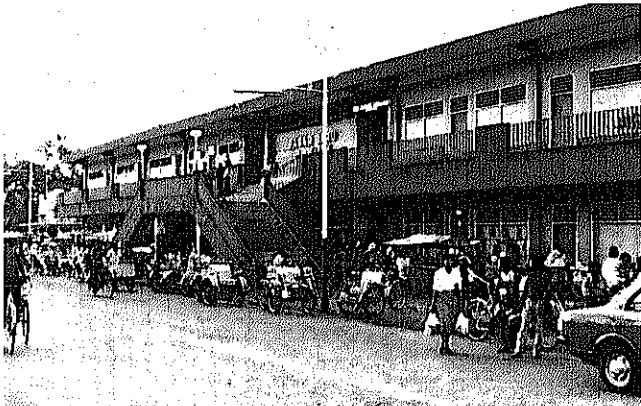
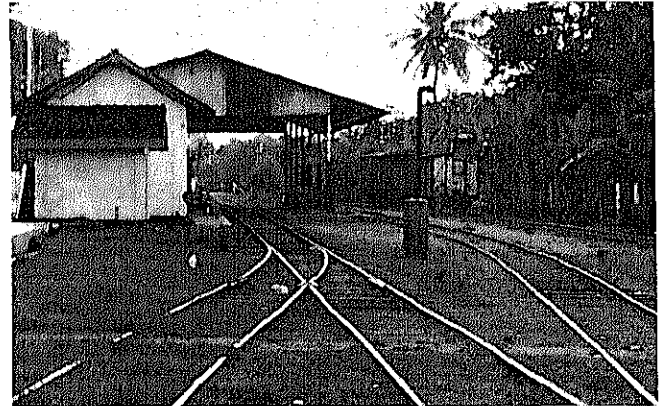


○マドゥーラ島, バンカラン

マドゥーラ島で最も人口が集中しているのがバンカランである。バンカランの中心市街地には比較的大規模なパサールがあり, また, 鉄道の駅も存する。(44, 45)



(44. バンカランのパサール)



(45. バンカランの鉄道駅)

○マドゥーラ島における道路, 鉄道

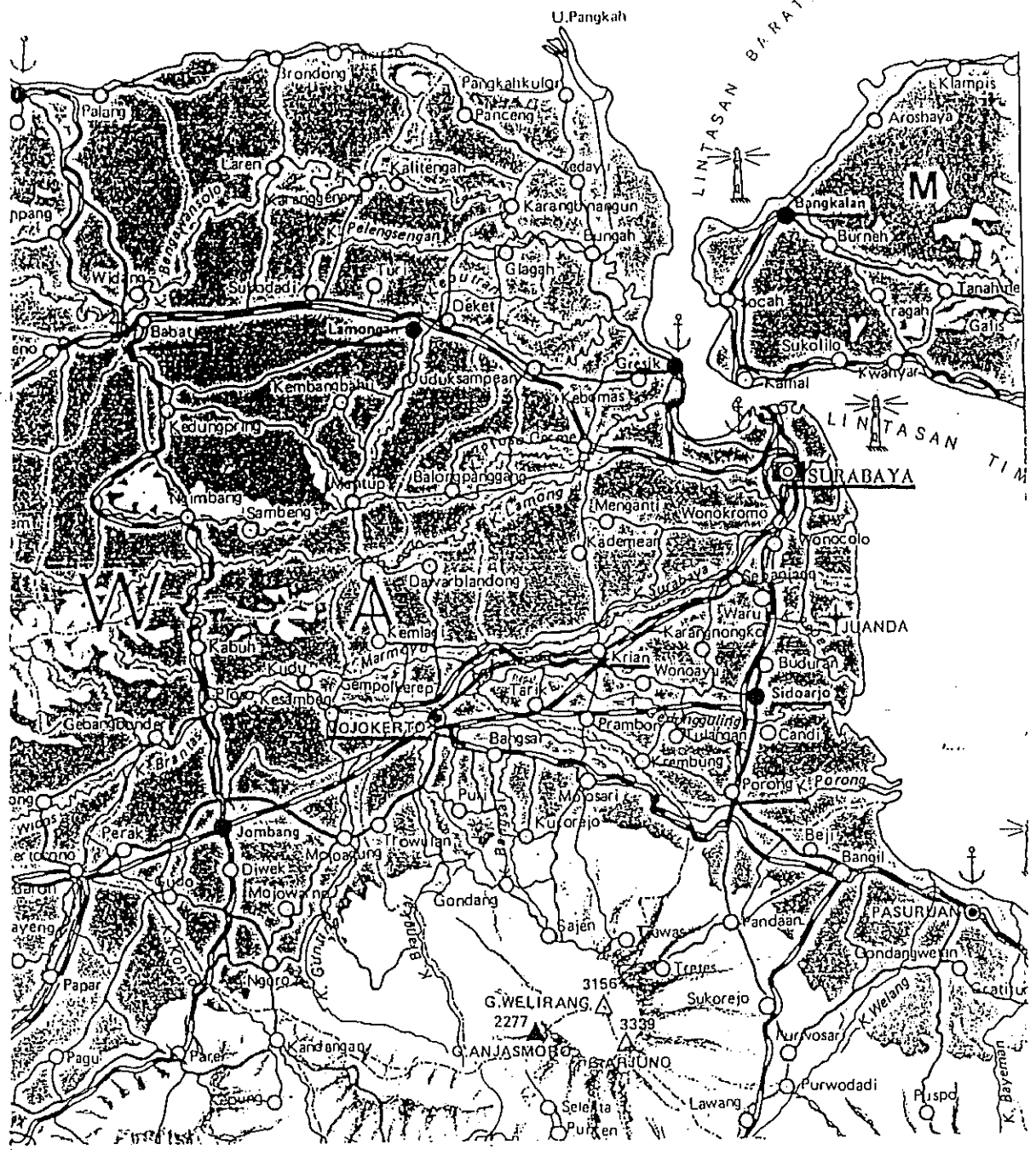
マドゥーラ島の鉄道は(46, 47)のような状況である。街道は一応舗装されており, 鉄道も運行されていると思われる。



(46. マドゥーラ島の街道)



(47. マドゥーラ島の鉄道)



## II-4-3 土地利用の状況

### 4-3-1 GKS地域の構成

GKS地域は、東部ジャワ州に属し、行政区域としては、スラバヤ、モジョケルトの両コチャマダと、スラバヤ、モジョケルト、グレシック、ラモンガン、シドアルジョ及びバンカランのカブパテンにより構成されている。

このうち、バンカランを除く区域はジャワ島の東部に位置し、バンカランはマドゥーラ島に位置している。(図-1)

GKS地域の中心はスラバヤであるが、スラバヤは北部と東部が海に面している。スラバヤから南はシドアルジョを経てマランへ、南西はモジョケルト、北西はグレシック、ラモンガンを経てジャワ島の西部へと結びついている。また、マドゥーラ島とは北のタンジュクープリク港よりフェリーが運航されており、これを経てバンカランに結びついている。(図-2)

### 4-3-2 地形

東部ジャワ州の地形の概況は図-3の通りであるが、このうちGKS地域はジャワ島の部分はスラバヤ川の河口に発達したデルタ地帯を中心とした平坦な地域にあり、またマドゥーラ島の部分も島の西側の平坦な部分にある。

スラバヤ地域の地形の特色は、このようなデルタを中心とする平坦な地域であることと、海岸に面する部分に塩田又は養魚場が発達していることが掲げられる。

なお、スラバヤの中心部を流れている河川は、ブランタ川-スラバヤ川-カリマス川と名前を変え、それぞれの間、ポロング水路、ウォノクロモ運河が分岐している。(図-4)

### 4-3-3 GKS地域の土地利用

GKS地域の土地利用については1977年に調査されたデータがあるが、それによると次のとおりとなっている。

水田 (Rice Fields)	39.4%
乾地 (Dry Land)	24.7%
市街地 (Settlement)	12.5%
森林 (Forest)	7.8%
池 (Pond / Fishery)	5.2%
沼沢 (Swamp / Lake)	2.0%
塩湖 (Salt Lake)	0.4%
その他	7.9%

- Kotamadya.
1. Surabaya
  2. Mojokerto
  3. Madiun
  4. Kediri
  5. Blitar
  6. Malang
  7. Pasuruan
  8. Probolinggo
- Kabupaten.
9. Surabaya
  10. Sidoarjo
  11. Mojokerto
  12. Jombang
  13. Bojonegoro
  14. Tuban
  15. Lamongan
  16. Madiun
  17. Ngawi
  18. Magetan
  19. Ponorogo
  20. Pacitan
  21. Kediri
  22. Nganjuk
  23. Blitar
  24. Tulungagung
  25. Trenggalek
  26. Malang
  27. Pasuruan
  28. Probolinggo
  29. Lumajang
  30. Bondowoso
  31. Situbondo
  32. Jember
  33. Banyuwangi
  34. Bangkalan
  35. Sampang
  36. Pamekasan
  37. Sumenep

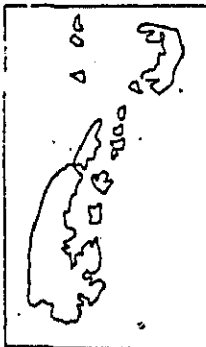


図-1 東部ジャワ州の行政区画

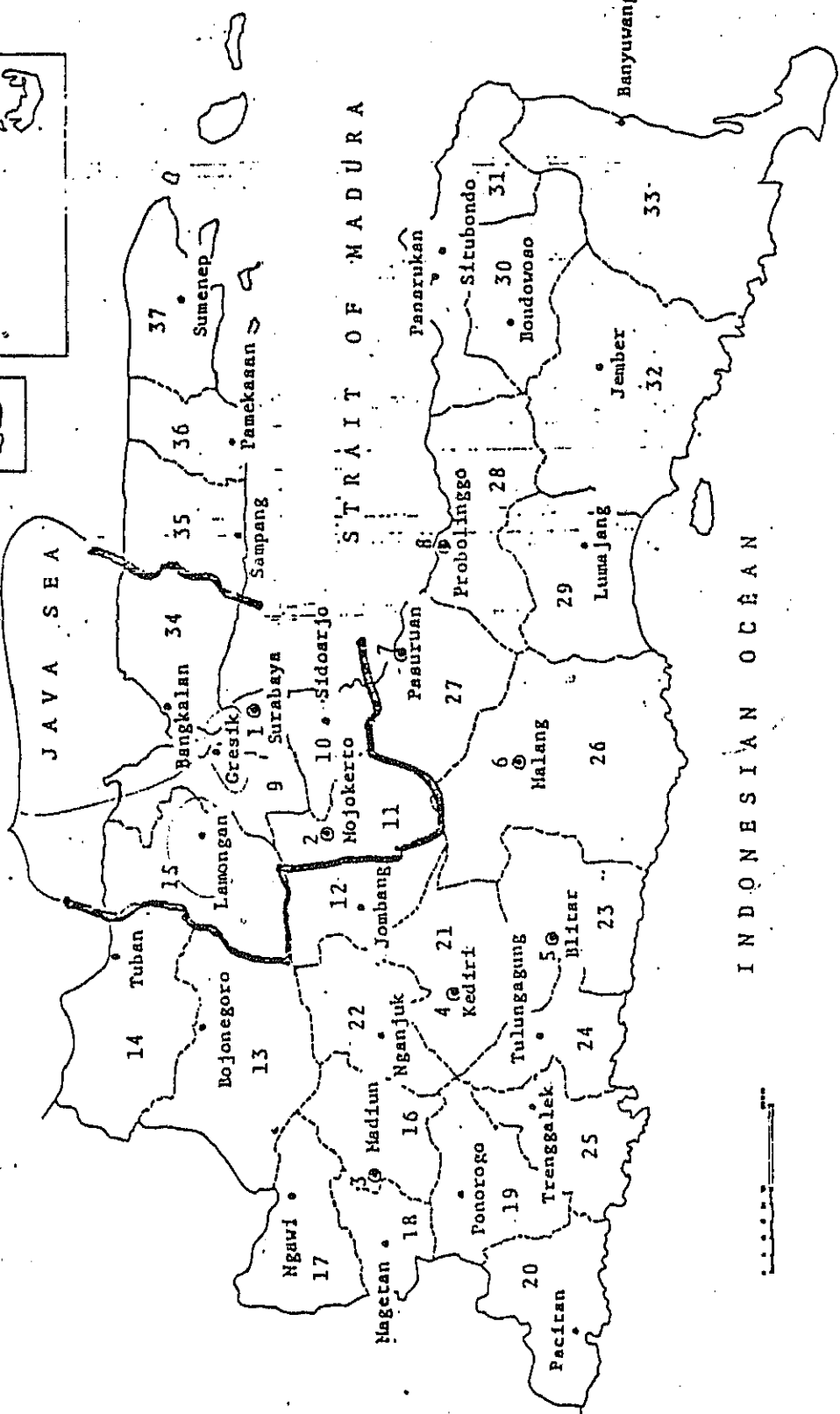


図-2 GKS地域の構成

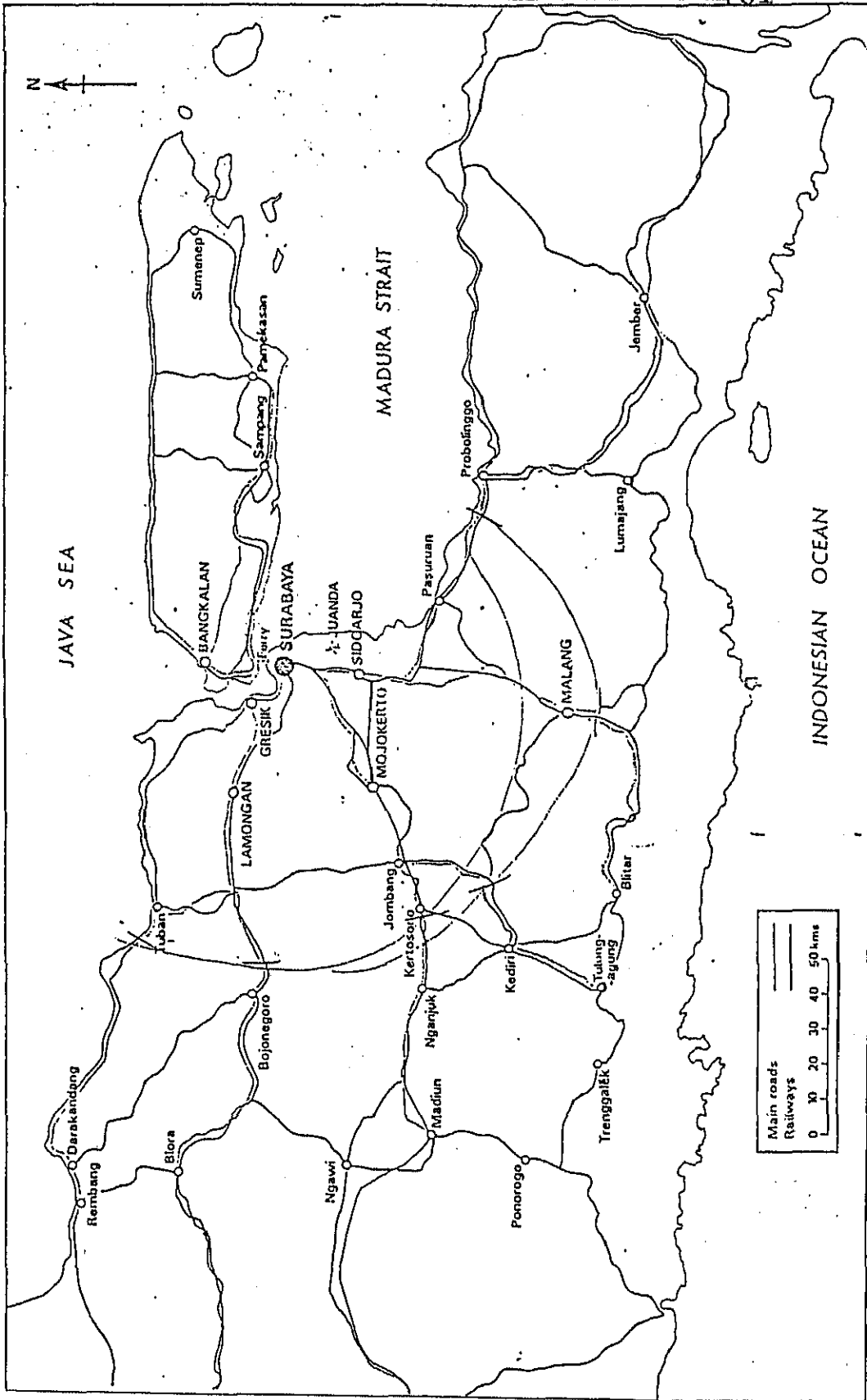


図-3 東部ジャワ州の地形

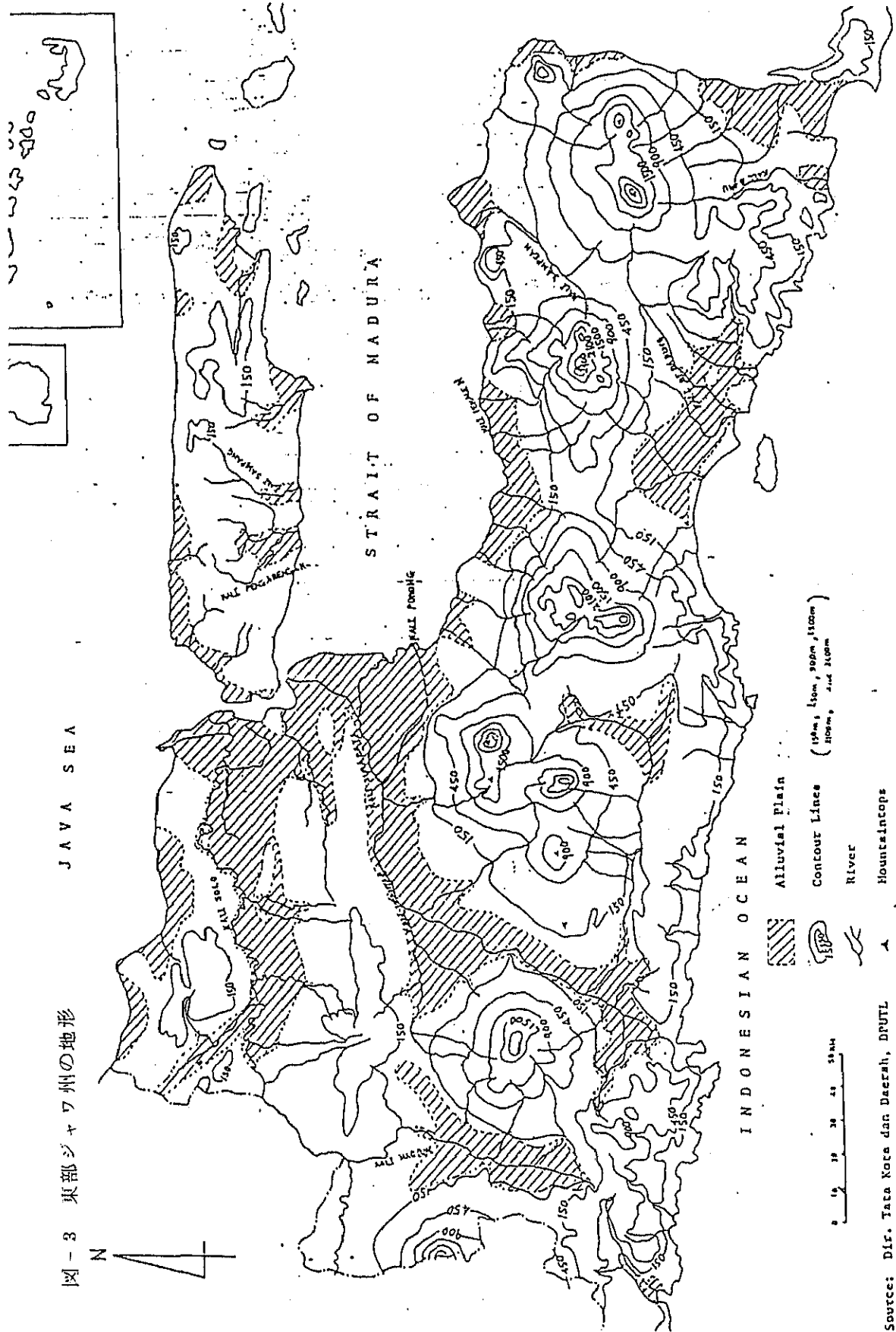
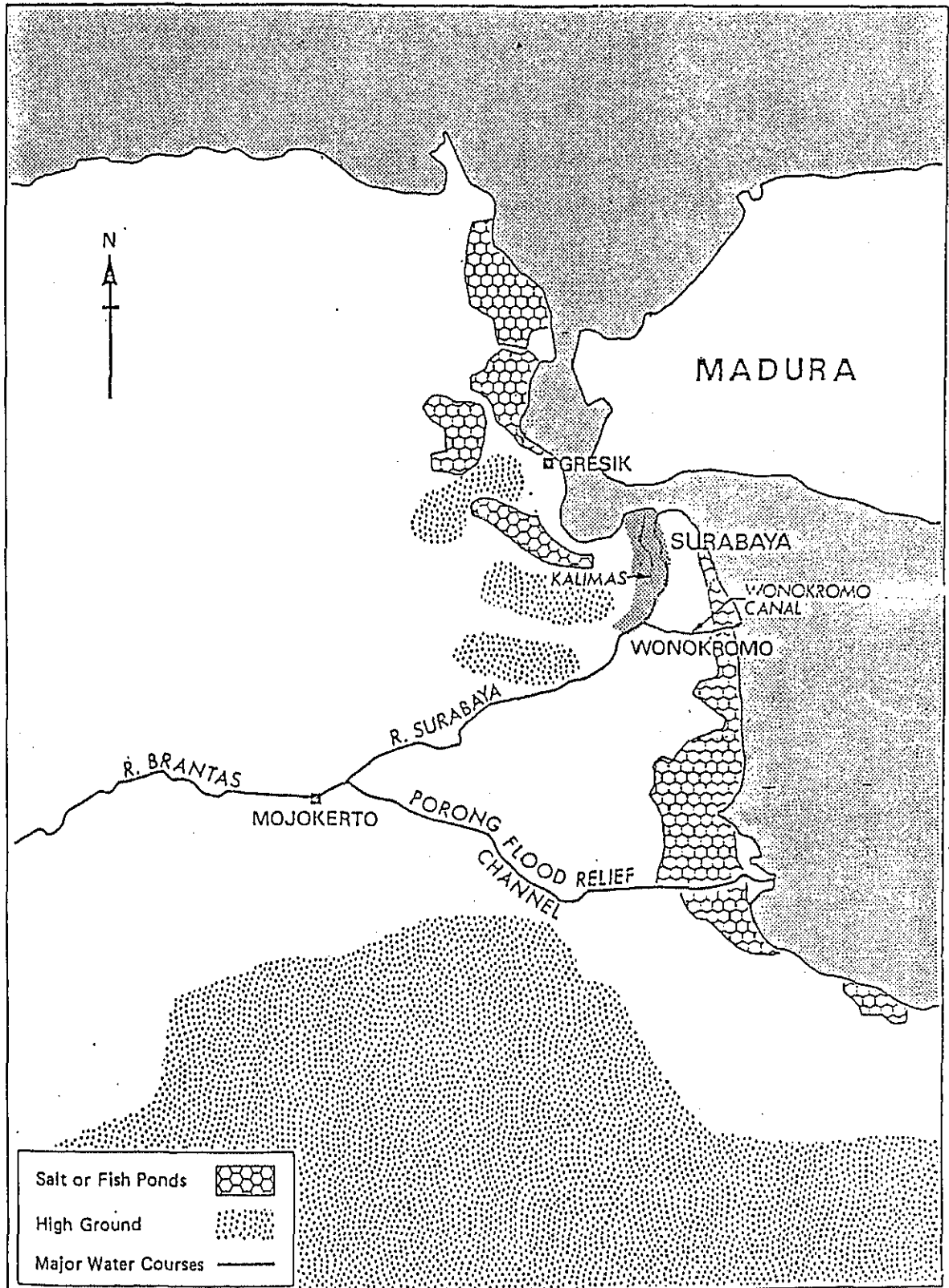


図-4 GKS地域の地形の特色



出典： Surabaya Metropolitan Region

## GERBANGKERTOSUSILA

### 4-3-4 スラバヤの土地利用の構造

GKS地域のうち、スラバヤと他の都市とは幹線道路により結びついてはいるが、市街地は連担しておらず、土地利用上は独立していると考えられる。

これらの都市のうち、スラバヤは地域の人口の1/3を擁する大都市であるので、ここではスラバヤの都市構造について述べる。

スラバヤのコチャマダは29,000haであるが、そのうちおよそ8,000haが市街地である。スラバヤは、市の北側にある港湾を中心にカリマス川に沿って発達してきた。

河川の南部地域にヨーロッパ人、中国人の商人の居住地が形成されたが、その地域が現在のCBDを形成している。この地域は現在では中国人の居住地以外は商業・業務地となっている。

その後、都市は南の方へ展開してきた。東西方向の開発は河川と排水路によって阻まれているので進んでいない。

近年、商業・業務の中心は上で述べた地域よりさらに南下する傾向にあり、トゥンジュガン通り、ブプタン通り、ベミューグ通りへと展開している。

上級住宅地はこれらの地域のさらに南であるダルモ、ゲーベング、ブカングに立地している。

人口密度の高いカンポンは旧市街地の周辺、特にその西側及び東側に位置している。

重工業はンガゲル・ルムンバ通り、デマク、ディバク通りに位置している。

住宅地は、レンガ造りの家とバンブー造りの家とが混在している。高層の住宅はほとんど存しない。

オープンスペースは、旧市街地には少ない。東海岸沿いのケンジャラン及びCBDの外辺のタンバクサクには公園とスタジアムが立地している。

ホテル、映画館、レストラン等はCBDの周辺及びインナーシティの新しい商業地域に立地している。

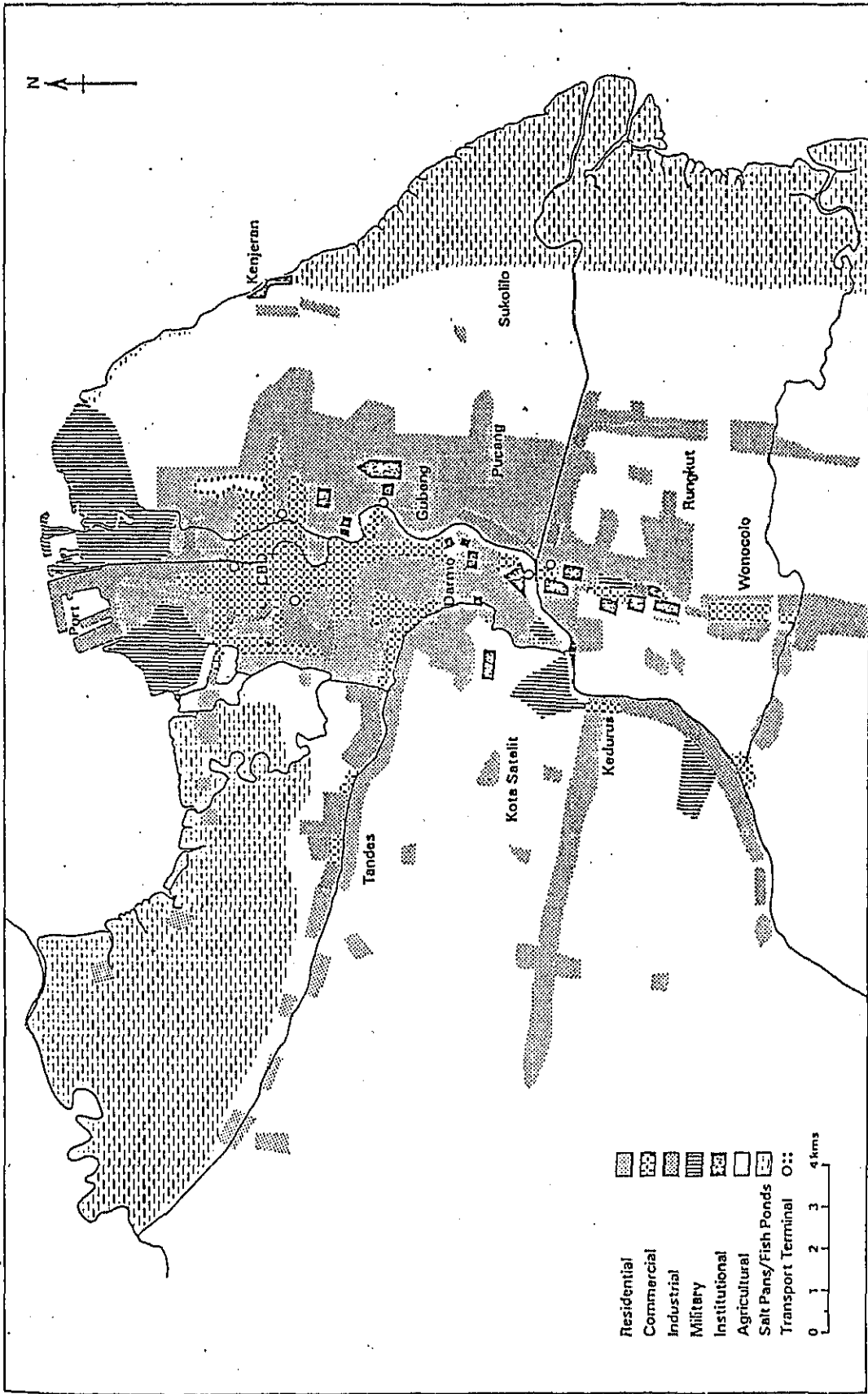
大学は、旧市街地に分散しているが、アランガ大学及びスラバヤ工科大学の施設の一部はスコリロに近年建設されている新大学地区に移転している。

新しい住宅地（主として低・中密度の個人住宅）が旧市街地の南、東及び西—ウォノコロ、スコリロ及びサテライトタウン（タンデス）—に建設されている。

工業開発は既成市街地の周辺—ラングカット地区、タンデス及びカラングピラング川の隣接地—で行われている。（図5）



図-5 スラバヤの土地利用状況



## II-4-4 行政機構および経済・財政の状況

インドネシアの地方行政は四段階の組織により構成されている。地方行政組織のうち最も広域的なものは州であり、州知事は州議会の選んだ候補者の中から中央政府によって任命される。G K S 地域は東ジャワ州に包含されている。

州の下には、日本の市町村に当たる Kotamadya と Kabupaten がある。Kotamadya は、日本の指定都市に当たるような人口密集地域を管轄するものであり、G K S 地域にはスラバヤ、モジョケルトの2区域がある。また Kabupaten はそれ以外の地域を管轄し、現在6区域が存在する。これらの首長は大統領の同意を得て州知事が任命する。

Kotamadya または Kabupaten は10を越える Kecamatan (日本で言えば区に相当する) に分割される。Kecamatan の規模は、ほぼ平均して90 km<sup>2</sup> であり、約5万人の人口を擁する。

さらに Kecamatan の下には Desa (村落) が存在する。その面積は平均して6 km<sup>2</sup>、人口は約3千人である。地域の経済活動は巨大都市スラバヤを中心とした典型的な一極構造を示している。1977~78年の統計によれば、スラバヤはG K S 地域内の工業生産の62%、商業活動の65%を占めている。また代表的な都市型サービス産業である金融・保険業についてみる、実に95%の活動がスラバヤに集中している。(いずれも附加価値ベース)

したがってその他の地域は農業その他の一次産品をスラバヤに供給するヒンターランドとしての性格を強く持っているが、グルシク、モジョケルト、シダルジョなどの市の中心部には、ある程度の工業・商業的蓄積が見られる。特にグルシクについては1967~80年にかけて、国内資本による投資がスラバヤを上回る規模でなされており、今後も工業地域としての成長が期待される。

他方、バンカラン、ラモンガンなどの地域は目立った工業・商業集積がなく、農業等の第一次産業が生産活動の大半を占める。特にマドゥーラ島のバンカラン地域は、スラバヤと海峡を隔てる不利もあって発展が非常に遅れている。少し資料が古いが1971年の各地域の1人当たり所得をみると、スラバヤ58,814ルピアに対し、バンカランが15,924ルピア、ラモンガンが19,023ルピアと、いずれもスラバヤの三分の一に満たない水準に甘んじている。

1971~78年にかけての地域別G R Pの年伸率をみると、スラバヤが26%であるのに対し、バンカランは2.56%、ラモンガンは2.57%に過ぎない。スラバヤ以外の地域では、先に述べたグルシクが13.80%と、ただ一地域10%の大台を越えている。このような状況が今後も継続すれば、2000年にはG K S 全域のG R Pのうち、98%がスラバヤに集中してしまい計算になる。もちろんスラバヤ地域において土地、住宅、輸送等のボトルネックが生じるため、このような事態が現実に起り得るとは考えられないが、これを裏返して言えば、G K S 地域がスラバヤ一極構造による成長を追求するならば、遅かれ早かれ壁に突き当たる

ことは明らかであり、他地域への適正な分散と分担関係の再編成を行う必要が生じよう。

最後にG K S地域に所属する地方自治体の財政状況であるが、地方税の構成（自動車税、自動車取得税、レストラン・ホテル税、娯楽税、広告税、世帯税、道路税より成る）からみて、スラバヤ、グルシク等の都市地域ないし工業地域ではかなりの税収が見込めるが、その他の地域では、公共投資を大規模に行うほどの税収を得ることが困難であると考えられる。したがって国庫補助金、地方債の発行等により自治体に資金を流すシステムを充実させる必要がある。

## II-4-5 関連開発計画の状況

### I 進行中主要プロジェクト

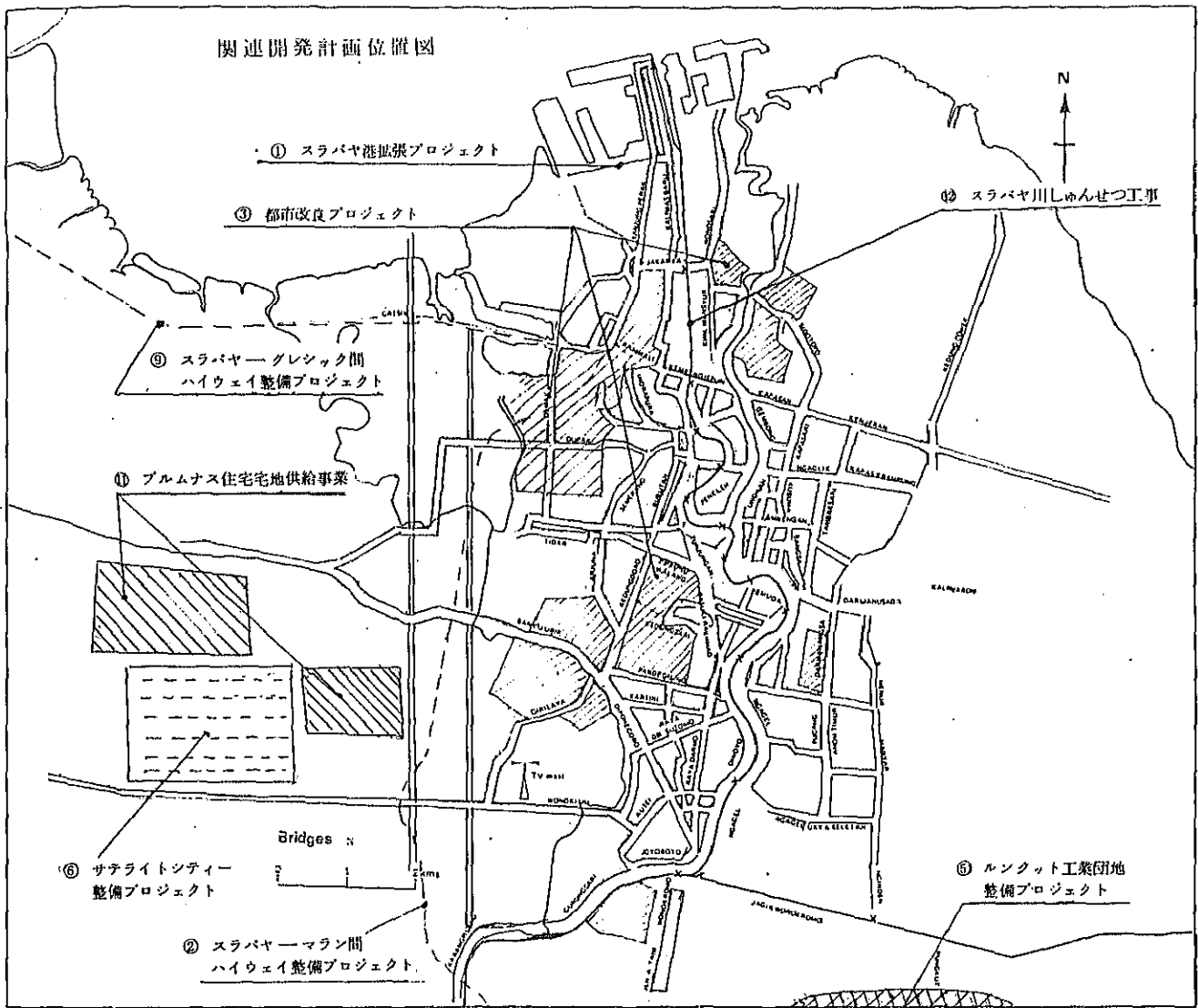
- ① スラバヤ港（タンジュンペラク）拡張プロジェクト
- ② スラバヤ—マラン間ハイウェイ—整備プロジェクト
- ③ 都市改良（カンボンインブルーヴメント）プロジェクト
- ④ JEN.A.YANI 立体交差化プロジェクト
- ⑤ ルンクット工業団地整備プロジェクト
- ⑥ サテライトシティ—整備プロジェクト
- ⑦ ソロ川下流域改修計画
- ⑧ グレシク火力発電所建設プロジェクト

### II 計画中主要プロジェクト

- ⑨ スラバヤ—グレシク間ハイウェイ—整備
- ⑩ スラバヤ—スマラン間鉄道改良プロジェクト
- ⑪ ブルムナス住宅地供給事業
- ⑫ 都市排水改良計画



関連開発計画位置図



SURABAYA AREA TRANSPORTATION STUDY  
HALCROW FOX AND ASSOCIATES



FIGURE 2.8  
SURABAYA ROAD NETWORK-1976



## II-5 S/W協議ミッション構成

- 団 長 支 倉 幸 二 ( 総 括 )  
 日本住宅公団宅地事業部計画第一課長  
 団 員 村 橋 正 武 ( 交 通 計 画 )  
 建設省都市局都市交通調査室課長補佐  
 団 員 本 多 晃 ( 都 市 施 設 計 画 )  
 建設省計画局国際課海外協力官  
 団 員 沖 村 恒 雄 ( 土 地 利 用 計 画 )  
 建設省都市局都市計画課課長補佐  
 団 員 後 藤 紳 太 郎 ( 経 済 , 財 政 計 画 )  
 建設省道路局道路経済調査室課長補佐  
 団 員 小 林 正 博 ( 業 務 調 整 )  
 J I C A 社会開発協力部開発調査一課

## II-6 S/W協議ミッションの日程

日順	月日	曜日	行 程	調 査 内 容
1	8/18	火	11:15 成田 CX501 14:35 香港 16:20 CX711 21:25 ジャカルタ	コロンボプラン住宅専門家との打合せ
2	19	水		日本大使館, J I C A 事務所 表敬, 打合せ ジャカルタ市内都市計画プロジェクト視察
3	20	木		公共事業省住宅総局 ( C I P T A K A R Y A ) 局長表敬 都市地域計画局 ( T A T A K O T A ) と S / W 案 協議
4	21	金		都市地域計画局長と S / W 案 協議
5	22	土	17:00 ジャカルタ GA484 18:10 スラバヤ	東部ジャワ州 C I P T A K A R Y A 市と調査日程打合せ 市内開発プロジェクト視察
6	23	日		現地踏査および収集資料整理
7	24	月		東部ジャワ州 C I P T A K A R Y A , スラバヤ市 表敬打合せ
8	25	火		現地踏査

日順	月日	曜日	行 程	調 査 内 容
8	25	火		東部ジャワ州 BARPEDA, 州政府機関および関係市町村 代表者全体会議
9	26	水	15:00 スラバヤ → GA483 → 16:10 ジャカルタ	州CIPTA KARYA 打合せ, スラバヤ総領事館表敬,
10	27	木		CIPTA KARYA / TATA KOTA とのS/W案打合せ
11	28	金		BAPPENAS 他政府関係者合同会議 S/W協議, 大使館, JICA報告 CIPTA KARYA とのS/W MINUTES 調印
12	29	土	8:00 ジャカルタ → CX710 → 15:00 香港 16:20 → CX500 → 21:15 成田	





モクタール住宅総局長（中央右）との協議



BAPPEDAにおける州レベル全体会議  
議長はスマルディ BAPPEDA 局長





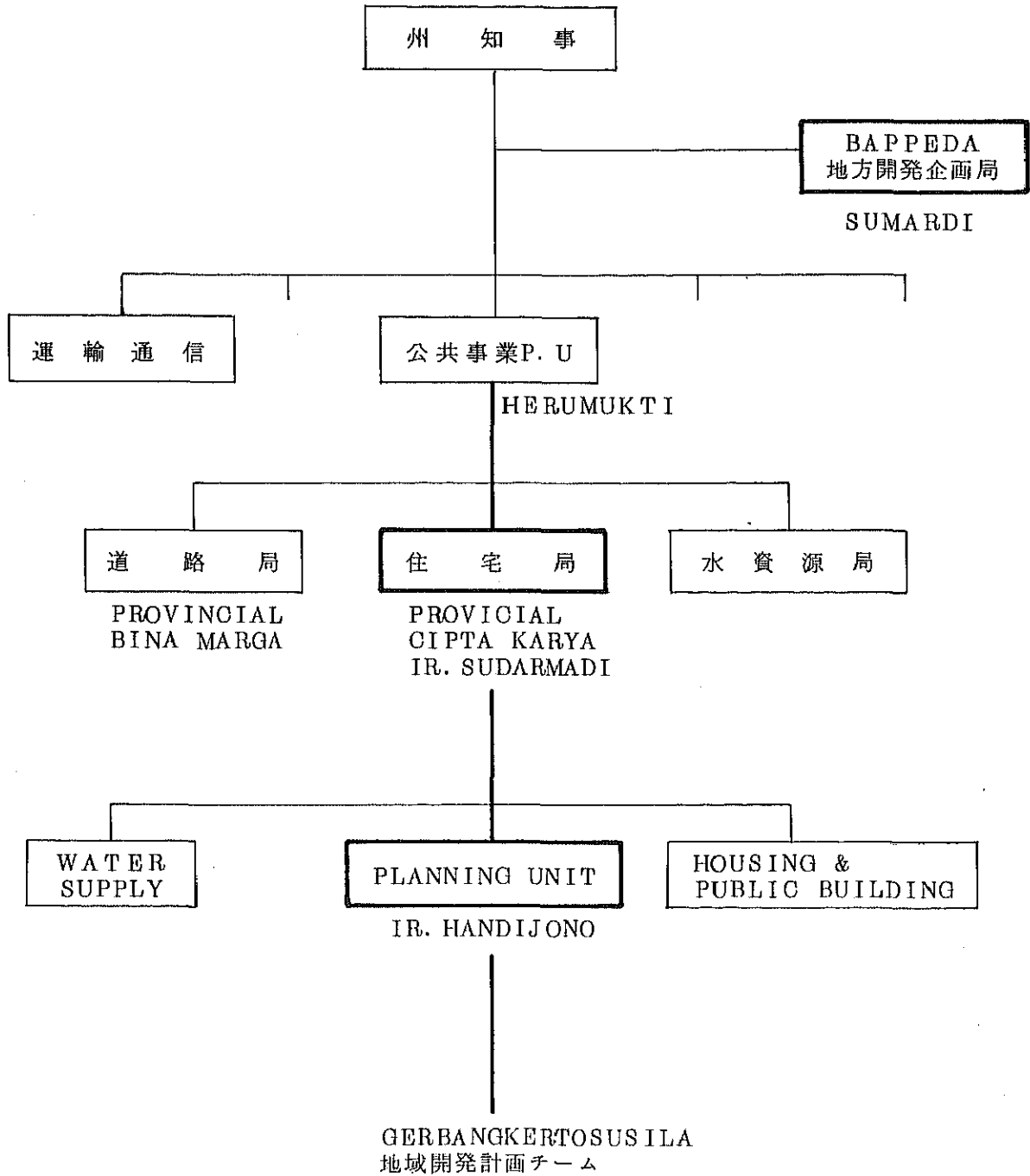
BAPPENSにおけるINTER DEPARTMENT  
COMMITTEE 議長はSARWOHADI氏(BAPPENAS)



ジャカルタ市内カンボン改良事業視察



東部ジャワ州機構図



☆

## II - 7 収集資料リスト

Surabaya transportation study  
Results and recommendations  
Surabaya transportation study  
Study techniques

### JABOTABEK METROPOLITAN DEVELOPMENT PLAN

Executive Summary  
Regional Framework Policy Objectives  
Development Framework, Implementation methods  
Finance, Programmes and projects

Staff development within the JABOTABEK region  
Report number ; T/10

The development of small-scale industry in JABOTABEK  
Report number ; T/11

A study of manufacturing in JABOTABEK: Development patterns,  
Employment levels and locational preferences  
Report number ; T/13

Prospects for regional development in JABOTABEK  
Report number ; T/15

The coordination of transport planning  
Report number ; T/16

A strategic development plan for Bogor  
Report number ; T/18

A strategic development plan for tangerang  
Report number ; T/19

A strategic development plan for Bekasi  
Report number ; T/20

Outline for a development programmes for small-scale industry  
in JABOTABEK  
Report number ; T/21

Transport strategy for JABOTABEK  
Report number ; T/22

Greater Jakarta water supply development plan  
Report number ; T/23

Staged industrial land development programme in JABOTABEK  
Report number ; T/24

Jakarta urban betterment programme  
Report number ; T/27

Proposed guided land development programme for greater Jakarta  
Report number ; T/29

Proposed guided land development programme (Annexes)  
Report number ; T/29

Sanitary utilities development programme  
Report number ; T/26

Ringkasan Lporan Utama  
Penyusunan Rencana umum Kota Surabaya dan Sekitarnya  
GERBANGKERTOSUSILA  
(The main report of the formation of general planning of  
surabaya city and its neighbourhood)

Kumpulan data dasar Di wilayah GERBANGKERTOSUSILA  
Th. 1971 - 1978 Jilid I Fisik (Phisical)

Jilid II Social (Social)

Jilid IV Transportasi (Transportation)

Penyusunan rencana umum kota surabaya dan sekitarnya  
GERBANGKERTOSUSILA

Fisik dan pemukiman/Technical Report Book

Sosial dan aadministrasi/Technical Report

Ekonomi permanian/Technical Report

Transportasi/Technical Report

Ekonomi wilayah/Technical Report





II - 8 「イ」側へ提出した説明資料

LIST OF PAPERS

24 Aug. 1981

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- I. Scope of Work for the Urban Development Study on Surabaya Metropolitan Area in the Republic of Indonesia
- II. Detailed Explanation on " Items of Study of Scope of Work "
- III. Data needed for " Development Study on Surabaya Metropolitan Area "
- IV. Counterpart Contribution ( tentative )
- V. Operation Plan of Traffic Survey ( draft )
- VI. Operation Plan of Existing Land Use Survey ( draft )



I. Scope of Work for the Urban Development Study on Surabaya  
Metropolitan Area in the Republic of Indonesia (Draft)

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SCOPE OF WORK  
FOR  
THE URBAN DEVELOPEMENT STUDY  
ON  
SURABAYA MENTROPOLITAN AREA  
IN  
THE REPUBLIC OF INDONESIA  
  
BETWEEN  
JAPAN INTERNATIONAL COOPERATION AGENCY  
AND  
DIRECTORATE GENERAL CIPTA KARYA  
MINISTRY OF PUBLIC WORKS

SCOPE OF THE WORK  
FOR  
THE URBAN DEVELOPMENT STUDY  
ON  
SURABAYA METROPOLITAN AREA  
IN  
THE REPUBLIC OF INDONESIA

I. INTRODUCTION

In response to the request made by the government of the Republic of Indonesia, the Government of Japan has decided to conduct the Urban development study on Surabaya Metropolitan Area in the Republic of Indonesia in accordance with laws and regulations in force in Japan. The Japan International Cooperation Agency (hereinafter referred to as 'JICA'), the official agency responsible for implementation of technical cooperation programs of the Government of Japan, will carry out the Urban Development study on Surabaya Metropolitan Area (hereinafter referred to as 'the Study') in close cooperation with the authorities concerned of the Government of the Republic of Indonesia. The following scope of work was set forth, basing on the results of the JICA's Preliminary Surveys carried out in May and August 1981.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are ;

- 1) to formulate the development structural plan and its strategy up to year 2000 for Surabaya Metropolitan Area within the GERBANG KERTOSUSILA Region.
- 2) to perform technology transfer to Indonesian counterpart personnel in the course of the Study.

### III. SCOPE OF THE STUDY

#### 1. Study area

- 1) The survey area covers GERBANG KERTOSUSILA Region (Kotamadya of Surabaya and Mojokerto and the k Kabupatens of Gresik, Lamongan, Mojokerto, sidoarjo and Bangkalan)
- 2) The planning area covers Surabaya Metropolitan area which will be defined in the course of the Study.

#### 2. Target year

- 1) Long term : Year 2000
- 2) Short term : Fiscal year 1988/89

#### 3. Items of the Study

##### 3.1 Data collection and analysis

- 1) Review of existing reports
- 2) Socio-economic aspects of the study area
  - a) Population
  - b) Commerce and industries
  - c) Others
- 3) Land use and land development
- 4) Urban transport
- 5) Housing
- 6) Infrastructure, public utilities and services
- 7) On-going and proposed development projects

##### 3.2 Identification of development potentialities

- 1) Preparation of criteria of potentialities
- 2) Classification of potential zones

##### 3.3 Presentation of a general development concept for GERBANG KERTOSUSILA Region.

- 1) Socio-economic frame-work
- 2) Regional structure
- 3) General land use
- 4) Infrastructure and public utilities

3.4 Presentation of a development structural plan for Surabaya Metropolitan area

- 1) Socio-economic frame-work
- 2) Land use plan.
- 3) Transportation network
- 4) Parks and open space
- 5) Water supply and drainage
- 6) Housing
- 7) Public utilities and others

3.5 Presentation of a Long-term Development Strategy for Surabaya Metropolitan area

- 1) Implementation scheme
  - a) Administration and management
  - b) Investment
- 2) Development projects
- 3) Preservation
- 4) Guideline for private sector's activities

*sectoral priority*  
~~sectoral priority~~

3.6 Presentation of a Short-term Development Program

IV. STUDY SCHEDULE

The whole work will be conducted in accordance with the attached schedule.

V.I. REPORTS

JICA will prepare and present the following reports in English to the Government of the Republic of Indonesia.

- 1) Inception Report  
\*Fourty (40) copies at the beginning of the Study
- 2) Progress Report I and II  
\*Fourty (40) copies in the course of the Study in Indonesia
- 3) Interim Report  
\*Fourty (40) copies at the end of the Study in Indonesia
- 4) Draft Final Report  
\*Fourty (40) copies within four (4) months after the commencement of the Study in Japan  
  
\*The Government of the Republic of Indonesia will provide JICA with its comments within one (1) month after the receipt of the Draft Final Report
- 5) Final Report  
\*Eighty (80) copies within two (2) months after the receipt of the comments on the Draft Final Report from the Government of Republic of Indonesia

#### VI UNDERTAKING BY THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. To provide the Study Team with relevant data, information and materials necessary for the execution of the Study.
2. To secure permission for entry into private properties and restricted area in connection with the field survey.
- 3.
3. To exempt the Study Team from any taxes and duties for materials, equipment and personal effects which are to be brought into Indonesia by the Study Team.
4. To provide the Study Team with suitable office space with necessary equipment and services for the Study.

5. To provide the Study Team with transportation necessary for the Study.
6. To appoint counterpart personnel for the Study Team.
7. To organize an inter-department committee and to hold necessary meetings in Indonesian authorities concerned for the Study.
8. To make arrangements for the Study Team to take back to Japan the data, maps and materials for the Study, subject to the approval of the Government of the Republic of Indonesia.
9. To maintain security of life and property of the Study Team during its stay in Indonesia.
10. To afford the Study Team medical services during its stay in Indonesia, if necessary.
11. To undertake to bear claims if any, against the Study occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Indonesia, except for those claims arising from the willful misconducts or gross negligence of the Study Team members.

## VII UNDERTAKING BY JICA

1. To send a study team to conduct the Study
2. To undertake on-the-job training and transfer of knowledge to the Indonesian counterpart personnel in Indonesia and in Japan during the period of the Study.



VII TENTATIVE STUDY SCHEDULE

	1981			1982												1983			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	
Inception Report	⊙																		
Study in Indonesia																			
Progress Report I & II				⊙			⊙												
Interim Report											⊙								
Study in Japan																			
Draft Final Report																			
Comments on Draft Final Report															⊙				
Final Report																			⊙

Items	1981			1982							1983									
	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	
Data collection by Indonesian counterparts																				
3.1 Data collection analysis																				
Data collection (Traffic)																				
Data analysis (Traffic)																				
3.2 Development potentialities																				
3.3 General development concept for G-K region																				
3.4 Development structural Plan for Surabaya Metropolitan																				
3.4 Long-term development strategy for Surabaya Metropolitan area																				
3.5 Short-term development program																				

A

Inception Report

Progress Report I

Progress Report II

Interim Report

Draft Final Report

Final Report

## II. Detailed Explanation on " Items of Study of Scope of work "

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### 3.1 Data Collection and Analysis

In this section, we mainly intend to collect and analyze existing data and forecast of future will be done at section 3.3. and 3.4.

#### Notes

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#### 1) Review of existing reports

1. Socio-Economic plan, Regional Development plan and City planning.
2. Specific regional Development plans.
3. Specific project plans such as port, water supply, inter-urban highway, rural roads system and so on.

#### 2) Socio-economic aspects of the study area

##### a) Population

We will collect the following data: population, employment, income per capita, of each region in G.K.S. for ten years.

Then we will analyse them and search the causes of immigration. And we will see the trend of population and its characteristics/

##### b) Commerce and industries

We will collect the following data: Gross Regional Product (GRP) and Production of each industry for ten years, present situation of agriculture

manufacturing, commerce of G.K.S. in this chapter. Then we should know the productive forces in G.K.S. and the way to increase them in latter chapter.

c) Others

Public expenditure, investment, taxation and so on. We will analyse the size and flow of them.

3) Land use and land development

1. Data collection

- Map & data of land use (G.K. & Surabaya)
- Land use plan
- Map & data of a physical condition (G.K. & Surabaya)
- Location map & data of main facilities (G.K. & Surabaya)
- Situation of land ownership (G.K. & Surabaya)
- Statistics of trend of buildings (Surabaya)
- Map & data of the price of land (G.K. & Surabaya)
- Statistics of trend of land development (G.K. & Surabaya)

2. Analysis

- Region & urban structure at present (G.K. & Surabaya) such as CBD, sub-center, local center so on.
- Vector of urban development (Surabaya).

- Trend of land development (G.K. & Surabaya)
- Trend of location of main facilities (G.K. & Surabaya)
- Trend of land use (G.K. & Surabaya)

4) Urban transport

The methodology and size of traffic survey is depended on the situation of existing data, items which we need, period and cost of a field survey. For the present, we presume that OD Survey is enevitable.

1. Data collection

- Existing urban transport facilities
  - (Ex). Road : Road net work
    - Elements of main road et
  - . Railway: Network, Station
    - Operation etc.
  - . Bus: Network, Operation etc.
  - . Bemo )
  - . Bajai ) Registered number
  - . Becak ) and Operation
  - . Parking: Place, management etc.
  - . Harbor ) Location, Capacity etc
  - . Airport)
  - . Traffic control : signal
    - system etc.
- Traffic Hour
  - (Ex). Total traffic volume
    - . Generation & concentration of traffic

- . OD trip volume
  - . Modal split
  - . Assignment of traffic volume
  - . Traffic volume of main transport facilities (CBD, terminal etc.)
- Existing Data on urban transportation
- . Traffic volume on road network
  - . Railway & bus passengers
  - . Port & airport passengers
  - . Usage of parking space

## 2. Survey

Survey on following items are expected to be needed

- Present situation of package of OD survey, road traffic, usage of mass transportation, usage of parking space, usage of port & airport, usage of terminal (railway, bus & truck), usage of ferry etc.

## 3. Analysis

- Analysis of traffic flow (G.K. & Surabaya)
- . Total traffic volume
  - . Generation & concentration among each zones
  - . OD trip distribution on each route
  - . Modal split
- Analysis of Usage of traffic facilities.
- . Road; Traffic volume at main road.
  - . Railway & bus: passengers, operation.
  - . Parking space

5) Housing

1. Data collection

- Statistics of trend of building (Surabaya)
- Location of houses (Surabaya)
- Situation of a housing owner (Surabaya)
- Size of house (Surabaya)

2. Analysis

- Situation of a housing owner (Classification of income rank)
- Situation of a housing location
- Situation of a housing size
- Location of compon
- Location of new residences

6) Infrastructure,  
Public utilities  
& services

1. Data collection

- Location and size of infrastructure
- Location of main public facilities (hospital, school, etc).
- Condition of electricity, gas, water supply.
- Location of administrative facilities.

2. Analysis

- Condition of administrative services
- Economic condition of electricity, gas & water.

- 7) On-going & proposed development project
1. Urban development plan and projects & re-development and plan projects.
  2. Transportation plan and projects (Road, Port etc.)
  3. Rural development plan and projects.
- 3.2. Identification of development potentialities
- 1) Preparation of criteria of potentialities  
General measurement for judging districts potentialities such as "good access to trunk road", "steep hill, not adequate to live" and so on
  - 2) Classification of potential zones  
To classify every actual district's potentiality with several types by it's characteristics of sectors, social, topographical and physical conditions.
- 3.3. Preparation of a general development concept for GERBANG KERTOSUSILA region
- "CONCEPT" will be compared with "STRUCTURAL PLAN" and "STRATEGY".  
"Concept": general recognition of suitable future state about the region as well as its trend. We intend to show the "Concept" figure physically by the map of the scale of about 1 : 200,000, and non-physically by some levels of volume and figure.
- 1) Socio-economic framework  
It may be followed to the 1980's report of CIPTAKARYA such as population size, employment and Gross Regional product in the socio-economic framework.



- 2) Regional structure      Functional distributions in future should be clearized.
- 3) General Land Use      Urban and Rural.  
Urban Land Use would be divided to 4 or 5 types like dwelling zone industrial zone and so on.
- 4) Infrastructure and public utilities      Main infrastructure like main roads and public utilities would be described.

### 3.4 Presentation of a development structural plan for Surabaya Metropolitan area.

In this stage following items will be studied and formulated into a single integrade plan. This plan should be referred to as 'development structural plan'.

- 1) Socio-economic frame-work
  - Forecast Map (Trend Map), Potential Map
    - . Productivities of each district/region (Agriculture, Industry, Commercial etc.)
    - . Population of each district/region (dwelling population, working population)
  - Problems Finding
  - Several Proposals for its solution
  
- 2) Land use plan
  - Forecast Map (Trend Map), Potential Map
    - . Agriculture, Dwelling (High-density, Medium-density, Low-density), Mixed (Home industry, dwelling with small industry), Heavy Industry, Business Commercial,
  - Problems Finding
  - Several proposal for its solution
    - . New projects, Buiding, regulating
  - Structure Plan Map of them
    - cost, evaluation

- 3) Transportation network
  - Forecast Map (Trend Map)
    - . Traffic node (Origin and Destination)
      - Harbour, Railway station, Distribution Lender, Commercial Center, Business Center, Airport, Industry Area, Housing Complex, New town, route to another city.
    - . Traffic Route/Volume (Person/Goods) car (Highway, trunk, district) Railway, Ship, Airway, Business Service
  - Problems Finding
  - Several Proposal for its solution
    - . Future network plan
    - . New construction, partial extension improvement
    - . Cost, Evaluation (Merit, Demerit, impact).
  
- 4) Parks and open space
  - Forecast Map (Trend Map)
    - . Natural Open space, Parks
    - . Area/person of each district
  - Problems Finding
  - Several proposals for its solution
    - . Future green network.
    - . Leisure space, Boundary of each zone (housing - industry etc.)
    - . Cost, Evaluation

5) Water Supply and  
Drainage

- Forecast Map (Trend Map) of  
Water Supply
  - . Water supply demand,  
(Existing demand, new development  
demand)
  - . Possible water supply (existing  
plan)
- Problems Finding
- Several proposals for its solution
  - . Enforcement of existing facilities  
(Extension of existing pipeline,  
enlargement of existing  
purification plants etc.)
  - . New water supply network  
(Pipeline, new plants, mini plants)
  - . Cost, Evaluation
- Forecast Map of Flood area
  - . Outlet route/volume
  - . Possible outlet by existing  
drainage
  - . Possible flooding area
- Several proposals for its solution
  - . Enforcement of existing drainage  
(widening, dredging, etc.)
  - . New drainage network  
(shortcut, new construction).

6) Housing

- Forecast Map (Trend Map)
  - . Increase of high-density interior  
kampung in build-up area
  - . Expansion of un-planned kampung  
(urban sprawl)
- Problems Finding
- Several proposals for its solution
  - . Improvement of housing  
(Kampung Improvement Project,  
Housing Improvement Project,  
Residential area renewal).

- . New supply of housing  
(flat construction in empty lot,  
additional flat by renewal,  
conventional housing project by  
Perumnas/real estate,  
Big scale supply by new town  
system, etc.)

7) Public Utilities  
and others

- Forecast Map (Trend Map)
  - . Electric power demand  
(existing demand, new development  
demand)
  - . Possible electric supply  
(existing plan)
- Problems Finding
- Several proposals for its solution
  - . Expansion of existing supply route
  - . New electric power supply  
(new network, new power station,  
mini power station, etc.)
  - . Cost, Evaluation

### 3.5 Presentation of a long-term Development Strategy for Surabaya Metropolitan area

In general

In this stage the study team will formulate a development strategy. 'a Development Strategy' means a set of tools and methods to realize the development goals or development targets which are indicated in the previous stage, in 3.4.

'A long-term development strategy' consists of

- 1) Implementation scheme,
- 2) Development Projects,
- 3) Preservation and
- 4) Guideline for private sector's activities

#### 1) 'Implementation scheme'

##### a) Administration and Management

will refer to the role of administrative bodies to implement Surabaya Metropolitan development plan and recommend administrative framework for implementation of programmes, such as which organization should have what administrative power and how to control the progress of programme, or what function should be given to which administrative body.

But this will be a subtle matter and the presentation will have a great influence on each agency.

Therefore the study team is expected to have close consultation with Indonesian side and, at most, they will present the scheme of distribution of administrative functions, not of real power,

##### b) Investment

'Investment' means budget needed to carry out the development structural plan and the way to finance the implementation.

2) Development projects

The study team will identify the key projects to stimulate and support the realization of development structural plan.

It is expected that key projects will be providing and improving projects of transportation facilities, water supply, drainage, housing land development for industrial usage, housing and so on.

In this stage those projects will be identified individually and its size and duration will be determined.

3) Preservation

The study team will identify some land areas or some zones to be preserved in previous stage, in the structure-plan of land use.

Preservation of some area is a mean to reserve a certain extent of land for agricultural use, to preserve for flood control or to protect natural and urban environment.

Here, in this stage the study team will present the methods to secure the preservation of land, such as regulations and land use land acquisition by public sector, promoting of agricultural land use and so on.

4) Guideline for private sector's activities

It is very important to use and control development energy of private sector for complete realization of development structural plan.

Therefore, in this stage the study team will present guideline for private sector's activities, such as regulations on building and land development activities, incentives to stimulate investment through private fund and indications for investment, that means to which area or to what kind of industry private investment should be done.

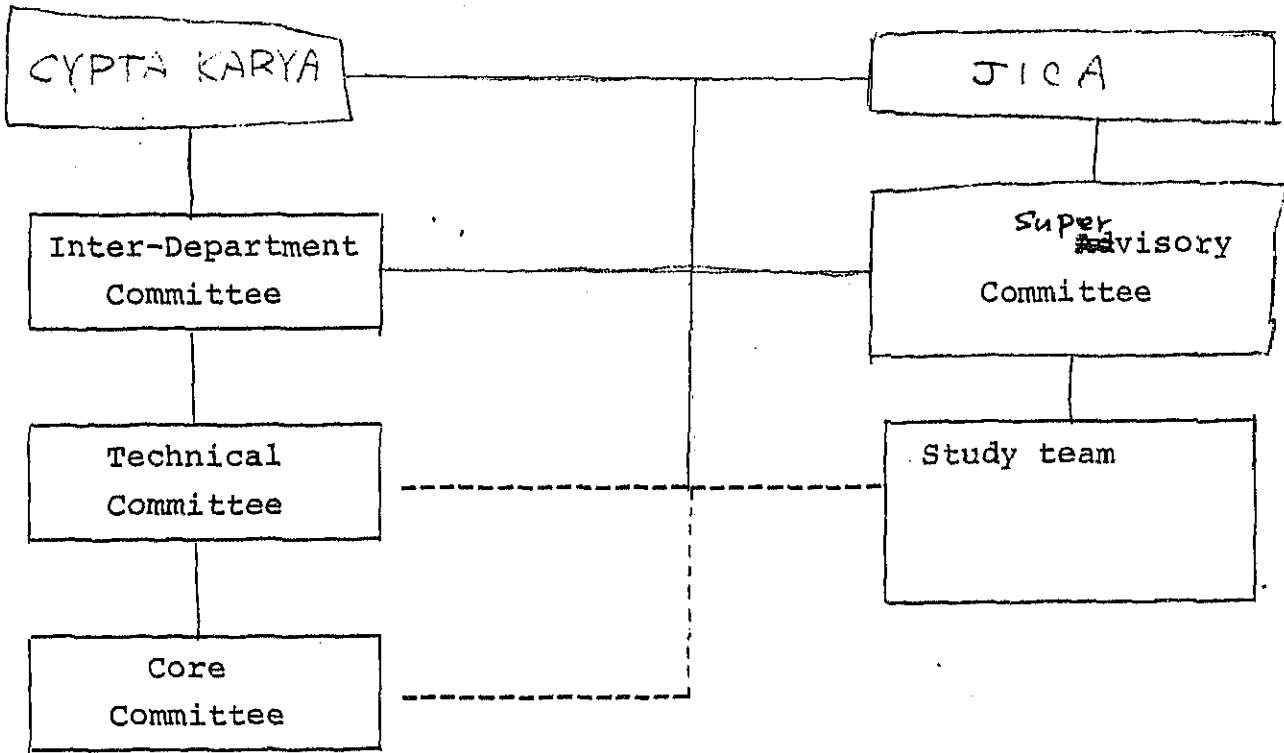
## Institutional Framework

o Direct responsibility - Cipta Karya as the <sup>leading</sup> ~~lending~~ agency

o Governmental bodies needed to cooperate closely

- . Generally Province Planning Board (BAPPEDA)
- . Administrave  
framework Ministry of Home Affairs
- . Socio-economic (Cipta Karya)  
BAPPENAS  
Ministry of Finance
- . Land-use (Cipta Karya)  
Ministry of Agriculture,  
Forestry and Fishery  
Ministry of Industry
- . Transportation  
network Directorate General of Land Transport  
Directorate General of Sea Transport  
Directorate General of Bina Marga
- . Parks and  
Open spaces (Cipta Karya)
- . Water Supply and  
Drainage (Cipta Karya)  
Directorate General of Water Resources  
Development
- . Housing Directorate General of Housing  
Plymnas
- . Public Utilities  
and Others (Cipta Karya)  
Ministry of Industry
- . Municipality (Kotamadya)





(Head of Sub-Directorate Level)

## Indonesian Counter-part Committee

1. Inter-Department Committee
  - . At least at the time of the presentation of following reports.  
(Inception, Progress I & II, Interim, Draft Final)
2. Technical Committee
  - . At least once a month during the study in Indonesia  
(held in Jakarta and Surabaya)
3. Core Committee
  - . At least twice a month during the study in Indonesia  
(held in Jakarta and Surabaya).

### III. Data Needed for " Development Study on Surabaya Metropolitan Area "

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#### 1. Regional Economy Statistics

- (1) Gross Regional Product (GRP) of Each Region in G.K.S. for five years before 1974.
- (2) Production of Each Industry, Each Region in G.K.S. for five years before 1974.
- (3) Employment of Each Industry, Each Region in G.K.S. for ten years.
- (4) Income Per Capita of each region in G.K.S. for ten years.

#### 2. Local Government Finance Statistics

- (1) Public Revenues and Expenditure of Each Local Government in G.K.S. for ten years.

cf. Revenues

Local Taxes

Grants from Central Government

Public Enterprises' Income

Local Government Bond

Others

Expenditure

Wages

Social Welfare

Public Investment (Road, Housing, Port,...)

Others

- (2) Grant System for Public Investment and Public Utilities

cf. Public Utilities: Transport, Telephone and Telegram

Electricity and Gas Supply, Others

1. From Central Government to Local Government

2. From Central or Local Government to Public Utility Enterprises.

### 3. Productive Forces Statistics

#### (Agriculture)

- (1) Cultivated Field Area of Each Crop, Each Region in G.K.S. (Km2)
- (2) Harvest of Each Crop, Each Region in G.K.S. (ton)
- (3) Forest Area available to timber of Each Region in G.K.S. (Km2).
- (4) Volume of Fish Catch in Each Region in G.K.S. (ton).

#### (Manufacturing)

- (1) Number of Factories in Each Region in G.K.S.
- (2) Consumption of Electricity in Each Region in G.K.S.
- (3) Location Planning of Big Manufacturing Factories in G.K.S., if any.

#### (Commerce)

- (1) Number of Stores in each region in G.K.S.
- (2) Amount of Store Sales in Each Region.

### 4. Housing and Land Use

#### (1) Present Situation of Buildings

- ° Number of Buildings of Each Kind  
cf. Housing, Office, Store, Warehouse, ...
- ° Number of Buildings of Aging Degree  
cf. 0 10 years, 11 20 years, 21 30 years,  
over 31 years.

#### (2) Construction of Buildings

- ° Each Kind of Buildings for ten years.

- (3) City Development Area
  - ° Development Area for ten years
- (4) Summary of Land Use Regulation, City Planning Regulation, Regional Development Regulation, Housing Regulation.

#### 5. Local Government Organization

- (1) Role and Organization of Each Grade Local Government, (Laws and regulations on Local government activity) cf. State, Municipality, Regency, ...
- (2) Selection System of Local Government's Head  
cf. Central Government's Decision, Election, Other Way

#### Data Collection Concerned Transportation

#### 6. Existing Traffic Facilities (present)

- (1) Road : . Road Network (map & data)
  - . Elements of Main Road (map & data)  
(rank, length, width component of wide)
- (2) Railway: . Network, Station (places & faculty),  
Operation, Economic condition.
- (3) Bus : . Networks, Vehicles, Operation, Fair, Bus Terminal, Economic condition.
- (4) Parking: . place . management (public & private)
- (5) Harbour: ° Location. Scale (capacity)
- (6) Airport: ° Location. Scale (capacity)
- (7) Traffic Control : Signal system. One way system.
- (8) Construction Cost of all.

7. Existing/Forecast of Urban Activity
  - (1) Existing Urban Development Projects
  - (2) Population : Total Numbers, Population at night & mid-time, day time.
  - (3) Vehicle ownership data (Registration, Frequency)
  - (4) Land use on each zone/Land Use Plan
  - (5) Labor Income
  - (6) Status quo of buildings
  - (7) Design standard of buildings
  
8. Traffic Flour
  - (1) Total traffic volume (intra-urban)  
(for purpose in intra-urban)
  - (2) Generation & Concentration trip volume
  - (3) Origin-Destination trip volume (for purpose)
  - (4) Modal split (for purpose)
  - (5) Assignment trip volume (for purpose)
  - (6) Traffic volume of main transport facilities  
(Ex) Station, bus-terminal, harbour, air-port.  
CBD.
  
9. Present condition on urban transportation
  - (1) Traffic volume on road network
    - . Sectional traffic volume (all day & peak hour, vehicle classification).
    - . Traffic volume at main crossing.
    - . Journey speed survey.

- (2) Usage of public transportation
  - . Railway & bus passenger data (mainline)
  - . Railway & bus passenger data (station)
- (3) Usage of parking space
  - . Location of parking space (on a road and out of a road)
  - . Usage of parking space
- (4) Usage of port and airport
  - . Passengers survey (number, O-D pattern)
  - . Freight survey (item, weight, O-D pattern)
- (5) Usage of terminal
  - . Usage of truck terminal

10. Existing/Forecast of Urban traffic

- (1) Road
  - . Traffic jam at main roads (all day & peak hour)
  - . Traffic jam at main section
  - . Traffic accidents
  - . Components of mehle type
  - . Environmental problem
- (2) Railway
  - . Management
  - . Fare
  - . Financial condition

- . Trend of passengers
- (3) Bus
  - . Management
  - . Fare
  - . Financial condition
  - . Trend of passengers
- (4) Becak . Management (Number of Employee)  
 Bajay . Fare (Income and Expenditure)
- (5) Parking . Demand and supply  
 . Improvement method
- (6) Main terminal facilities
  - . Congestion of station, port and airport
- 11. Present and future : Inter Urban traffic problem  
 (Mainly G-K region)
  - (1) Present traffic facilities
  - (2) Planning on Inter-region activity
  - (3) Inter-region traffic flow
  - (4) Inter-urban traffic survey
  - (5) Present and future Inter-urban traffic problem.
- 12. Existing Development study report
  - (1) The study on Surabaya port
  - (2) Surabaya - Malang Highway Project  
 (Bina Marga/ADB)



- (3) The study on "Water supply, Waste water, Drainage and Solid wastes" Vol. I, II, III, IV (CIPTA KARYA/World Bank).

#### IV. Counterpart Contribution (tentative)

##### 1. Japanese Government

Experts of the study team ; max. 10 persons min. 7 persons

Nov/1981 - Apr/1982 ; 8 persons

May/1982 - Jun/1982 ; 7 persons

Jul/1982 - Aug/1982 ; 10 persons

##### 2. Indonesian Government

###### 1) Personnel

###### I) Full time technical counterparts (Nov/1981 - Aug/1982)

One person from cypta karya

for data collection and coordination at central  
government level

One person from cypta karya of governor's office

for data collection and coordination at local  
government level

One person from Kotamadya Surabaya

for data collection and coordination with  
Kotamadya Surabaya

###### II) Part time technical counterparts (Period of traffic surveys)

Approximately 10 persons from central and local government.

To be the leaders for the traffic surveys

###### III) Office staff

Typist 2

Clerk 2

Draftman 2

Driver 2

###### 2) Office space Nov/1981 - Apr/1982 in Surabaya

May/1982 - Aug/1982 in Jakarta

###### 3) Office equipment

Desks, Chairs, Sofa set, Lights, Typewriter, etc.

###### 4) Running cost of Office

###### 5) Fuel of the vehicles for the study

3. Technology transfer

The study team performs technology transfer to Indonesian counterparts personnel in the course of the Study.

V. Operation Plan for Traffic Survey (draft)

1. Approach to the Study

Surabaya Area Transportation Study Report by Halcrow Fox and associates (British consultant Oct. 1977) will provide basic data on traffic in Kotamadya Surabaya area within GKS region.

Therefore a broad traffic survey on whole GKS region is required to grasp the traffic flow in this region and to update the previous survey data.

2. Items of the traffic survey

(1) Modal split in GKS region is followings.

The objective of the traffic survey is to grasp the flows of them.

(Passenger) Car  
Motor cycle  
City bus  
Mini bus  
Bemo  
Becak  
Train  
Ferry  
Airplane

(Freight) Truck  
Train  
Ship

(2) The share of train in Modal split is negligible. But that of vehicle and motor cycle is specifically large.

The person trip survey in this region is difficult because of uncertainty of population data and limited survey time and cost.

Therefore Car O-D survey will be conducted mainly and other various traffic surveys will be adopted.

(3) Items of traffic survey

1. Car O-D survey
  - 1) Private passenger car ; Home interview survey
  - Private freight car ; Home interview survey
  - 2) Company freight car ; Office interview survey
  - 3) Bus ; Bus operation survey
2. Board traffic volume survey
  - 1) Road side survey ; Main cross section & main crossing
  - 2) Corden line survey ; Traffic volume/vehicle types & hours
  - 3) Screen line survey ; Traffic volume/vehicle types & hours
  - 4) Journey speed survey
3. Parking survey ; Inner city on-road parking  
Large size vehicle parking
4. Truck terminal survey
5. Bus survey ; Bus terminal survey  
Bus stop survey
6. Minibus, Bemo, Becak survey
7. Port survey ; Ferry survey  
Freight ship survey
8. Railway survey ; Station, Passenger
9. Airplane survey ; Airport, Passenger
10. Traffic facility survey
  - i) Road structure ; Width, Structure, Side walk
  - ii) Crossing structure
  - iii) Traffic control survey
11. Aerial photo survey

3. Estimated traffic survey scale (man-power needed)

1.1 Car O-D survey (Private car)

- 1) Number ; 40,000 cars
- 2) Sampling rate ; 15%
- 3) Number of samples ;  $40,000 \times 0.15 = 6,000$
- 4) One man survey 5 car/day ;  $6,000/5 \text{ car.man.day} = 1,200 \text{ man.day}$

- 5) 20 day survey (One month) ;  $1,200 \text{ man day} / 20 \text{ day} = 60 \text{ man}$
- 6) Instruction on survey method for 3 days ;  $60 \text{ man} \times 3 \text{ day} = 180 \text{ man.day}$
- 7) On leader to ten surveyers ;  $60/10 = 6 \text{ man}$
- 8) Leader, man day ;  $6 \text{ man} \times 20 \text{ day} = 120 \text{ man day}$
- 9) Sub total 4) + 6) + 8)  $\pm 1,500 \text{ man day}$

#### 1.2 Car O-D survey (Freight)

- 1) Number ; 20,000
- 2) Sampling rate ; 5%
- 3) Number of samples ;  $20,000 \text{ cars} \times 0.05 = 1,000 \text{ car}$
- 4) One man survey 10 car/day ;  $1,000/10 \text{ car.day.man} = 100 \text{ man.day}$
- 5) 10 day survey ;  $1,000 \text{ man day} / 10 \text{ day} = 10 \text{ man}$
- 6) Instruction on survey method for 3 days ;  $10 \text{ man} \times 3 \text{ day} = 30 \text{ man day}$
- 7) Leader ; One person
- 8) Duration of leader ;  $1 \text{ man} \times 10 \text{ day} = 10 \text{ man day}$
- 9) Sub total 4) + 6) + 8) = 140 man day

#### 1.3 Car O-D survey (Bus)

- 1) Number ;  $\pm 1,000 \text{ cars}$
- 2) Sampling rate ; 10%
- 3) Number of samples ;  $1,000 \times 0.1 = 100 \text{ cars}$
- 4) One man survey 10 car/day ;  $100/10 \text{ car per day} = 10 \text{ man day}$
- 5) 2 day survey ;  $10 \text{ man day} / 2 \text{ day} = 5 \text{ man}$
- 6) One day instruction on survey method ;  $5 \text{ man} \times \text{one day} = 5 \text{ man day}$
- 7) Leader ; One man
- 8) Duration of leader ;  $\text{One man} \times 5 \text{ day} = 5 \text{ man day}$
- 9) Sub total 4) + 6) + 8) = 20 man day

#### 2.1 Road traffic volume survey (Road side survey)

- 1) One point ; 3 group (4 persons/group)
- 2) Survey time ; 24 hours (8 hours x 3)
- 3) Number of points ; Main road  $\pm 30 \text{ points}$   
Main crossing  $\pm 15 \text{ points}$   
Total  $\pm 45 \text{ points}$
- 4) Sub total 4 man day x 3 group x 45 points = 540 man day

2.2 Road traffic volume survey (Corden line survey)

- 1) One point ; 3 group (8 person/group)  
Traffic volume - 4 person  
Interview - 4 person
- 2) Survey time ; 24 hours (8 hours x 3)
- 3) Number of points ; 5 points
- 4) Sub total 8 man day x 3 group x 5 points = 120 man day

2.3 Road traffic volume survey (Screen line survey)

- 1) One point ; 3 group (4 person/group)
- 2) Survey time ; 24 hours (8 hours x 3)
- 3) Number of points ; Screen point  
South - North 15 points  
East - West 5 points  
Total 20 points
- 4) Sub total 4 man day x 2 group x 20 points = 240 man day

2.4 Road traffic vehicle survey (Journey speed survey)

- 1) One car ; 3 man boarding  
(only one day survey)
- 2) Survey time ; Morning 7:30 - 9:30 (for 2 hours)  
Afternoon 16:00 - 18:00  
(for 2 hours)
- 3) Number of line ; South - North 4 roads  
East - West 2 roads  
Total - 6 roads
- 4) Sub total 3 man day x 6 roads = 18 man day

3.1 Parking survey

- 1) One road ; 2 group
- 2) One group ; 4 man (2 man for each side)
- 3) Survey time ; 16 hours (6:00 - 22:00)
- 4) Number of roads ; ± 40 roads
- 5) Sub total ± 4 man day x 2 group x 40 = 320 man day

4.1 Truck terminal survey

- 1) One place ; 2 man
- 2) Number of places ; 1 place
- 3) Sub total 2 man day

5.1 Bus passenger survey (Bus terminal survey)

- 1) One place day ; 2 man
- 2) Number of places ; 10 places
- 3) Sub total 3 man day x 10 place = 30 man day

5.2 Bus passenger survey (Bus stop survey)

- 1) One place ; By 2 group
- 2) One group day ; 2 man day
- 3) Survey time ; 16 hours (6:00 - 22:00)
- 4) Bus stop ;  $\pm$  30 places
- 5) Sub total 2 man day x 2 group x 30 = 120 man day

6.2 Mini bus, Bemo, Becak survey

- 1) One place ; By 2 group
- 2) One group a day ; 2 man day
- 3) Survey time ; 16 hours (6:00 - 22:00)
- 4) Number of points ; 65 points  
(Road side and screen line  
survey points)
- 5) Total 2 man day x 2 group x 65 points = 260 man day

7.1 Port survey

- 1) One place ; 3 group (Ferry - 2 group,  
Freight - one group)
- 2) One group ; 2 man
- 3) Number of place ; One
- 4) Sub total 2 man day x 3 group x 1 = 6 man day

8.1 Railway survey

- 1) One place ; One group (One group 2 man)
- 2) Number of place (Station) ;  $\pm$  10 station
- 3) Sub total 2 man day x 10 = 20 man day

9.1 Airplane survey

- 1) One place ; One group (2 man)
- 2) Number of place ; One
- 3) Sub total 2 man day

10.1 Traffic facility survey

- 1) One group (a day) ; 2 man
- 2) One group (a day) ; 10 places
- 3) Number of points ; 100 points  
(for one day  $100/10 = 10$ )
- 4) Sub total 2 man day x 10 = 20 man day

11.1 Aerial photo by airplane

- 1) One group (a day) ; 4 man
- 2) Leader ; One man
- 3) Sub total (One day job) ; 4 man day

12.1 Mini person trip survey (conducted by Government officials for technology transfer)

- 1) Number of samples ; 1,000 (New housing area in suburbs)
- 2) One man survey 5 samples per day ;  $1,000/5$  man day = 20 man day
- 3) Duration of survey ; One day
- 4) Instruction of survey method ; 2 day x 20 man = 40 man day
- 5) Leader ; One man to 10 surveyor  
 $20$  surveyor/ $10 = 2$  man
- 6) Leader man day ; 4 man x one day = 4 man day
- 7) Sub total 2) + 4) + 6) = 64 = 70

13.1 Grand total 1.1 to 11.1

$$1,500 + 140 + 20 + 540 + 120 + 240 + 20 + 320 + 2 + 30 + 120 + 260 + 6 + 20 + 2 + 20 + 70 = 3,430 \text{ man day}$$
$$= \pm 3,400 - 3,500 \text{ man day}$$

Man day of Leaders needed (Government officials)

- 1) Car O-D survey 135 man day
- 2) Other traffic surveys 13 man day
- 3) Mini person trip survey 70 man day
- 4) Total 218 = 220 man day



Annex

Number of vehicle ownership (1976)

Item	GKS region	Kotamadya Surabaya area
(Passenger)		
1) Car (Private)	40,000	26,000
2) Motor cycle	20,000	115,000
3) Bus	1,000	700
4) Bemo	3,000	2,000
5) Becak	50,000	37,000
6) Bicycle	50,000	20,000
(Freight)		
7) Freight car (company)	20,000	13,000

Note 1) Population of GKS region and Surabaya city are as follows.  
Number of vehicles in GKS region was estimated by applying  
the same rate of population/car in Surabaya city.

Population (1976)

GKS region ± 5,400,000 (2.1 times of Surabaya)

Surabaya city ± 2,550,000

i) Number of vehicles in Surabaya x Ratio of population  
26,000 x 2.1 = 55,000

ii) Considering the locality of GKS region, the number of  
vehicles of GKS region is estimated as follows,  
5,500 vehicles 50,000 vehicles

Note 2) Number of Motor cycles is estimated by the above mentioned  
method

i) Number in Surabaya x Ratio of population  
115,000 x 2.1 = 242,000

ii) Considering the locality of GKS region  
242,000 200,000 motor cycles

Note 3) Number of Bus is estimated by the same method

i) Number in Surabaya  
700 x 2.1 = 1,500

ii) Considering the locality  
1,500 1,000

Note 4) Number of Bemo, Becak, and bicycle are estimated by the same  
method.

VI. Operation Plan of Existing Land Use Survey (draft)

- 1) Content ; To make map of existing land use which can be used as basic information in order to make land use planning.
- 2) Target area ; Surabaya Metropolitan area
- 3) Method ; If possible, to describe existing land use on base map of 1/3,000 - 1/5,000 scale, then to accumulate them, but aerial colour photos can be used as simple method.
- 4) Items to be distinguished;
  - Forest
  - Woods
  - Field
  - Paddy field
  - Urban area
    - Residential
      - Low storied
      - Middle storied
      - Low density
      - Middle density
      - High density
    - Commercial -do-
    - Industrial
    - Mixed use
  - Road (except small roads)
  - River
  - Park
  - School
  - Public facilities
  - etc.
- 5) Scale ; At first, to put above-mentioned information on 1/50,000 scale basic maps analyzing 1/10,000 aerial photo.  
Finally, to arrange the existing land use map with the scale of 1/100,000.

6) Man-power ; Depend on the area of Metro Surabaya region, namely the number of sheets of aerial photos (1/10,000).

For example;

- Metro Surabaya region 20 km X 20 km

- Aerial photo ..... 30 cm X 30 cm

-  $200,000 \text{ m}/10,000 = 2,000 \text{ cm}$ .  $2,000 \text{ cm}/30 \text{ cm} = \pm 70$

Therefore 70 sheets X 70 sheets =  $\pm 500$  sheets

\* If the area of the region is 40 km X 40 km,  
then  $\pm 2,000$  sheets of basic map of land use is  
necessary.

If one sheets can be made by one-day-man, total man-day would be  
500 --- 2,000 man-day.









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