Total |
|---|---|---|---|---|---|
| 1977 | 339.5 | 178.0 | 52.8 | 13.4 | 583.7 |
| 1978 | 369.4 | 190.6 | 56.4 | 17.1 | 633.5 |
| 1979 | 403.7 | 202.8 | 64.7 | 21.7 | 692.9 |
| 1980 | 428.1 | 222.3 | 77.8 | 29.4 | 757.6 |

Source: Vehicles and Length of Road Statistics, 1980
Biro Pusat Statistic, Jakarta

2.1.3 Land Use

(1) DKI Jakarta

DKI Jakarta is devided in to 5 wilayah of Central, North, West, South, and East Jakarta. Main Urbanized area and Public Facilities are concentrated in Central Jakarta and it expanding to North and South Jakarta. Population density of Central Jakarta is average of 269 perso/ha at year of 1978.

In North Jakarta, many industries and Warehouses are located along the coast line. The vicinity of Tanjung Priok port is a major industrial area in North Jakarta. However, eastern and western part of the wilayah is remaining as agricultural area. Development of residential area has been proceeding in South Jakarta.

East of Kali Angke in West Jakarta is now being rapidly developed due to the high urbanization pressure of Central Jakarta. Many programs of residential development and industrial development are now under going.

West of Kali Angke is identified as agricultural area.

Urban growth pressure from Central Jakarta is also extending to East Jakarta. Some part of the region is developed as the residential area and industrial area. However most part of the region is still remaining as agricultural area.

(2) Project Area

Study on existing land use and future development plan has been carried out to identify the existing land use and potential of future land development along the new railway line. The project area is shown in Fig. 2.1.1.

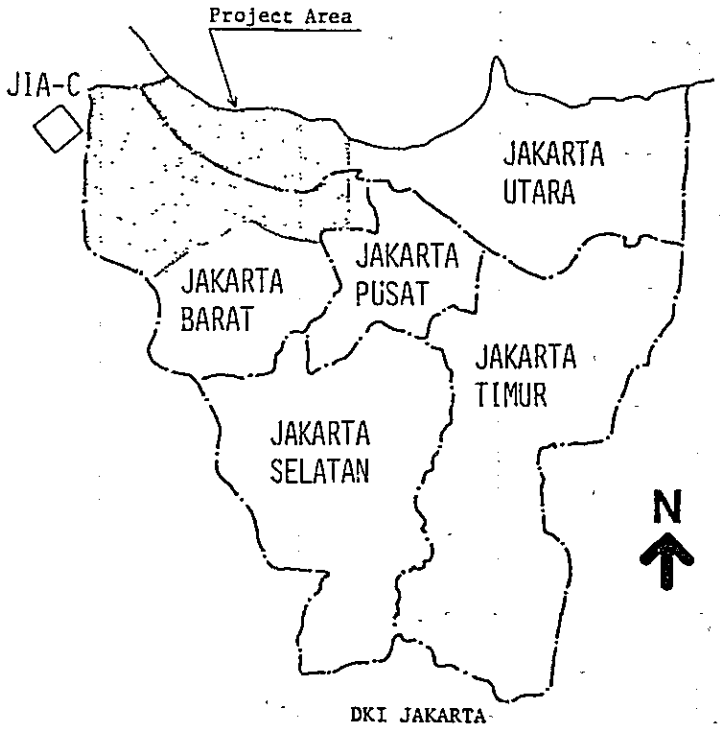



Fig. 2.1.1 Land Use Study Area

The project area is located in a part of Wilayah Jakarta Utara and Wilayah Jakarta Barat. The area is located in an area 5 km to 20 km from Central Jakarta, and it is in between Tangerang city and Central Jakarta.

Though the Jakarta - Tangerang road is the only arterial road in this area at this time, Jakarta-Tangerang Tollway which is now under construction will be open to traffic at the southern part of this area. Cengkareng Access Highway is planned at the northern part of this area.

Existing land use data was collected from land use map of Tata Kota Jakarta Barat and Tata Kota Jakarta Utara, and also from the field observation surveys along the alternatives of the New Railway Line. The information collected from the inventory was plotted on a map and zonal land use component was measured from the map.

Fig. 2.1.2 shows the land use in 1980, and Table 2.1.4 indicates the land use composition of the project area by zone.

Development potential of this area is considered very high and many real estate development programs are in progress due to the high rate of population increase of DKI Jakarta in the past several years and excellent accessibility to the center of the city from the area.

Location of manufacturing facilities is as shown on Fig. 2.1.3. The industrial development especially of medium and large scale manufactures has been progressing along the Jakarta - Tangerang road and Tangerang railway line.

Some of medium and small scale light industries are located along the Kapuk street.

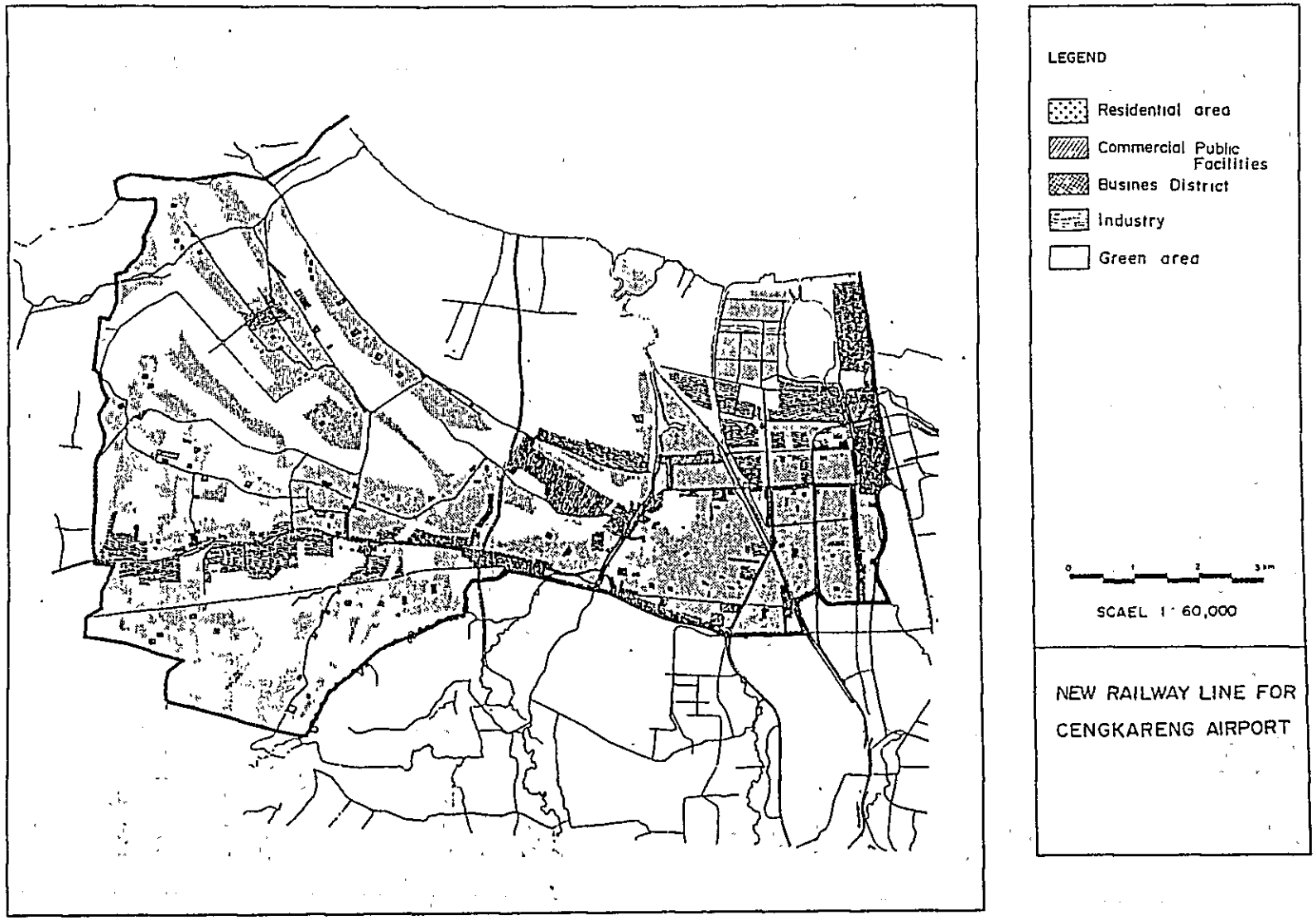


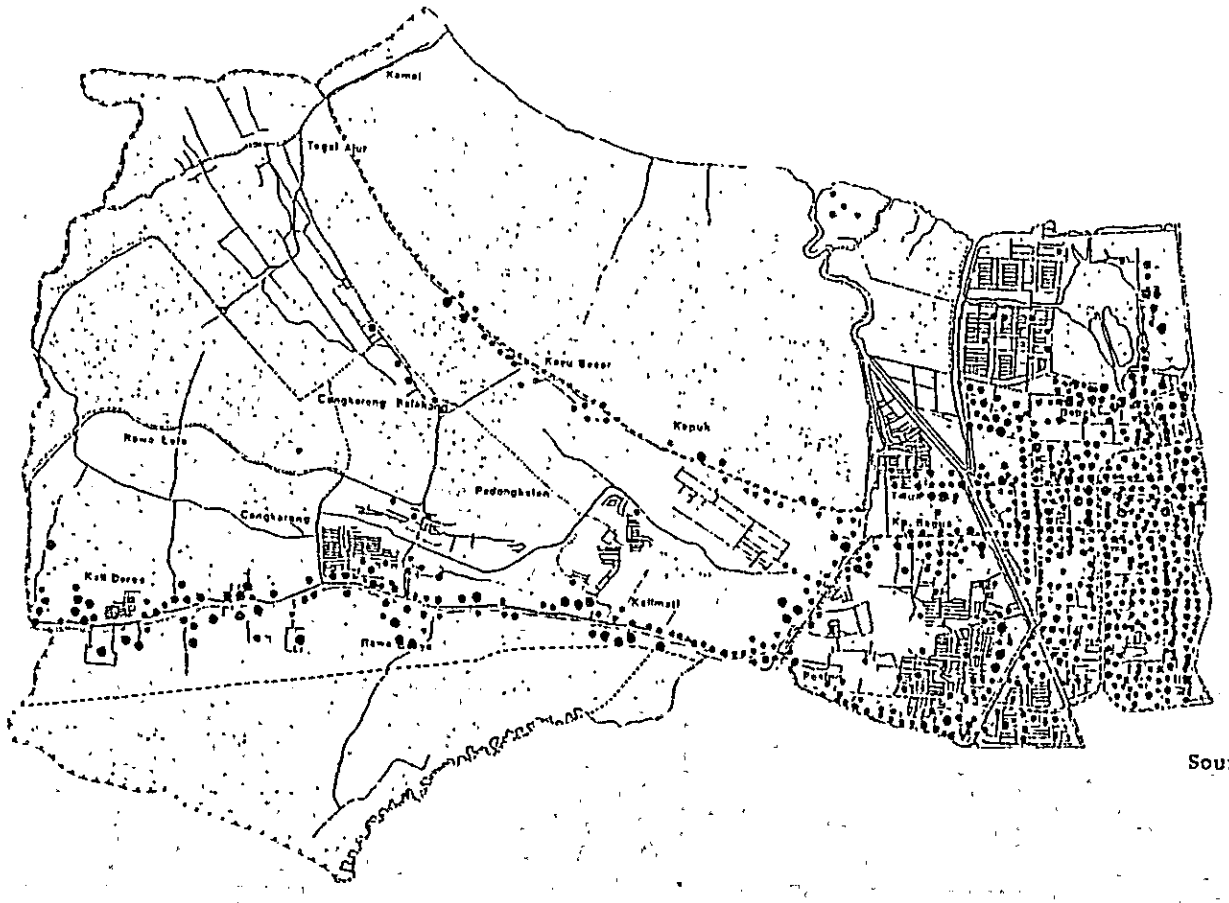

Fig. 2.1.2. Exsisting Land Use Plan of Project Area

Table 2.1.4 Land Use of Project Area in 1980

Unit: Ha

| No. | Zone name | Commercial & administrative | Industrial area | Residential area | Developed area Sub total | Green & agricultural area | Total |
|---|---|---|---|---|---|---|---|
| 13 | Kanal Muara | 0 | 0 | 0 | 0 | 766 | 766 |
| 14 | Kapuk Muara | 2 | 62 | 24 | 88 | 1086 | 1174 |
| 15 | Penjagalan | 80 | 119 | 142 | 341 | 111 | 452 |
| 16 | Penjaringan | 11 | 165 | 169 | 345 | 550 | 895 |
| 21 | Semanan | 4 | 84 | 112 | 200 | 213 | 413 |
| 22 | Rawa Buaya | 8 | 56 | 121 | 185 | 654 | 839 |
| 26 | Kamal | 6 | 26 | 317 | 349 | 481 | 830 |
| 27 | Pegagungan | 3 | 0 | 162 | 165 | 420 | 585 |
| 28 | Kali Deres | 13 | 41 | 241 | 295 | 336 | 631 |
| 29 | Cengkareng | 21 | 0 | 347 | 368 | 324 | 692 |
| 30 | Kapuk Barat | 5 | 6 | 111 | 122 | 237 | 359 |
| 31 | Kapuk Timur | 3 | 113 | 140 | 256 | 278 | 534 |
| 32 | K.K. Angke | 10 | 47 | 162 | 219 | 166 | 385 |
| 33 | Jelambar Utara | 4 | 17 | 122 | 143 | 125 | 268 |
| 34 | Jelambar Selatan | 26 | 26 | 246 | 298 | 55 | 353 |
| 39 | Tambora | 76 | 25 | 111 | 212 | 72 | 284 |
| 40 | Duri | 10 | 9 | 187 | 206 | 36 | 242 |
| TOTAL | | 282 | 796 | 2714 | 3792 | 5910 | 9702 |

Note: Zone No. and Name correspond to those mentioned in Table 3.1.11.




**LEGEND**

- Large Scale Industry
- Medium Scale Industry
- Small Scale Industry

N

Source: DINAS PERINDUSTRIAN
DKI JAKARTA

Fig.2.1.3 Location of Manufactures

(3) Land Use along the Alternative Routes

As described in later chapter "Loute Location", two final alternatives are selected and studied. Existing land use along these Alternative Routes of Route A and Route C are as described below:

Route A

This line goes along existing old Kampungs located on the coastal ridges, where existing land use is mainly rice field and old Kampung area from the Airport to the Kali Angke. Between Kali Angke and Central Jakarta area, the line goes through the mixed area of commerce, industry and residence.

Route C

This line goes north - south direction, parallel to the DKI Jakarta western boundary.

Old Kampungs are located on the coastal ridges parallel to the coast. Because of the distance from Central Jakarta, the northern part of this line has not been developed yet.

However, in the southern part where it is close to the Tangerang line, this area is already a built up area.

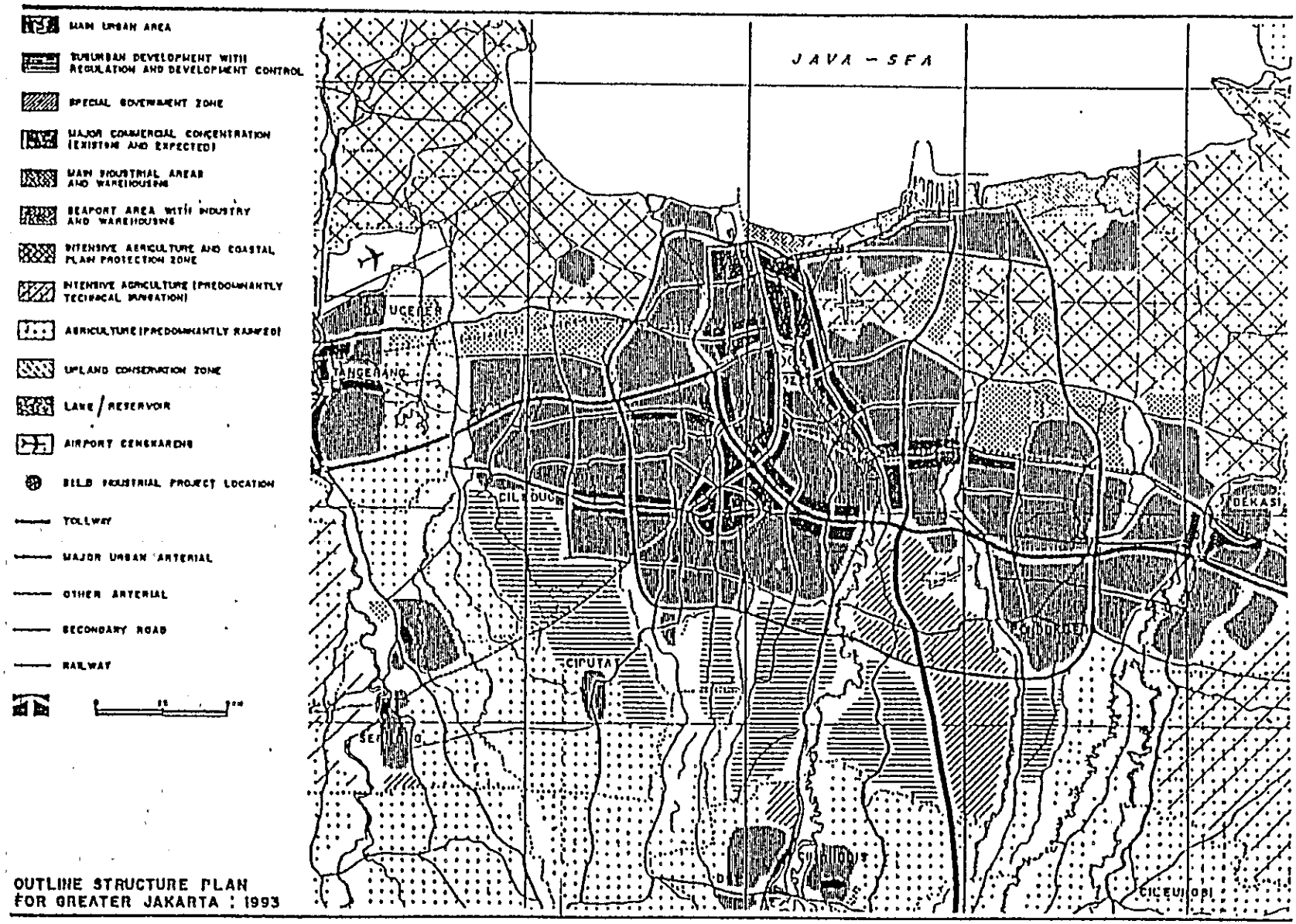
## 2.2 Future Land Use Plan

### 2.2.1 Development Concept

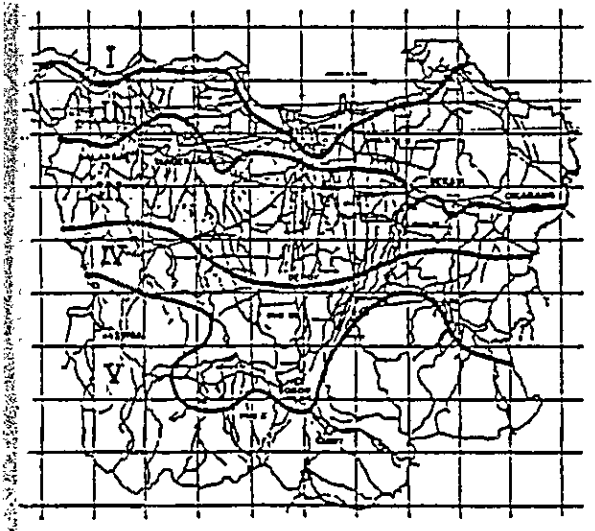
The Indonesian Government has prepared the JABOTABEK Metropolitan Development Plan (JMDP) and it proposes the structural plan for Greater Jakarta.

According to the JMDP, the project area includes the coastal plain protection zone in the north, agricultural conservation zone and a part of industrial development area along the Tangerang line.

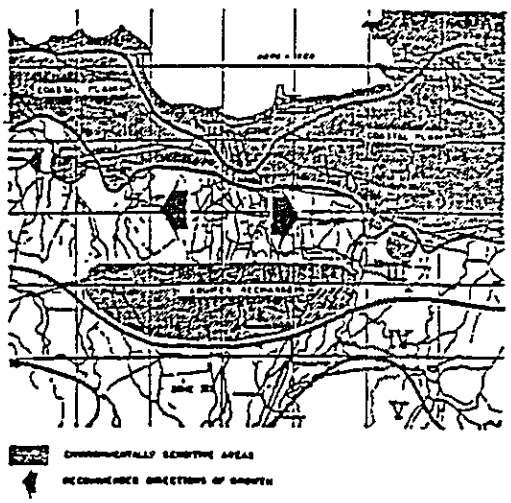
Residential development is planned mainly at the south of Tangerang line and is to be expanded to the west. Fig.2.2.1 shows JMDP Structural Plan, in which industrial area is planned to be located along the Tangerang line as mentioned above and also west of Tangerang city along the Jakarta-Tangerang Tollway.




OUTLINE STRUCTURE PLAN
FOR GREATER JAKARTA : 1993




DEVELOPMENT POTENTIAL ZONES




URBAN GROWTH

Development Potential Zones are categorized as following

ZONE I: AVOID URBAN DEVELOPMENT

- LOW LYING COASTAL STRIP
- FLAT SO BAD DRAINAGE
- SUBJECT TO FLOODING
- AGRICULTURE SUITED TO FISHPONDS
- GROUND WATER SALINE AND UNDRINKABLE
- POOR SOILS FOR BUILDING UPON
- THIS AREA ENCROACHING ON ZONE II AS SALINE INTRUSION INCREASES IN URBAN AREAS

ZONE II: AGRICULTURAL INTENSIFICATION LIMITED URBAN DEVELOPMENT

- LOW LYING PLAINS
- FLAT SO BAD DRAINAGE
- SUBJECT TO FLOODING
- EXCELLENT RICE GROWING ESPECIALLY IF IRRIGATED
- GROUND WATER FRESH BUT EASILY POLLUTED
- POOR SOILS FOR BUILDING UPON

ZONE III: MAJOR URBAN DEVELOPMENT AGRICULTURAL INTENSIFICATION

- HIGHER LANDS RISING FROM COASTAL PLAINS
- REASONABLE GRADIENT SO GOOD NATURAL DRAINAGE
  LOW FLOOD RISK
- GROUND WATER FRESH AND LEACHING SOILS LIMIT POLLUTION
- POORER AGRICULTURE
- REASONABLE SOILS FOR BUILDING UPON

ZONE IV: LIMITED URBAN DEVELOPMENT AGRICULTURAL INTENSIFICATION

- STEEPER SLOPING ZONE
- GOOD NATURAL DRAINAGE
- NO FLOODING
- LIMITED GROUNDWATER AND NO DEEP AQUIFERS
- REASONABLE AGRICULTURE BECAUSE MORE RAINFALL
- REASONABLE SOILS FOR BUILDING

ZONE V: UPLAND FOREST PLANTATIONS RECREATION AND CONSERVATION
AVOID AGRICULTURAL INTENSIFICATION

- STEEP MOUNTAINOUS ZONE
- RAPID RUN OFF BUT LIMITED BY VEGETATION
- NATURAL FOREST AREAS
- AGRICULTURE LIMITED TO COMPLICATED TERRACE CONSTRUCTIONS
- SUBJECT TO RAPID EROSION IF FORESTS CLEARED

Fig. 2.2.2 JMDP Development Concept

This structure plan is conformed to the JMDP development concept of East-West expansion and Coastal Plane Conservation which are summerized in following figures of "JMDP DEVELOPMENT CONCEPT."

Master Plan of DKI Jakarta was formulated in 1965 and despite partial amendment, city planning works have followed along this original concept.

DKI Jakarta is reviewing the JMDP and revising its Master Plan in accordance with the JMDP development concept.

### 2.2.2 Population Framework

Future residential population and population density in the project area is now being reviewed by DKI Jakarta in accordance with the JMDP Development Concept discribed in the previous section.

In order to conserve the coastal plane area, population growth rate in west of Kali-Angke of the project area will be kept lower than the average growth rate of DKI Jakarta.

Population growth of the project area, especially west of Kali-Angke in project area where is named North-West Area in JDMP, is estimated as shown below:

Population Framework

| Year | DKI Jakarta | | North-West Area | |
|---|---|---|---|---|
| | Population (×1000) | Annual Growth Rate | Population (×1000) | Annual Growth Rate |
| 1980 | 6,503 | | 251 | |
| | | 3.2% | | 2.8% |
| 1990 | 8,873 | | 330 | |
| | | 2.1% | | 1.4% |
| 2000 | 10,933 | | 380 | |
| | | 2.0% | | 1.3% |
| 2005 | 12,070 | | 405 | |

This tentative framework is prepared by DKI Jakarta for the establishment of the Master Plan 2005. The new master plan is scheduled to be finalized by the end of this year.

### 2.2.3 Future Land Use Plan

Future development trend will follow the JMDP as described in previous sections. Land use composition in the project area is estimated as follows:

1. East of Kali Angke will be developed in accordance with the recent DKI Jakarta Master Plan.

2. Industrial development will be proceeded along the Tangerang line as recommended by the JMDP report (Zone 21: Semanan and Zone 22: Rawa Buaya).

3. Area expansion of urbanized area will not be great in the zones other than described above.