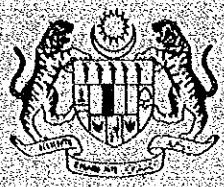

GOVERNMENT OF MALAYSIA

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

FINAL REPORT

EXECUTIVE SUMMARY

JUNE 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

GOVERNMENT OF MALAYSIA

THE FEASIBILITY STUDY ON
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PREFACE

In response to a request from the Government of Malaysia, the Japanese Government decided to conduct the Feasibility Study on Transportation Facilities Project in Klang Valley and entrusted the study to the Japan International Cooperation Agency (JICA).

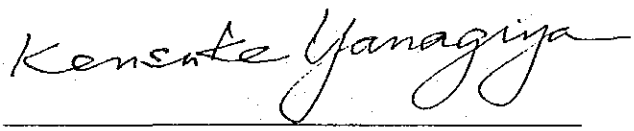
JICA sent to Malaysia several times a survey team headed by Mr. Toshio Kimura, Fukuyama Consultants International Co. Ltd., comprising members from Fukuyama Consultants International Co. Ltd., Pacific Consultants International Co. Ltd. and Aero Asahi Corporation from October 1987 to March 1989.

The team held discussions with officials concerned of the Government of Malaysia and conducted field surveys. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincerest appreciation to the officials concerned of the Government of Malaysia for their close cooperation extended to the team.

June 1989



KENSUKE YANAGIYA
President
Japan International Cooperation Agency

CONTENTS

CHAPTER 3: SUMMARY OF THE FREIGHT TERMINAL PROJECT

INTRODUCTION

Background

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan has conducted jointly with the Government of Malaysia the "Klang Valley Transportation Study" (hereinafter referred to as the "KVTS") from December 1985 to May 1987. The KVTS has proposed a list of priority transportation facility development projects, that of public transportation system project, road improvement and construction projects, traffic control and surveillance projects and freight terminal projects. Following the acceptance of these projects, the Government of Malaysia requested the Government of Japan to further conduct the Feasibility Study on Transportation Facilities Projects in Klang Valley which includes highways, the area traffic control and surveillance system and freight terminals (hereinafter referred to as the "Study").

In response to the request by the Government of Malaysia, a Scope of Work Mission organized by JICA was dispatched to Malaysia and signed the Scope of Work in March 1987. Based on the Scope of Work, the Study officially commenced on the 29th day of October, 1987 with the submission of the Inception Report. Progress Report I of the Study was submitted to the Government of Malaysia in February 1988. The Interim Report was submitted in September 1988. With the completion of Phase I of the Study, Progress Report II of the Study was submitted in January 1989.

The Draft Final Report was submitted in March 1989, presenting the Study Team's conclusion and recommendation for the Study. This report forms the EXECUTIVE SUMMARY of the Final Report which is prepared based on the Draft Final Report and incorporating comments from the Malaysian Government on the Draft Final Report.

Objectives of the Study

This Study has the following objectives:-

(1) To examine the technical, economic and financial feasibility of the proposed transportation facility projects in the KVTS;

(2) To prepare the preliminary engineering design for these transportation facilities in the Klang Valley following their technical, economic and financial analyses;

(3) To prepare a suitable implementation program for these projects; and

(4) To transfer the necessary technical know-how and methodologies on the feasibility study to the Malaysian counterparts in the course of the Study.

The Study Components

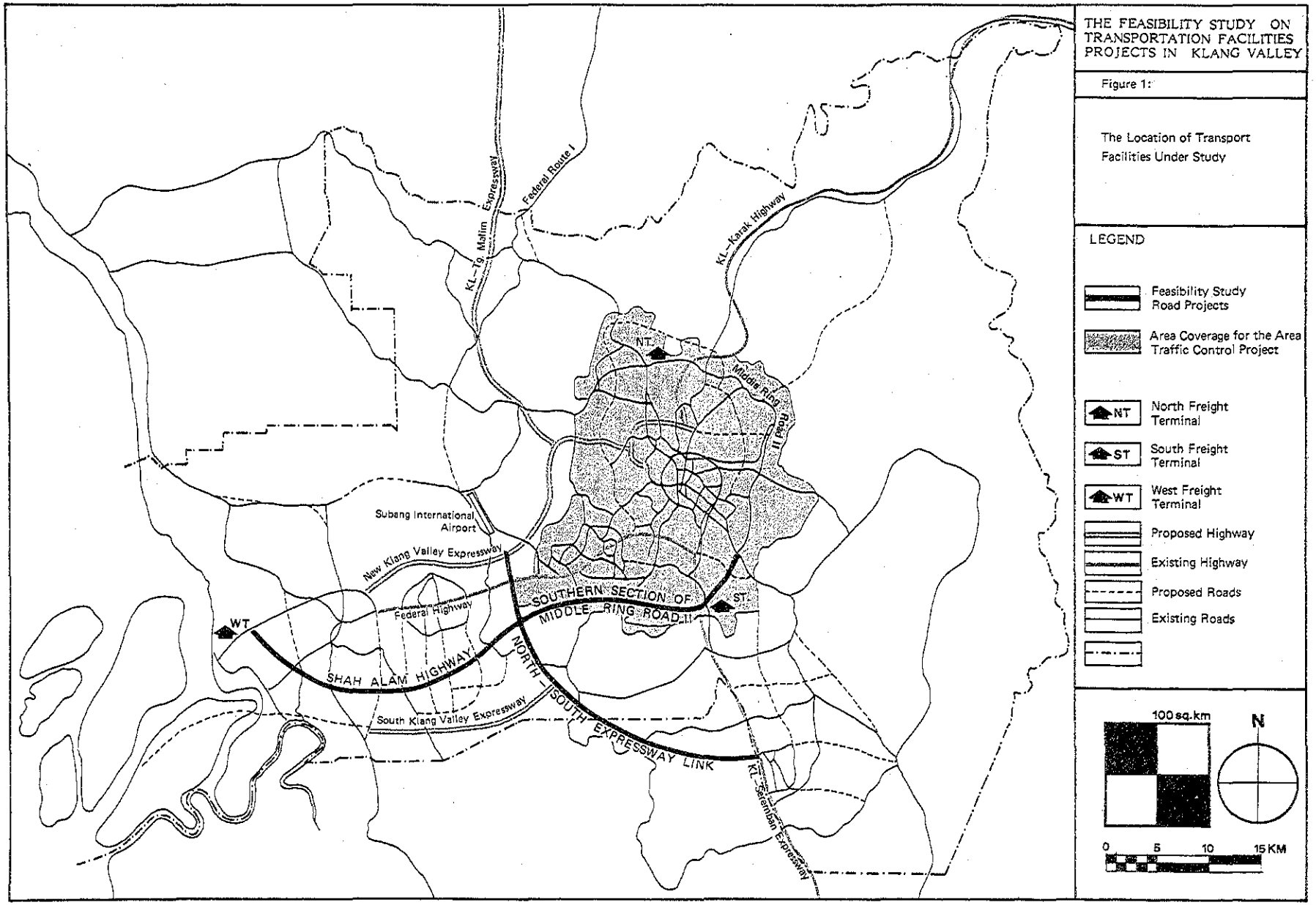
The Study examined three transportation facility component projects in the Klang Valley:-

(1) Highway Project
(2) Area Traffic Control and Surveillance System Project
(3) Freight Terminal Project

Figure 1 shows the location of these facility projects in Klang Valley.

Study Approach

This Feasibility Study was conducted in two (2) phases and organized into five (5) stages as illustrated in Figure 2. The highway project extended throughout the entire period while the other two (2) projects were completed at the Interim Report Stage. This Final Report presents the final outcomes of the Study.


THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
Figure 1:
The Location of Transport Facilities Under Study
LEGEND
Feasibility Study Road Projects
Area Coverage for the Area Traffic Control Project
NT North Freight Terminal
ST South Freight Terminal
WT West Freight Terminal
Proposed Highway
Existing Highway
Proposed Roads
Existing Roads
100 sq.km
N
0 5 10 15 KM
KL–Tg. Malim Expressway
Federal Route I
KL–Karak Highway
Middle Ring Road II
Subang International Airport
New Klang Valley Expressway
Federal Highway
SOUTHERN SECTION OF MIDDLE RING ROAD II
SHAH ALAM HIGHWAY
South Klang Valley Expressway
NORTH SOUTH EXPRESSWAY LINK
KL–Seremban Expressway

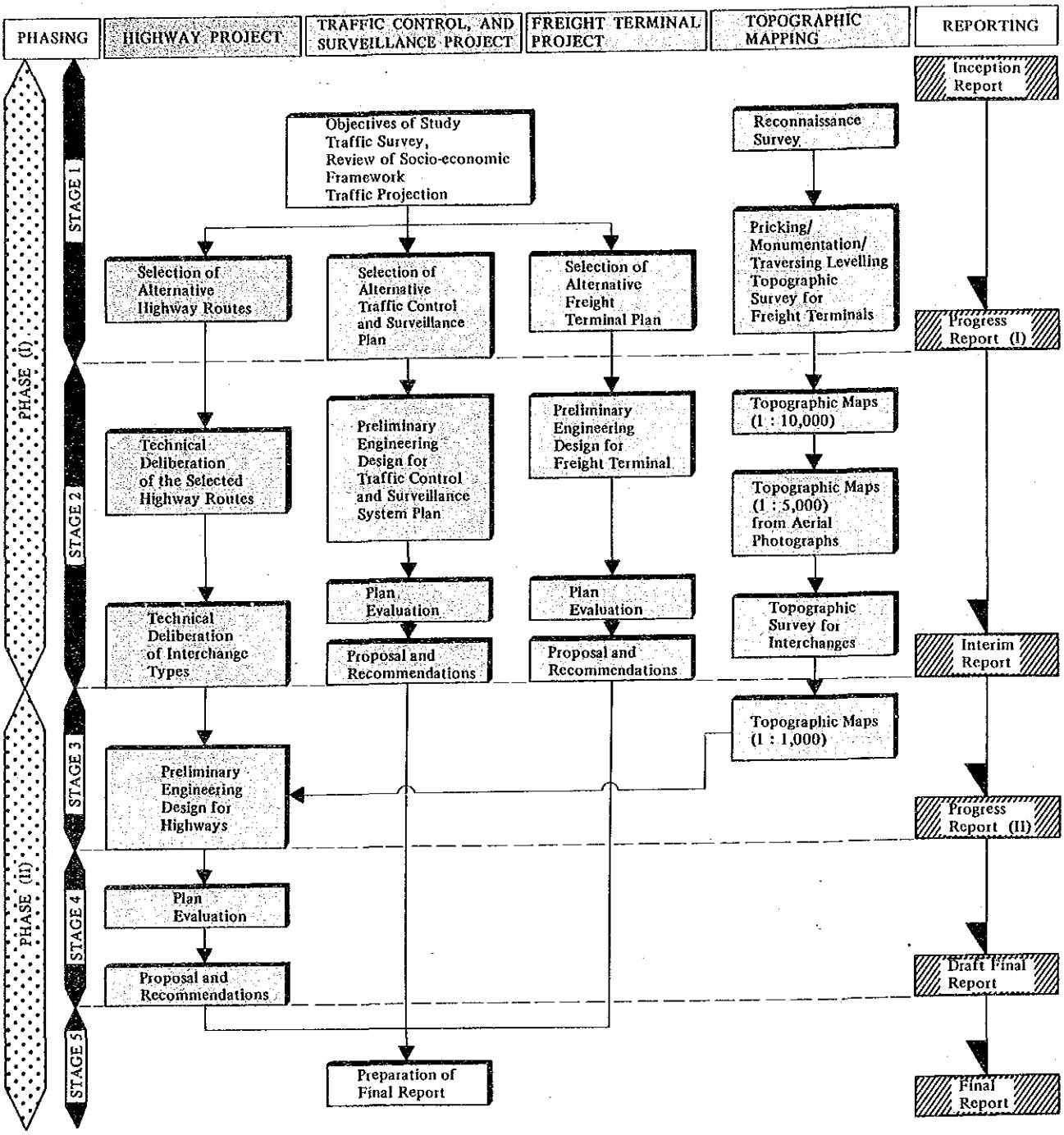
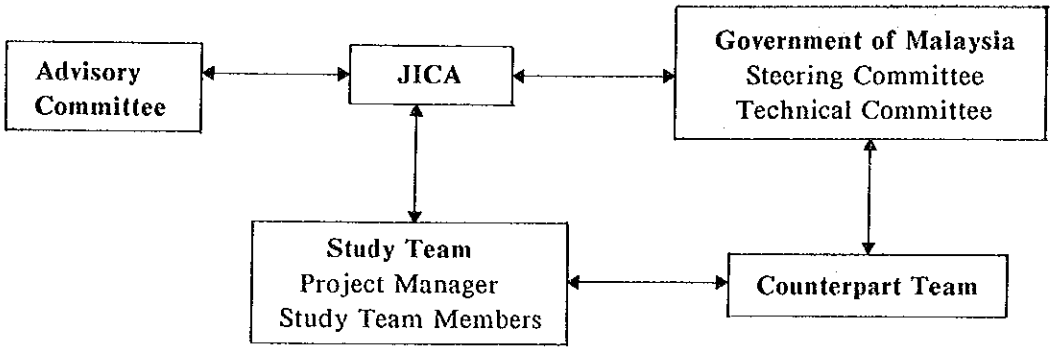


Figure 2: The Study Approach and Stages

Organization of the Study

The project is being carried out jointly by JICA and the Government of Malaysia in coordination with other related agencies. The organization for the project and the lists of committees members are as follows:-



JICA has set up an Advisory Committee to provide advice and suggestions for the Study.

Steering Committee, Government of Malaysia

Chairman	Dr.Mohd.Noor bin Haji Harun	Economic Planning Unit, Prime Minister's Department
	Mrs.Rosmah bte Jentra	Economic Planning Unit, Prime Minister's Department
	Mr.Ismail bin Mohamed	Economic Planning Unit, Prime Minister's Department
Secretary	Mrs.Farida bte Mohd Ali	Economic Planning Unit, Prime Minister's Department
	Datuk Yaacob bin Abd. Hamid	Klang Valley Planning Secretariat, Prime Minister's Department
	Mr.Ahmad Kamaruddin bin Abdul Rahid	Klang Valley Planning Secretariat, Prime Minister's Department
	Mrs.Norasiah Yahya	Klang Valley Planning Secretariat, Prime Minister's Department
	Mr.Amir bin Kassim	Highway Planning Unit, Ministry of Works
	Mr.Heng Aik Koon	Highway Planning Unit, Ministry of Works
	Mr.Taichi Seki	Highway Planning Unit, Ministry of Works

	Mr.Han Joke Kwang	Public Works Department, Ministry of Works
	Mr.Kamarul Baharin bin Dato Haji Abdul Raof	Federal Territory Development Unit, Prime Minister's Department
	Mrs.Hew Kwan Wai	Ministry of Transport
	Mr.Mahfix bin Omar	Kuala Lumpur City Hall
	Mr.Jabbari bin Ahamed	Development and Planning Unit, Selangor State

Technical Committee, Government of Malaysia

Chairman	Datuk Yaacob bin Abdul Hamid	Klang Valley Planning Secretariat, Prime Minister's Department
Secretary	Mr.Awangku Hidup bin Awangku Hossain	Klang Valley Planning Secretariat, Prime Minister's Department
	Mr.Ahmad Kamaruddin bin Abdul Rashid	Klang Valley Planning Secretariat, Prime Minister's Department
	Mrs.Norasiah Yahya	Klang Valley Planning Secretariat, Prime Minister's Department
	Mrs.Farida bte Mohd Ali	Economic Planning Unit, Prime Minister's Department
	Mr.Amir bin Kassim	Highway Planning Unit, Ministry of Works
	Mr.Heng Aik Koon	Highway Planning Unit, Ministry of Works
	Mr.Taichi Seki	Highway Planning Unit, Ministry of Works
	Mr.Han Joke Kwang	Public Works Department, Ministry of Works
	Mr.Ibrahim bin Ahmad	Public Works Department, Ministry of Works
	Mr.Kamarul Baharim bin Dato Haji Abdul Raof	Federal Territory Development Unit, Prime Minister's Department
	Mr.Prem Kumar	Federal Territory Development Unit, Prime Minister's Department
	Mr.Shamsuddin Che'Mat	Ministry of Transport
	Mrs.Hew Kuan Wai	Ministry of Transport

	Mr.Mahfix bin Omar	Kuala Lumpur City Hall
	Mr.Ooi Goan Lee	Kuala Lumpur City Hall
	Mr.Lee Then Hong	Kuala Lumpur City Hall
	Mr.Jabbari bin Ahmad	Development and Planning Unit, Selangor State
	Mr.Mohamad Khusrin bin Hj.Munawi	Development and Planning Unit, Selangor State
	Mr.Ghazali Md.Noor	Malaysian Highway Authority
	Mr.Ahmad Rahimi b.Jaafar	Malayan Railway Administration
	Mr.Sabini bin Tijan	Malayan Railway Administration

Malaysian Counterpart Engineers

	Mr.Mustafa Kamal	Public Works Department, Ministry of Works
	Mr.Ibrahim Ahmad	Public Works Department, Ministry of Works
	Mr.Goh Tok Peow	Road Transport Department, Ministry of Transport

Advisory Committee, Government of Japan

Chairman	Dr.Kazuo Yoda	Housing and Urban Development Corporation
	Mr.Koji Hasekura	Housing and Urban Development Corporation
	Mr.Toshio Takeuchi	Ministry of Construction
	Mr.Kazuhiro Watanabe	Ministry of Transport
	Mr.Saiji Noma	Ministry of Transport

Study Team

Japanese Expert

Team Leader	Mr.Toshio Kimura	Transport Planning
	Mr.Kokuro Hanawa	Traffic Engineering
	Mr.Satoshi Kishi	Transport Demand Forecasting
	Mr.Takashi Sato	Traffic Control System Planning
	Mr.Tetsuya Tahira	Traffic Control System Design/Cost Estimate
	Mr.Hisao Itazu	Freight Terminal Planning
	Mr.Takayuki Sakaguchi	Freight Terminal Design
	Mr.Michimasa Takagi	Highway Planning
	Mr.Kenji Maruoka	Highway Design
	Mr.Yoichi Yoshida	Highway/Structure Design
	Mr.Toshisada Katsurada	Transport Economics
	Mr.Yoshiteru Sunago	Financial Analysis

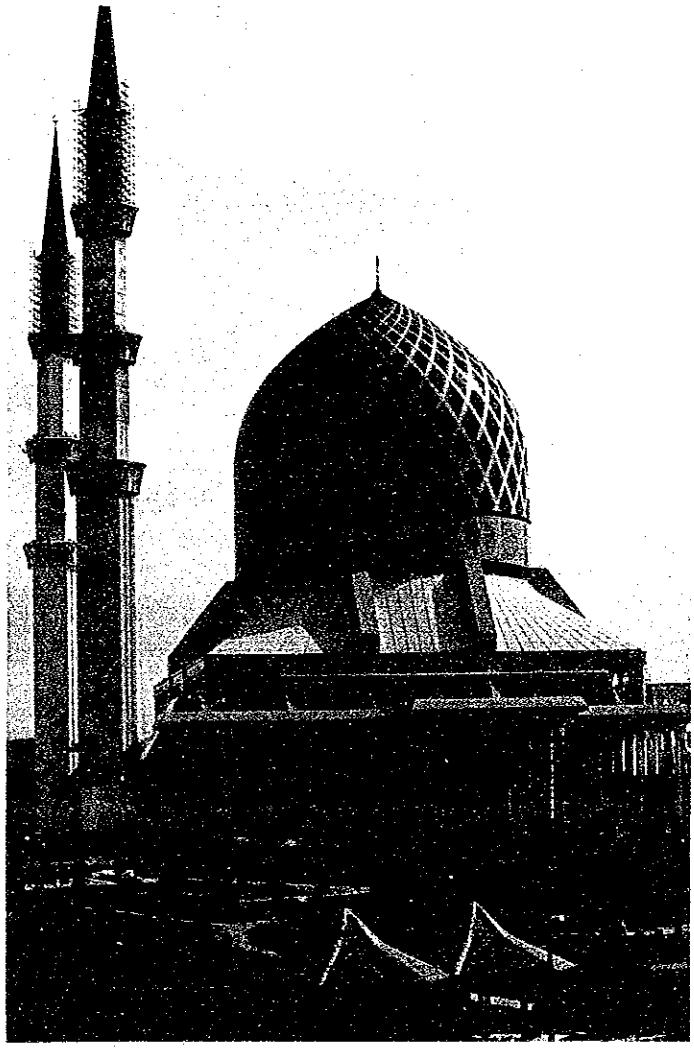
Malaysian Engineers

	Mr.Chua Mok You	Transport Planning
	Mr.Chin Kar Keong	Transport Planning
	Mr.Ooi Peng Hong	Transport Planning

Japan International Cooperation Agency

	Mr. Koji Mori	Coordinator
	Mr. Akira Endo	Coordinator

CONCLUSION AND RECOMMENDATIONS



CONCLUSION AND RECOMMENDATIONS

Highway Project

1. Project Outline

The highway project in this Study is to examine the technical, economic and financial feasibility of two highways proposed in the Klang Valley Transportation Study.

* Shah Alam Highway/Southern Part of Middle Ring Road II (MRR-II),
* North-South Expressway Link (N-S Link).

2. Design

Through the Feasibility Study, the Project Roads are recommended to be constructed with the following features.

Design Element	Shah Alam Highway/MRR-II	N-S Link
Design Standard	Arterial (U5)	Expressway (R-6)
Design Speed	80 km/h	120 km/h
Number of Lanes	Divided 6-lane	Divided 6-lane or 4-lane
Right-of-Way	40-80 m	60-80 m
Length	47.7 km	33.7 km

3. Economic Feasibility

Both the Project Roads, namely Shah Alam Highway/MRR-II and N-S Link are found to be economically feasible if they are implemented from 1991 to 2000. Moreover, results of the economic evaluation indicate that the sections of Shah Alam Highway/MRR-II from KL-Seremban Expressway to HICOM and N-S Link from New Klang Valley Expressway to Shah Alam Highway are the highest priority sections.

4. Implementation Concept

Shah Alam Highway/MRR-II should ideally be toll free as it is an alternative route to the tolled NKVE and Federal Route 2. However, as a matter of national policy, it could also be privatized by the Government and in which case, it should be implemented under the BOT (Build, Operate, Transfer) scheme.

Land acquisition cost is preferably to be borne by the Government irrespective of whether the project roads are to be privatized or not. Land acquisition at an early stage is recommended and sufficient right-of-way for the ultimate scheme should be obtained.

5. **Toll**

If the Project Roads are to be tollways, then it is recommended that the toll levy system on N-S Link be a closed system with distance proportional tariff while that on Shah Alam Highway/MRR-II be an open system with zone tariff to be collected at three (3) toll barriers.

6. **Options**

If the implementation of the Project Roads is to be privatized, three options can be considered.

A minimum package consisting of the highest priority sections of the Project Roads (Shah Alam Highway/MRR-II - KL-Seremban Expressway to HICOM as a 4-lane highway; N-S Link - connecting road from Jalan TUDM-Shah Alam to Shah Alam Highway as a 4-lane road) can be constructed at an estimated cost of M$210 million with twenty (20) year concession period to be granted by the Government.

Alternatively, a medium package consisting of the minimum package above and widening the 4-lane section of Shah Alam Highway in the minimum package into 6-lane highway, and constructing an additional section from HICOM to SKSB as a 6-lane highway and from SKSB to Jalan Langat as a 4-lane highway can be implemented at an estimated cost of M$385 with a twenty-five (25) year concession period.

Lastly, a maximum package consisting of all the Project Roads except the section of MRR-II from Jalan Cheras to KL-Seremban Expressway with a thirty-five (35) year concession period may be implemented at an estimated cost of M$874 million.

7. **Implementation Schedule** The Project Roads should preferably be implemented according to the following schedule:

Phase 1: 1991-1994	Phase 2: 1994-1997	Phase 3: 1997-2000
SHAH ALAM HIGHWAY/MRR-II: Construction of the section from KL-Seremban Expressway to HICOM as a 4-lane highway	**SHAH ALAM HIGHWAY/MRR-II** Widening of the section between KL-Seremban Expressway and HICOM as a 6-lane highway	**SHAH ALAM HIGHWAY/MRR-II** Construction of the section of MRR-II from Jalan Cheras to KL-Seremban Expressway as a 6-lane arterial
	Construction of the section from HICOM to SKSB as a 6-lane highway	Construction of the section of Shah Alam Highway from Jalan Langat to NKSB as a 4-lane highway
	Construction of the section from SKSB to Jalan Langat as a 4-lane highway	
N-S LINK: Construction of the connecting road from Jalan TUDM-Shah Alam to Shah Alam Highway to complete the section of N-S Link from NKVE to Shah Alam Highway as a 4-lane road		**N-S LINK** Construction of the section between NKVE and Shah Alam Highway as a 6-lane expressway
		Construction of the section from Shah Alam Highway to KL-Seremban Expressway as a 4-lane expressway

8. **Investment Requirement** The project for Phase 1 is estimated at M$210 million of which the foreign currency component will amount to M$91 million and the local currency component, M$119 million.

The project cost for Phase 2 is estimated at M$175 million, of which the foreign currency portion will amount to M$58 million and local currency portion, M$117 million.

The construction cost for Phase 3 is estimated at M$647 of which the foreign currency portion will amount to M$261 million and local currency portion, M$386 million.

9. **Further Areas of Investigation** This Study has evaluated the feasibility of three of the projects identified by the Klang Valley Transportation Study in response to the request from the Government of Malaysia. Further areas which need to be investigated as they are not covered in this Study are on the public transport system and intra-urban road network in Kuala Lumpur. These are deemed to be necessary as simultaneous improvements of the private and public transport systems in Klang Valley are very important for promoting a blanced transport system and to ensure the achievement of the planned mode shares in future.

Traffic Control and Surveillance (TCS) System Project

1. **Project Outline** — The TCS System should be introduced and/or upgraded in the areas of Kuala Lumpur, Petaling Jaya and on major highways under JKR for achieving the objectives of alleviating traffic congestion, ensuring more effective control of traffic, reinforcing the traffic surveillance function, enhancing driver information function and introducing statistical data collection function to these areas.

2. **TCS System** — Results of the economic and technical studies indicate that the following three (3) TCS Systems should be implemented as soon as possible.

   * Kuala Lumpur Area Traffic Control (ATC) System
   * Petaling Jaya Area Traffic Control (ATC) System
   * JKR Highway Traffic Surveillance (HTS) System

3. **Integrated System** — The Kuala Lumpur ATC System and Petaling Jaya ATC System should be an integrated system capable of area-wide traffic responsive signal control, traffic surveillance and dispensing driver information in their respectively coverage areas.

   The JKR System whose coverage routes are Federal Route 2 (from Kuala Lumpur city boundary to the junction with NKSB) and Airport Highway, should be an advanced form of real-time traffic surveillance and control system including traffic responsive signal control at interchanges on Federal Route 2.

4. **Central Control** — A center-subcenter formation is recommended for the central control function Under this formation, the main center of the TCS System should be set up in Kuala Lumpur and is to be called the Klang Valley Traffic Intelligence Center. Linked to this main center are the three (3) subcenters, i.e. Kuala Lumpur Subcenter, Petaling Jaya Subcenter and JKR Subcenter.

5. **Cost Estimate** — The project costs for the TCS Systems are estimated as:

System	Project Costs (at 1988 Constant Prices) Phase 1	Phase 2	Total
KL ATC System	M$39.8 million	M$20.3 million	M$60.1 million
PJ ATC System	M$11.3 million	M$ 2.5 million	M$13.8 million
JKR HTS System	M$13.6 million	M$28.8 million	M$42.4 million
TOTAL	M$64.7 million	M$51.6 million	M$116.3 million

6. **Task Force** — A task force is to be established under the Klang Valley Planning Secretariat with participation from DBKL, MPPJ, JKR, HPU, Royal Police Department and other relevant agencies to facilitate the implementation of the TCS Systems.

7. **Detail Design** — The detailed engineering design work for the three TCS systems should be carried out as one package.

8. **Implementation Program** — The TCS System should preferably be implemented in two phases from 1991 to 1999 with the required fund appropriated from the Sixth and Seventh Malaysia Plan respectively.

	Installation Period	Start of Operation		Federal Fund Requirement (at 1988 Constant Prices)
Phase 1 ..	1991-1994	1995	Sixth Malaysia Plan	M$ 64.70 million
Phase 2 ..	1996-1999	2005	Seventh Malaysia Plan	M$ 51.60 million
TOTAL				M$116.30 million

Freight Terminal Project

1. **Project Outline** — Three freight terminals are proposed for the Klang Valley, namely the North Terminal, South Terminal and Multi-modal (West) Terminal.

2. **Construction** — Results of the economic and financial studies indicate that the North and South Terminals should be constructed at the earliest possible time. However, construction of the Multi-modal (West) Terminal should be delayed until such time as when the existing Inland Clearance Depot of Kontena Nasional and Container Depot of Shapadu have reached their full capacity at around the year 1997 or earlier.

   Therefore, works on the detailed engineering design for the North and South Terminals should be started immediately.

3. **Financial Viability** — Financial analysis in this Study shows that the Freight Terminals are financially viable for a business entity to implement and operate and it can expect to receive appropriate level of profits.

Investors in the Freight Terminals can also expect to receive appropriate levels of Return on Investment (ROI), though not a high return due to the fact that such a project is a non-risky project involving the construction of a public infrastructure for the transport industry.

Transporters who are willing to relocate to the Freight Terminals can expect to receive sufficient net financial benefit even though the berth rental charges of the Freight Terminals are higher than the cost of existing facilities borne by the transporters.

4. **Cost** The project cost for the three Freight Terminals is estimated at M$30.82 million.

	Project Cost (at 1988 Constant Prices)
North Terminal	M$11,116,000
South Terminal	M$ 9,217,000
Multi-modal (West) Terminal	M$10,489,000
TOTAL	M$30,822,000

5. **Equity** The equity share of the capital costs shall be 20% and a public body shall take up at least 20% of the equity share.

6. **Loan** It is recommended that the Government arrange for the utilization of a lower interest long-term loan from Bank Pembangunan Malaysia (BPM) or a two-step loan from World Bank or OECF (Japan).

7. **Berth Rental** The berth rental at the terminals is recommended as follows:-

	Annual Berth Rental (at 1988 Constant Prices)
North Terminal	M$20,000
South Terminal	M$18,000
Multi-modal (West) Terminal	M$20,000

8. Utilization Rate

The expected berth utilization rate is as follows:

	North Terminal	South Terminal	Multi-modal (West) Terminal
1995	57 (65%)	51 (64%)	-
2000	71 (81%)	64 (80%)	-
2005	88 (100%)	80 (100%)	84 (100%)

Note: Figures in parenthesis are utilization rate to the total berth capacity

9. Implementation

The Study Team recommends that an organization to be identified as the promoters of the Project with participation from related agencies be established to carry out the following main activities at each stage.

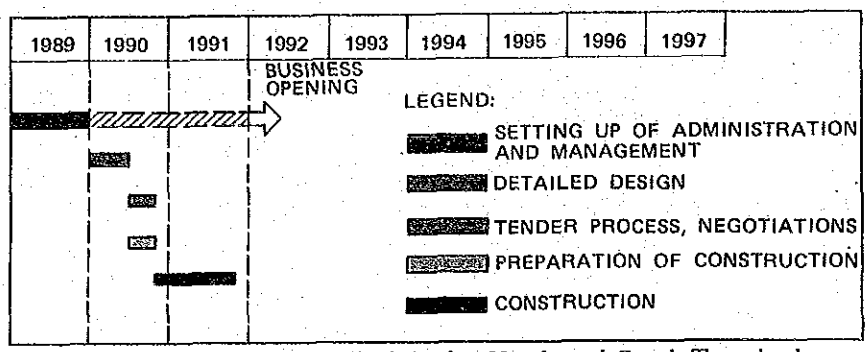
Stage	Promoters/Related Agencies	Main Objectives and Activities
Preparatory Stage of the Projects	* Selangor State Government * Kuala Lumpur City Hall * Ministry of Transport	* To induce the candidate promoters to sit at the same table after arrangement of interest among the members
Establishment of the Business Entity	* Selangor State Government * Kuala Lumpur City Hall * Ministry of Transport * Representatives of Lorry Transportation Industry * Loan Supplier/s * Entrepreneur/s	* To establish the business entity * Clarification and getting consensus on the conditions to determine the responsibility and role of each member * To arrange for sources of implementation fund * Preparation of Project Proposal

10. Public Control

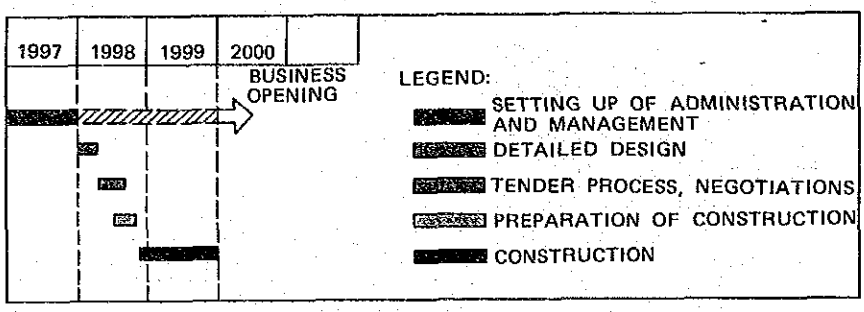
Considering that the Freight Terminals are public infrastructures for the lorry transportation system, a public body should jointly invest with the business entity to be set up for the Freight Terminals and contribute at least 20% of the total equity share in order to realize a desirable policy on the establishment of national-wide freight terminal network, to monitor and control freight cost set by the Government, to enhance the qualification of the business entity in receiving long-term loan from development banks and achieving a financially stable management.

11. Implementation Program

The Freight Terminals should preferably be implemented according to the following schedules:



Recommended Implementation Schedule for North and South Terminals



Recommended Implementation Schedule for Multi-modal (West) Terminals

12. Location

Three lots have been identified for the Freight Terminals based on the results of the location study.

* North Terminal on Lot No. 10903 (near Batu Caves)
* South Terminal on Lot Nos. 3050 and 3051 (part of former Sungei Besi Tin Mines)
* Multi-modal (West) Terminal on vacant reclaimed land at the North Port area in Klang

13. Area

The required area for the Freight Terminals are:-

* North Terminal .. 10.1 ha
* South Terminal .. 7.9 ha
* Multi-modal (West) Terminal .. 10.1 ha

14. Management	The Freight Terminal management companies shall lease the terminal berth spaces to lorry transporters or forwarders at a tariff rate agreeable to all parties. Auxiliary facilities such as warehouses, petrol station are also to be contracted out to private operators. Parking facility is provided for all the line-haul and distribution lorries to avoid the present haphazard parking by lorries along street shoulders.
15. Regulation	Regulations on restructuring and control of freight charges (between line-haul operators and distribution transporters); leasing procedure of berth spaces to transporters; terminal operations and usage need to be enacted. The Land and Marine Transport Divisions in the Ministry of Transport are recommended to play an active role in regulating the planning, construction and operation of all terminals in the country.
16. Network	Freight Terminals should be established not only in Klang Valley but also in Peninsular Malaysia as soon as possible in achieving the objectives of rationalizing freight transport system, modernizing freight transport industry and reducing the freight transport cost through the increase in transportation efficiency.
17. National Freight Terminal Study	A "National Freight Terminal Study" to undertake a feasibility study on the establishment of Freight Terminals at each regional center in Peninsular Malaysia is recommended in order to increase the overall efficiency of the lorry transport industry.

CHAPTER 1 : SUMMARY OF THE HIGHWAY PROJECT

CHAPTER 1: SUMMARY OF THE HIGHWAY PROJECT

1. Introduction

The highway project is to examine the technical, economic and financial feasibility of two highways proposed in the KVTS.

* Shah Alam Highway/Southern part of Middle Ring Road II (MRR-II);
* North-South Expressway Link (N-S Link)

The study approach for the highway project is illustrated in Figure 1.1.

2. Project Characteristics

The future inter-urban road network within Klang Valley is shown in Figure 1.2. The proposed six (6) urban centers of Kuala Lumpur, Shah Alam, Petaling Jaya, Klang, Bangi Newtown and Selayang Newtown will be interlinked by expressways and/or highways.

MRR-II in Kuala Lumpur is aimed at dispersing traffic converging to Kuala Lumpur as well as promoting sub-center development at Wangsa Maju, Bukit Jalil and Segambut-Penchala.

Shah Alam Highway was planned as an important inter-urban arterial linking Shah Alam southern town center to Kuala Lumpur in the Shah Alam Expansion Plan and reconfirmed by the then KVTS where it is planned to link up with MRR-II so that arterial traffic from Shah Alam to Kuala Lumpur will be dispersed by the ring road.

The planning of Shah Alam Highway is given priority as it will help to promote further industrial expansion in Shah Alam and relieve traffic congestion presently faced along Federal Route 2 at peak hours.

N-S Link on the other hand is planned to serve as a connecting link between the committed NKVE and KL-Tanjung Malim Expressway with KL-Seremban Expressway thus forming part of the Peninsular Expressway Network. When this national grid is completed, traffic from the north or south will be able to travel on the expressway network bypassing Kuala Lumpur and Petaling Jaya hence relieving traffic congestion on the local roads at these urban centers. Goods from the production centers of Bangi, Shah Alam, Petaling Jaya and Klang will be able to be transported swiftly on the expressway network for distribution within the Klang Valley Region and beyond.

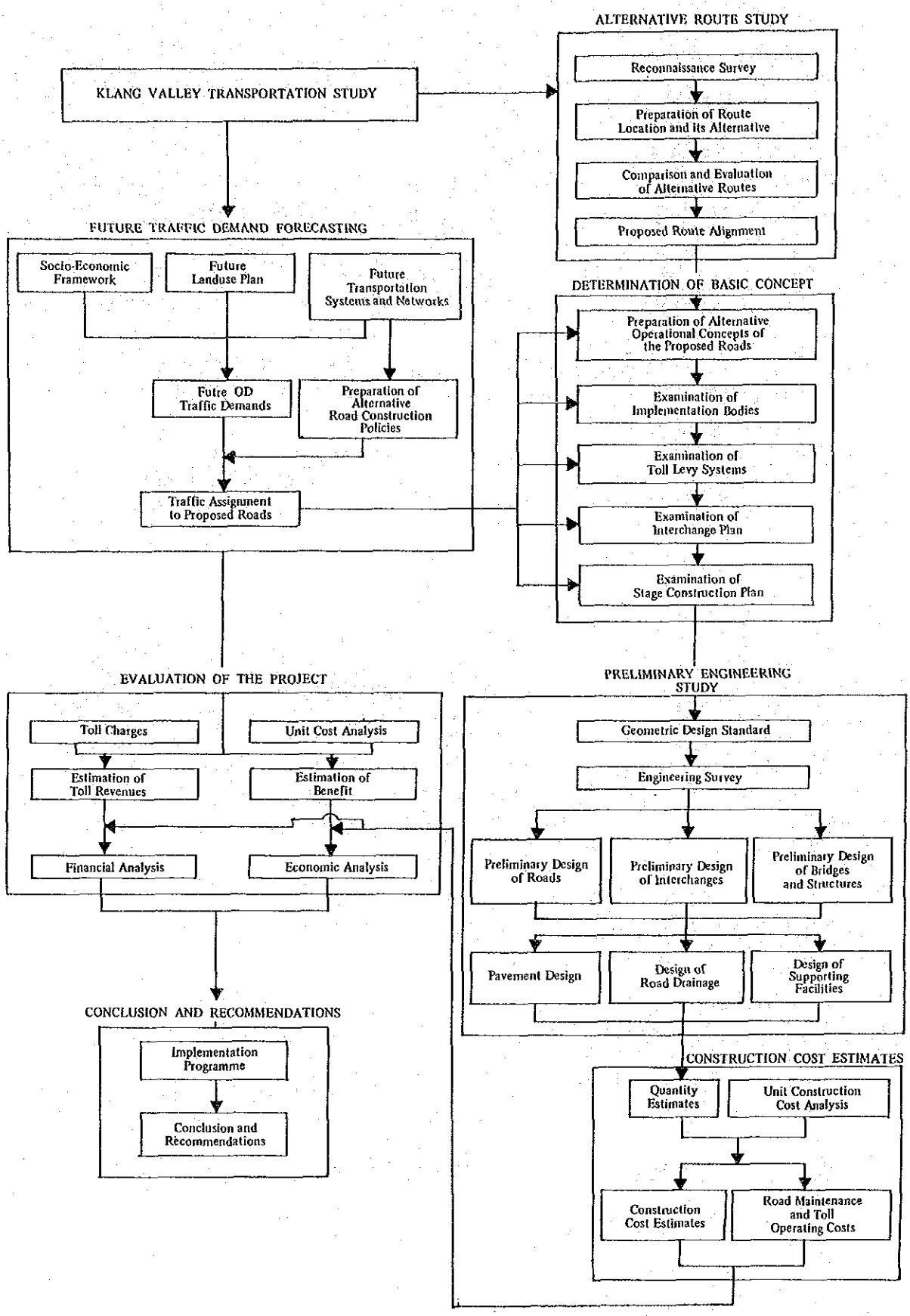
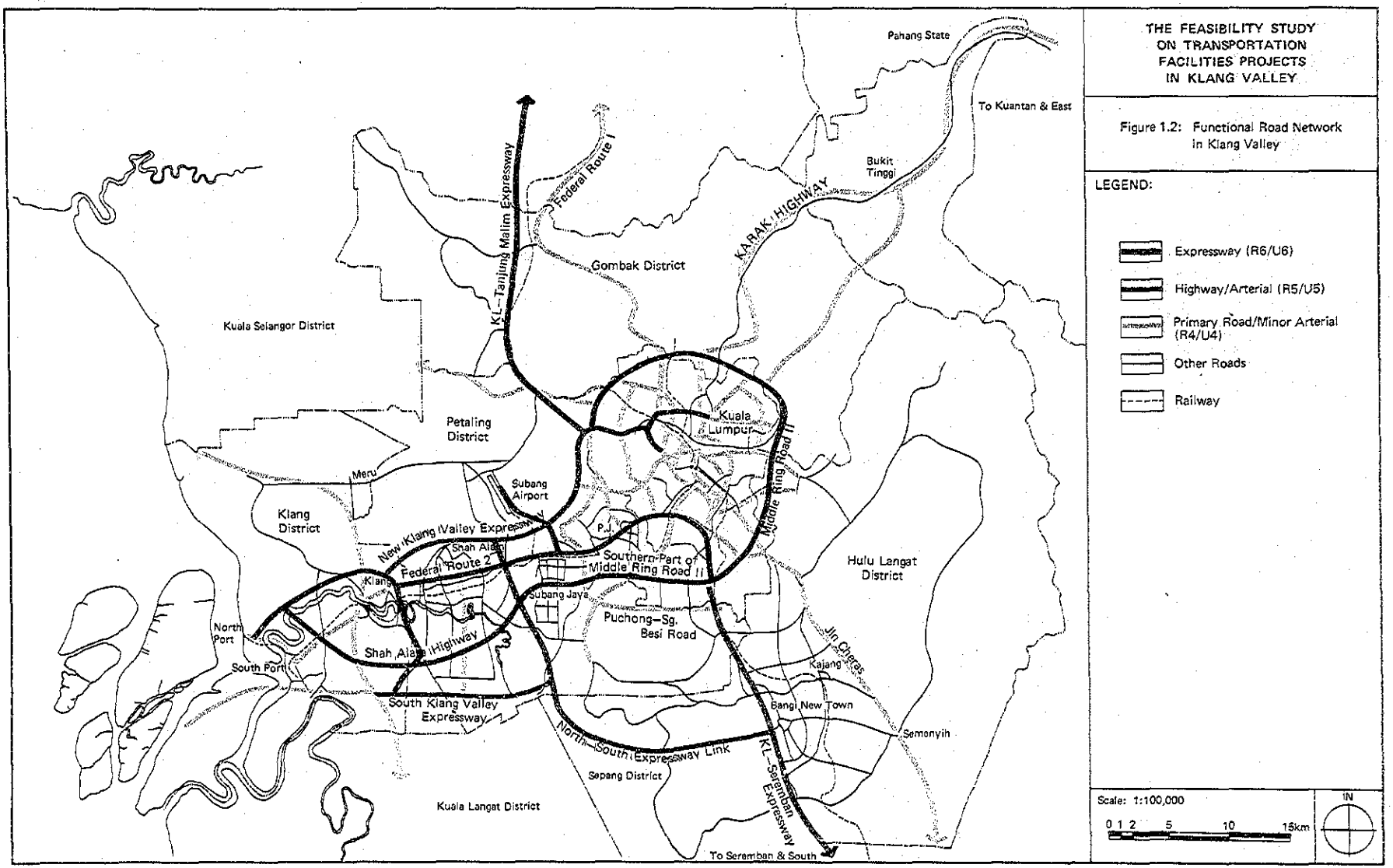
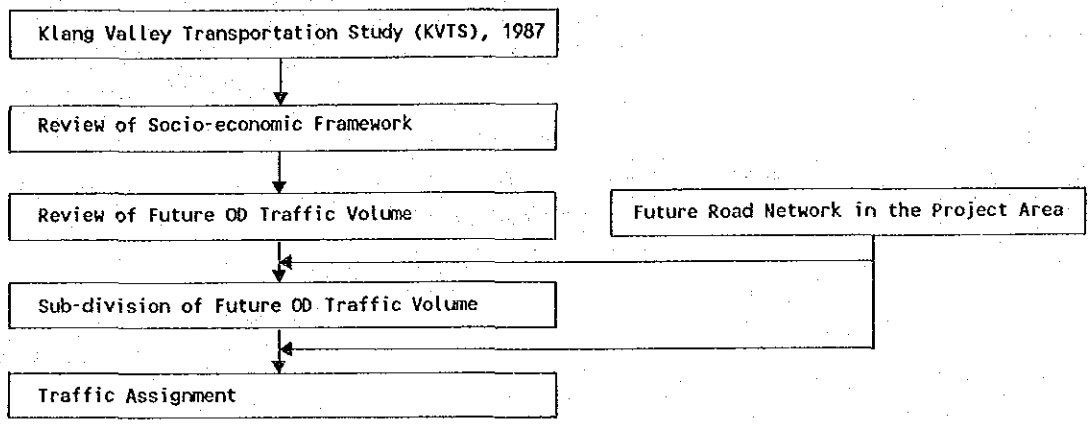


Figure 1.1: Study Approach for the Highway Project


THE FEASIBILITY STUDY
ON TRANSPORTATION
FACILITIES PROJECTS
IN KLANG VALLEY
Figure 1.2: Functional Road Network in Klang Valley
LEGEND:
Expressway (R6/U6)
Highway/Arterial (R5/U5)
Primary Road/Minor Arterial (R4/U4)
Other Roads
Railway
Scale: 1:100,000
0 1 2 5 10 15km
IN
Pahang State
To Kuantan & East
Bukit Tinggi
KARAK HIGHWAY
Federal Route 1
KL-Tanjung Malim Expressway
Gombak District
Kuala Selangor District
Petaling District
Kuala Lumpur
Middle Ring Road II
Meru
Subang Airport
Klang District
New Klang Valley Expressway
Shah Alam
Federal Route 2
Klang
P.J.
Southern Part of Middle Ring Road II
Hulu Langat District
Subang Jaya
Puchong-Sg. Besi Road
North Port
South Port
Shah Alam Highway
Jln Cheras
Kajang
South Klang Valley Expressway
Bangi New Town
Semenyih
North-South Expressway Link
KL-Seremban Expressway
Sepang District
Kuala Langat District
To Seremban & South

3. Future Traffic Demand

Future traffic demand on the project roads is based on the KVTS with adjustments made for the sluggish economic growth of 1985-1987 and the need to sub-divide traffic zones along the project road corridors.



The future traffic demand is forecasted based on the socio-economic framework of 5.55 million population and an employment of 2.22 million in Klang Valley by year 2005. The future landuse pattern along the project corridor is shown in Figure 1.3.

The future traffic demand on the project roads has been studied in great detail using traffic assignment models on some fourteen (14) alternative cases comparing the effects of toll and stage construction.

Figure 1.4 shows the assigned traffic volume on the project roads in 1995 and 2005 if the roads are tolled.

When toll is levied, the Project Roads are estimated to carry only 69% and 75% in 1995 and 2005 respectively of the corresponding total traffic volume if the Project Roads are operated as toll free highways.

At the Klang-Shah Alam Screenlines, when the Project Roads are implemented as toll free roads, 37% (or 78,700 pcu) of traffic volume on NKVE and Federal Route 2 is expected to be diverted to Shah Alam Highway.

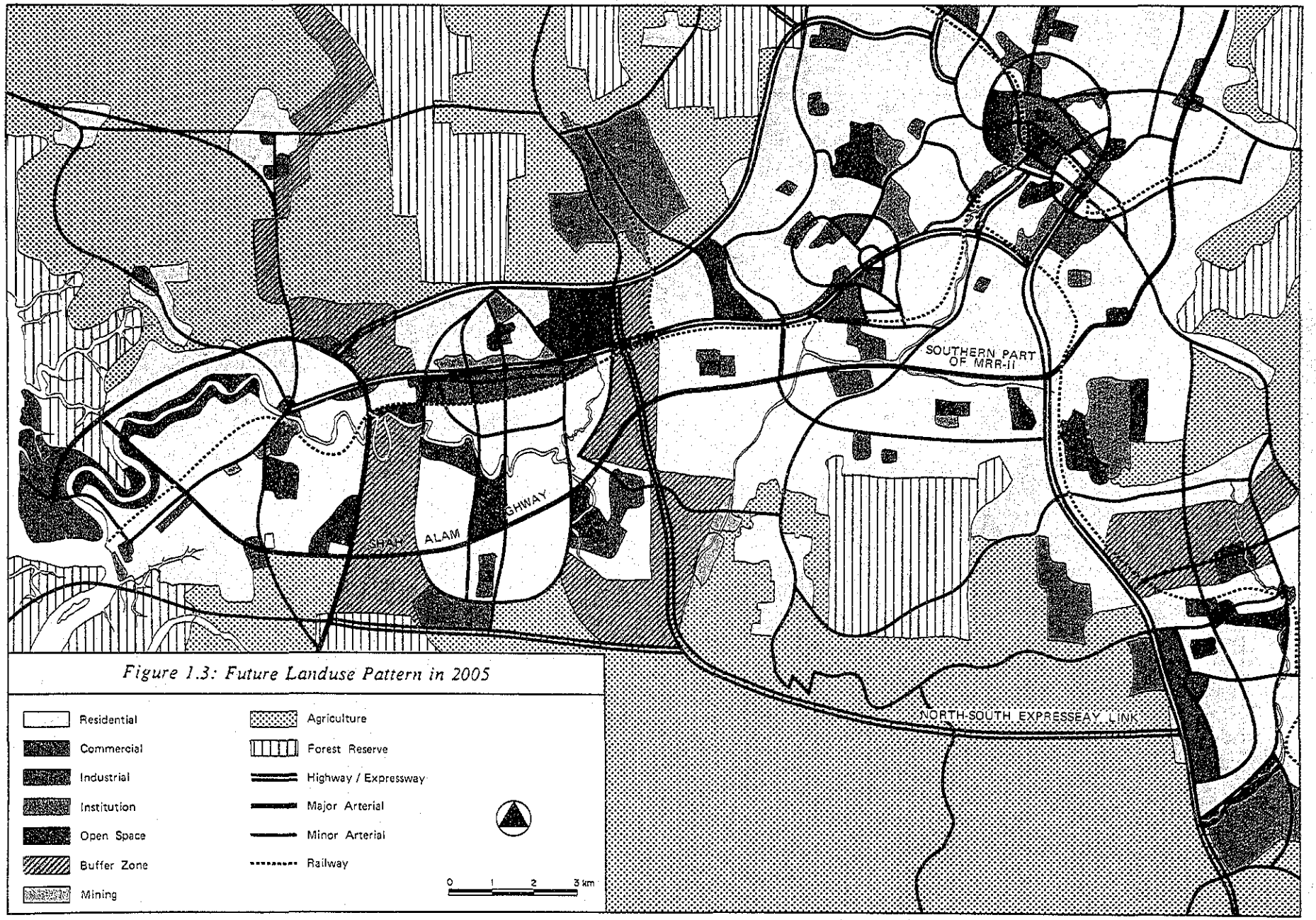


Figure 1.3: Future Landuse Pattern in 2005

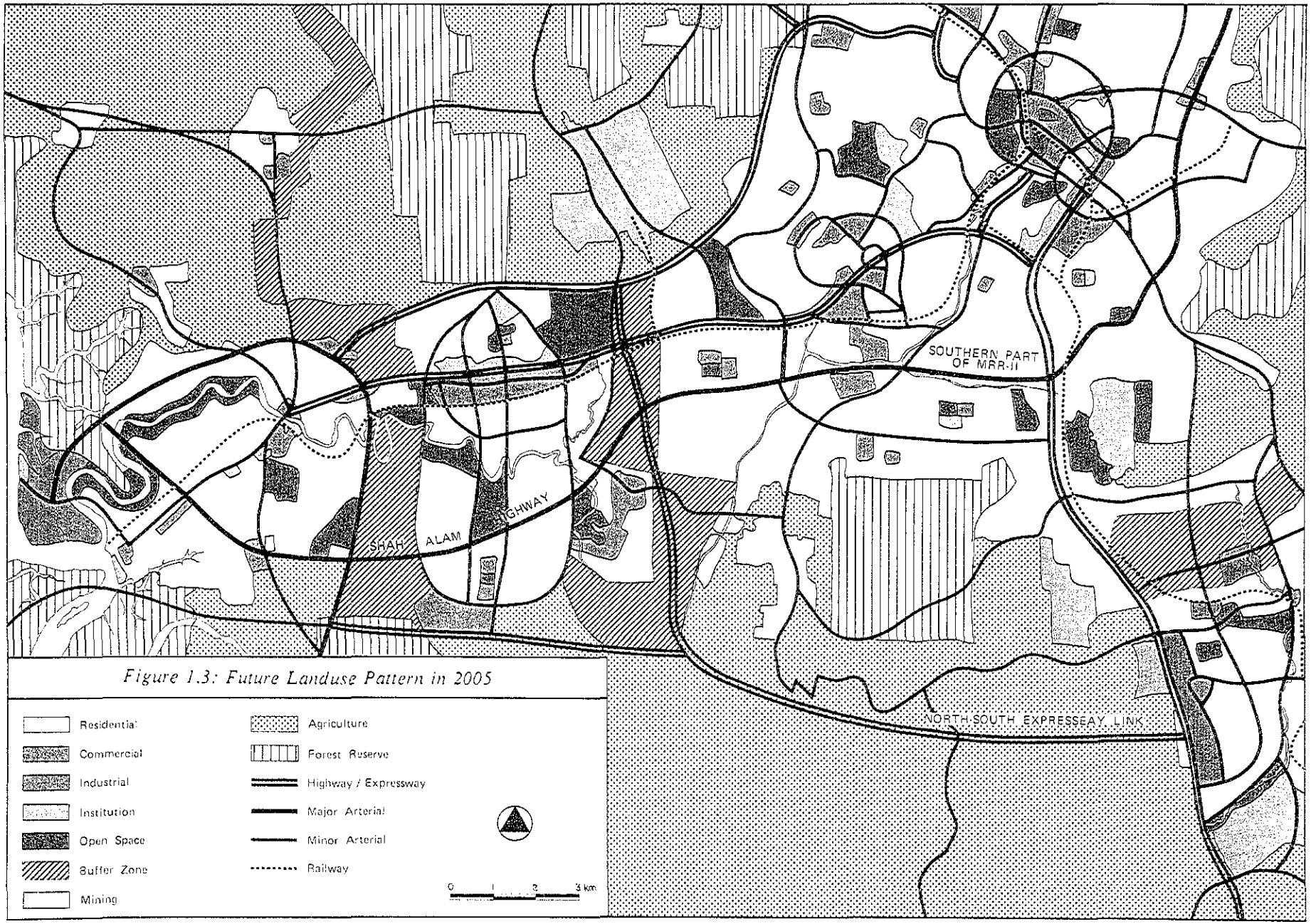
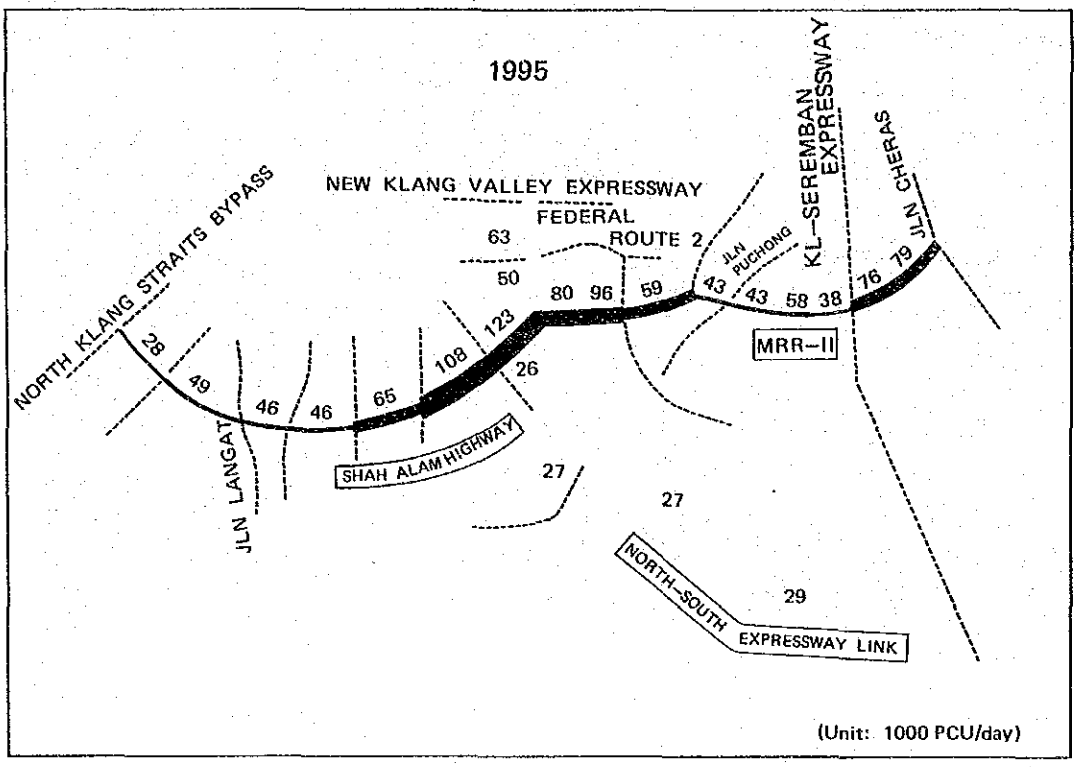


Figure 1.3: Future Landuse Pattern in 2005



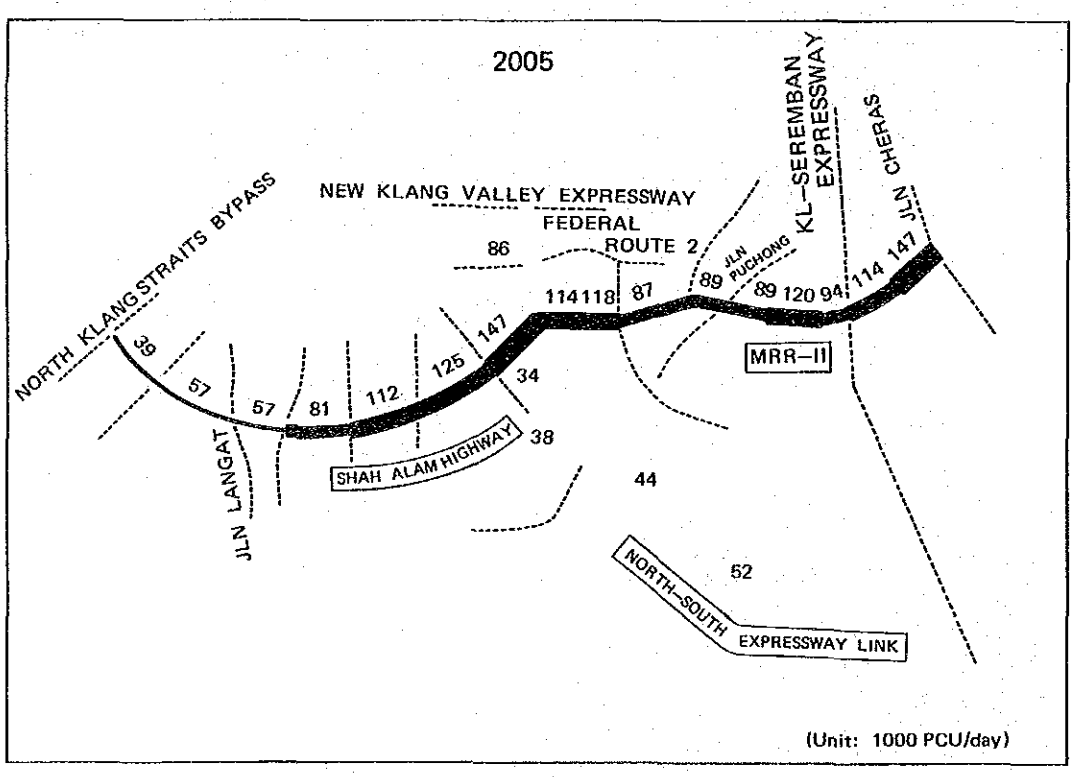


Figure 1.4: Assigned Traffic Volume with Toll System

At the Shah Alam-Petaling Jaya Screenline, when the Project Roads are implemented as toll free roads, 41% (or 148,000 pcu) of traffic volume on NKVE and Federal Route 2 is expected to be diverted to Shah Alam Highway while when the Project Roads are implemented as tollways then 31% (or 101,500 pcu) of the traffic volume on both roads is expected to be diverted to Shah Alam Highway/MRR-II.

With the toll concession on NKVE and Federal Route 2 given to PLUS, it is found that in the early stage, Shah Alam Highway/MRR-II should be constructed up to HICOM only and then the highway should be extended stagewise in proportion to increases in traffic volume.

Among the three alternative stage construction plans tested, the alternative plan that implements Shah Alam Highway/MRR-II as a 4-lane highway from KL-Seremban Expressway to HICOM and N-S Link from NKVE to Shah Alam Highway also as a 4-lane highway is found to be the most superior plan in terms of utilization rate on the highways.

4. Alternative Route Study

Alternative routes were explored based on information gathered through site investigation and examination of maps and aerial photographs.

For the purpose of comparing such alternative, the following criteria were taken into account in descending order of importance.

(a) Land Availability
(b) Impact on the Social Environment
(c) Future Traffic Demand
(d) Construction Economy
(e) Road User Benefits
(f) Development Impact

The route location was finalized through discussion on land availability with the relevant agencies, using proposed right-of-way maps shown on the standard sheets and the latest topographical maps to scales of 1:5,000 for throughway and 1=1,000 for major interchange locations compiled by photogrammetric plotting and field survey by the Study.

The proposed optimum routes shown in Figure 1.5 are a combination of segments whose technical feasibility has been deliberated on and those selected from among alternatives through the comprehensive comparison and evaluation process.

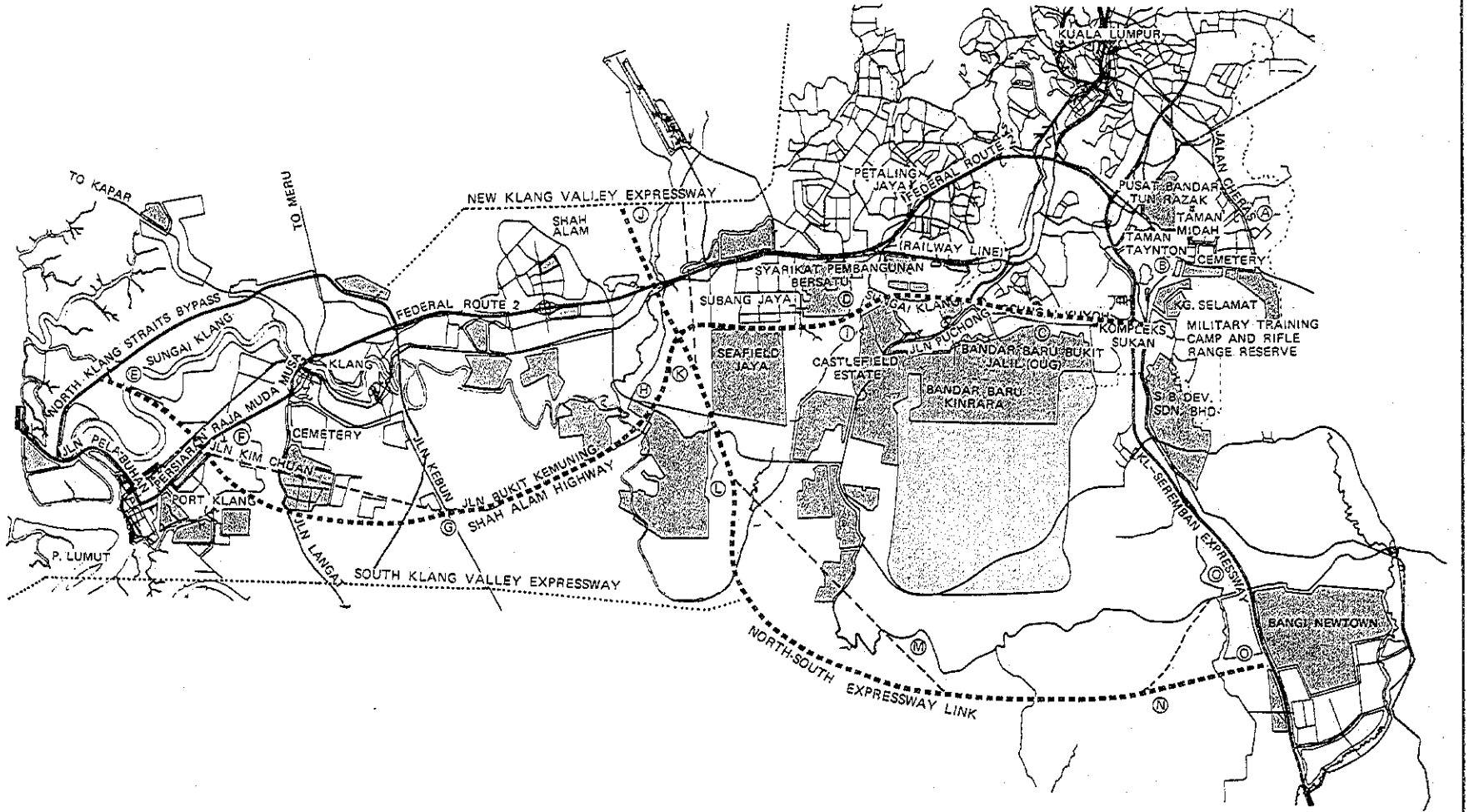


Figure 1.5: Proposed Route and Alternatives

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND:

- PROPOSED ROUTE
- ALTERNATIVE ROUTE
- PLANNED ROAD
- EXISTING ROAD
- NEW DEVELOPMENT AREAS
- FOREST RESERVE

SCALE: 0 1 2 4km

N

5. Basic Design Concepts

The implementation policy by the Malaysian Government in whether to construct the project roads as toll-free highways by JKR or toll highways by such agency as LLM or private sector will have some bearings on the basic design of the project roads.

If the roads are to be implemented as toll highways, the toll levy system and location of toll plazas are studied and prepared based on these considerations:-

(a) Urban community along the Project Roads
(b) Land availability for toll plazas
(c) Traffic characteristics on the Project Roads
(d) Compatibility with other toll levy systems
(e) Equitable toll levy
(f) Toll revenue expected
(g) Road and toll facilities construction costs
(h) Operating costs
(i) Malaysian context

Shah Alam Highway/MRR-II is proposed to have an open toll system with three toll barriers at the boundaries of Klang and Shah alam, Shah Alam and Petaling Jaya, Petaling Jaya and Kuala Lumpur.

N-S Link on the other hand is proposed to have a closed toll system on the account that it is planned to be a segment of the North-South Expressway Network.

In determining the optimum number of interchanges and its location on the Project Roads, alternative interchange plans prepared based on landuse, population and employment distribution plans, functional road network in Klang Valley and consideration on traffic demand were evaluated on the following aspects:-

(a) Traffic volume at the interchanges
(b) Toll revenue expected
(c) Roadway and interchange construction costs
(d) Average interchange interval at the existing expressway and highway in Klang Valley
(e) Urban development consideration

Comparative analysis on the various interchange plans indicated that the alternative plan with twenty-two (22) interchanges on the Project Roads is the optimum one among all others (Figure 1.6).

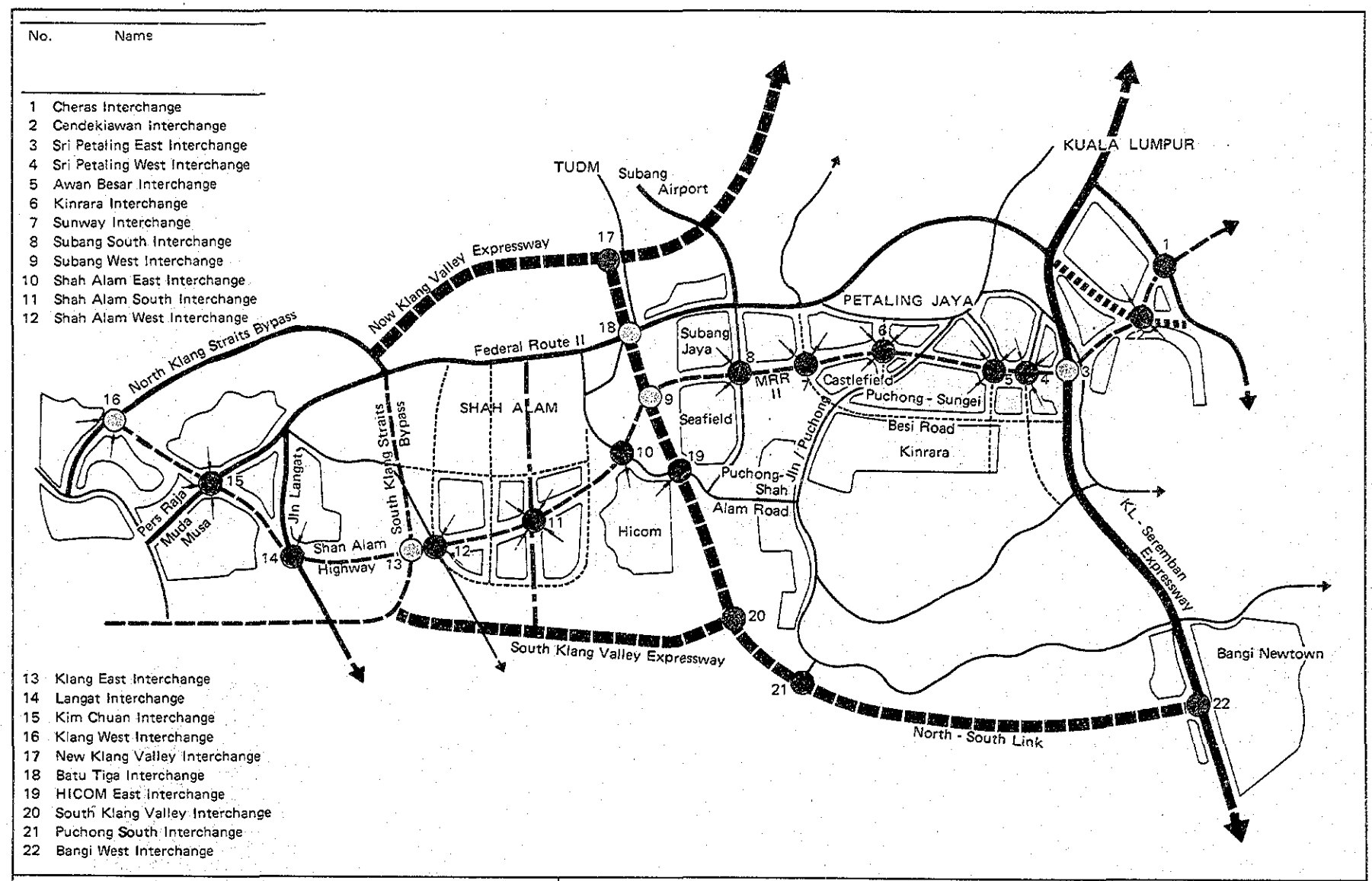


Figure 1.6: Proposed Toll Levy System on Project Roads

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

6. Preliminary Engineering Study

The land availability for the Project Roads was confirmed in principle by Selangor State Planning Department and Dewan Bandaraya Kuala Lumpur.

Subsurface soil conditions were explored by drilling 15 boreholes at seven major structure sites. The load bearing stratum has been found to vary from 10m below ground level at Klang River Bridge site to 40m at Klang West IC site. A depth of 20m to 30m is found elsewhere.

The recommended geometric design standard for the Project Roads is derived mainly from existing standards prepared by JKR and LLM. Some necessary supplements are made and the recommended design standard prepared.

The two Project Roads are to be designed into the following sections:-

Table 1.1: Road Design by Sections

Project Road	Section	Road Design
Shah Alam Highway/ MRR-II	Jalan Cheras to KL-Seremban Expressway	6-lane major arterial
	KL-Seremban to South Klang Straits Bypass	6-lane highway with exclusive cycle track
	South Klang Straits Bypass to NKSB	4-lane highway
N-S Link	NKVE to Shah Alam Highway	6-lane expressway
	Shah Alam Highway to KL-Seremban Expressway	4-lane expressway

The typical cross-sections are presented in Figures 1.7 to 1.9. The twenty-two (22) interchanges on the Project Roads are categorized by service level in terms of mobility into three (3) system interchanges (Class A) located on N-S Link, five (5) system interchanges (Class B) and fourteen (14) service interchanges on both Project Roads. Practical-type interchange designs are adapted to suit their functionality on the Project Roads as illustrated in Figures 1.10 and 1.11.

Major structures along the Project Roads include four bridges across Sungai Klang with waterways width ranging from 60m to 260m, bridges over other rivers, interchange bridges, viaducts, flyovers, box culverts and retaining walls.

There are forty-three (43) bridges/viaducts on Shah Alam Highway/MRR-II and forty-seven (47) bridges/viaducts on N-S Link, i.e. a grand total of ninety (90) bridge/viaduct structures on the Project Roads.

Considering the climatic and environmental conditions, physical properties and condition of the roadbed soil and the heavy traffic volume use in Klang Valley, the most reasonable design procedure was selected from procedures as described in the AASHTO Interim Guide.

Flexible pavement is recommended for throughway, ramps, frontage roads and bridges. Rigid pavement with slab thickness of 30cm is recommended in toll plaza area for all road segments.

7. *Cost Estimates*

The total construction cost of both the Project Roads in 1988 prices is estimated at M$1,032.1 million.

Table 1.2: Cost Estimate of the Project Roads

Project Road		Estimated Cost
Shah Alam Highway/MRR-II	..	M$ 673.5 million
N-S Link	..	M$ 358.6 million
Total	..	M$1,032.1 million

The annual road maintenance and toll operation costs of the Project Roads are estimated at M$8.73 million for Shah Alam Highway/MRR-II and M$5.89 million for N-S Link.

SHAH ALAM HIGHWAY

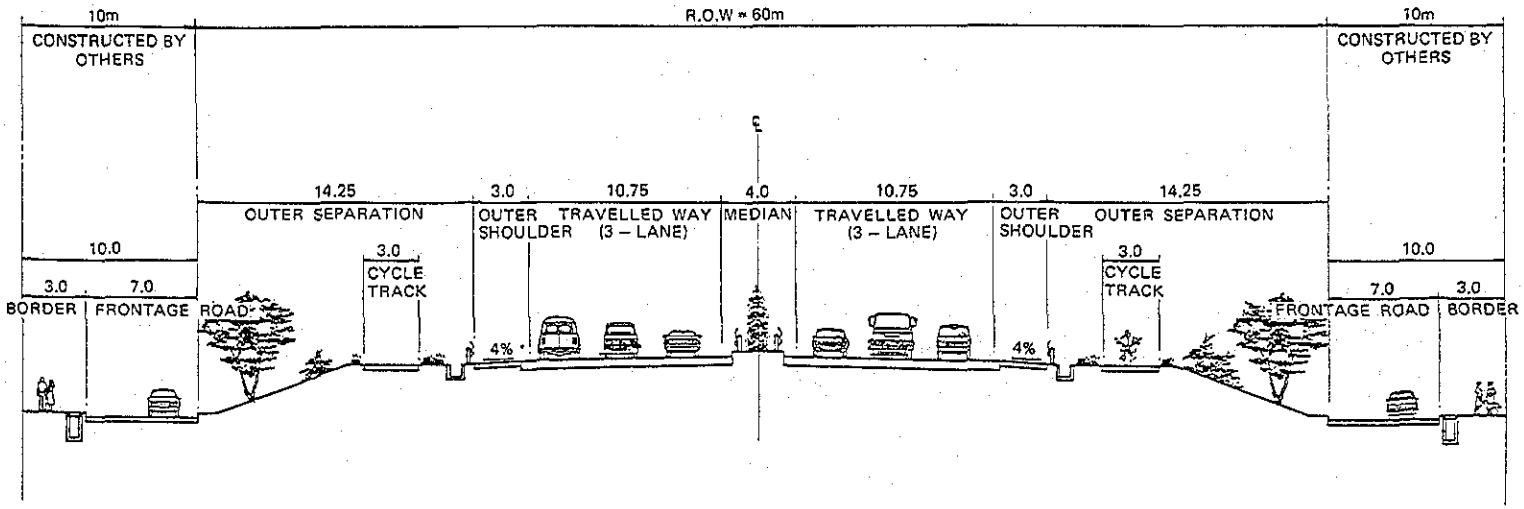


Figure 1.7: Typical Cross-section for Shah Alam Highway

SCALE : 4 2 0 2 4 6 metres

DRAWING NO : DATE :

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

JAPAN INTERNATIONAL COOPERATION AGENCY

MIDDLE RING ROAD II

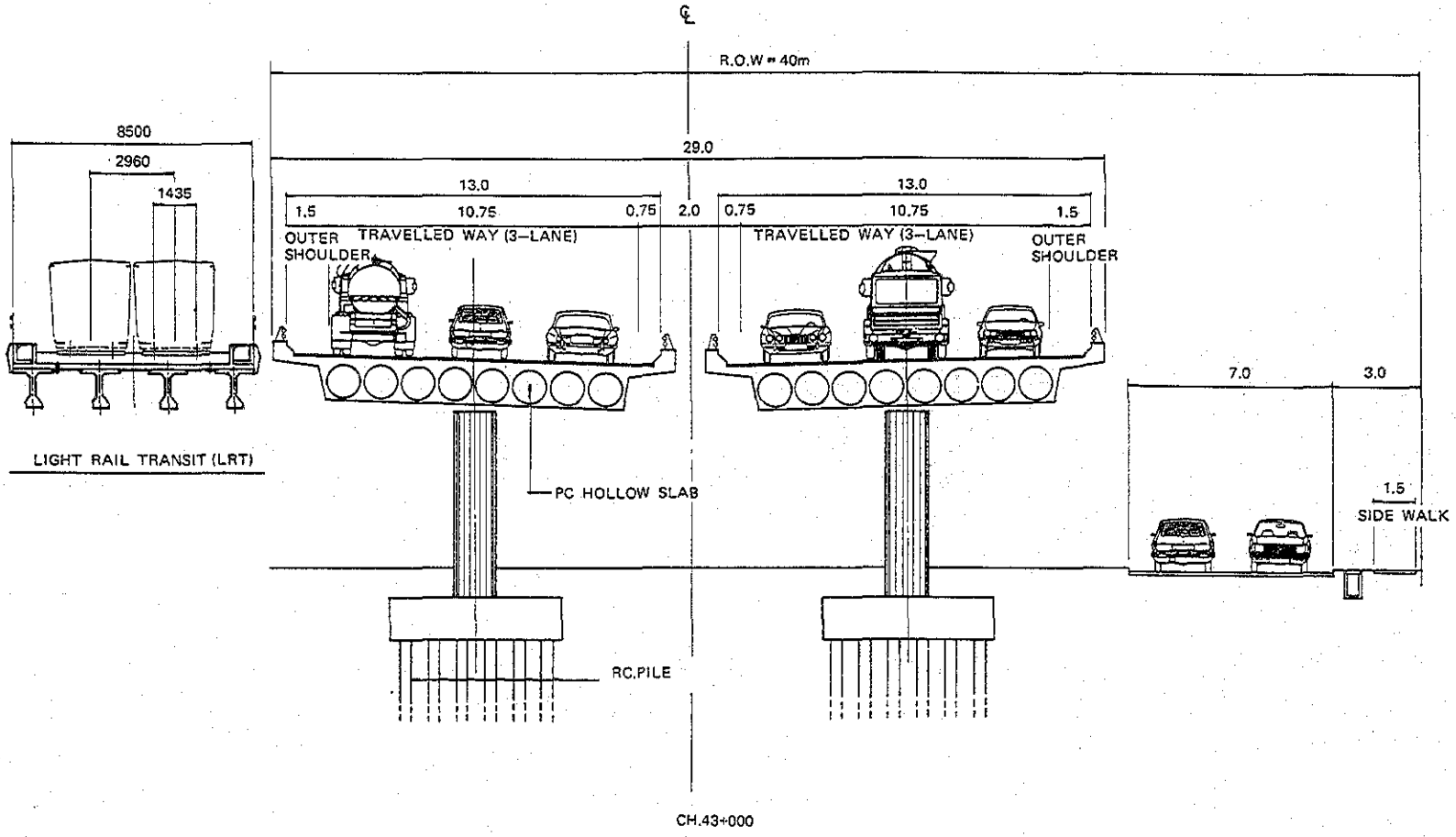


Figure 1.8: Typical Cross-section for Middle Ring Road II

SCALE : 2 1 0 2 metres 4

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THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

JAPAN INTERNATIONAL COOPERATION AGENCY

NORTH–SOUTH LINK

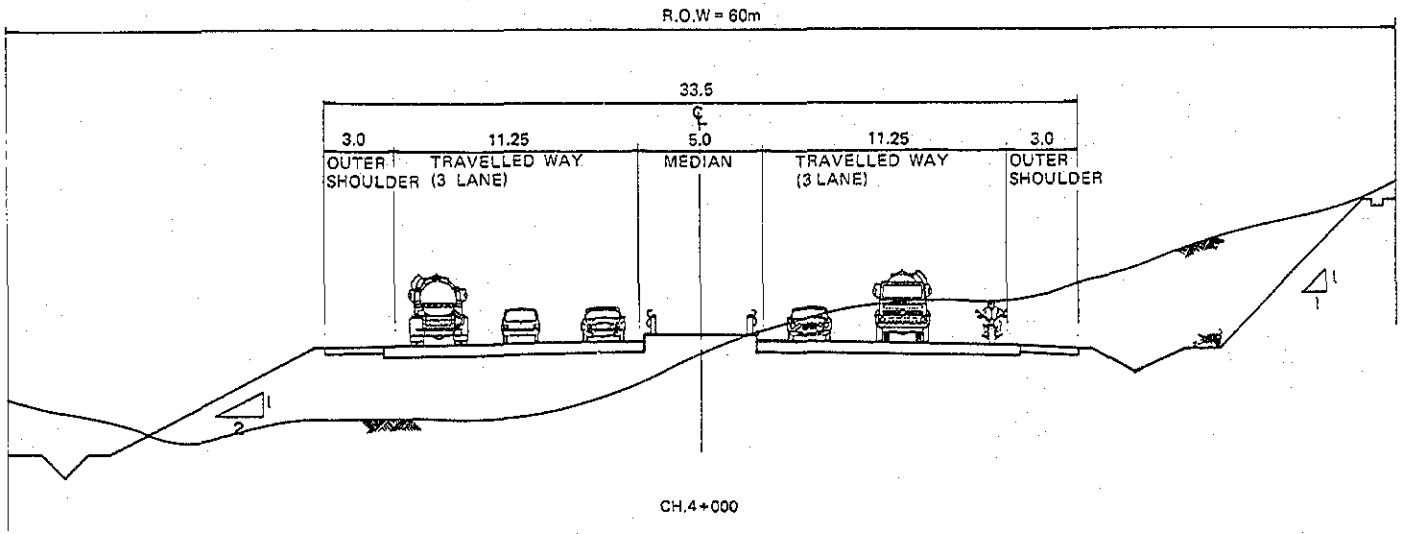

Figure 1.9: Typical Cross-section for N-S Link

SCALE : 2 1 0 2 4 6 metres

DRAWING NO : DATE :

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

JAPAN INTERNATIONAL COOPERATION AGENCY

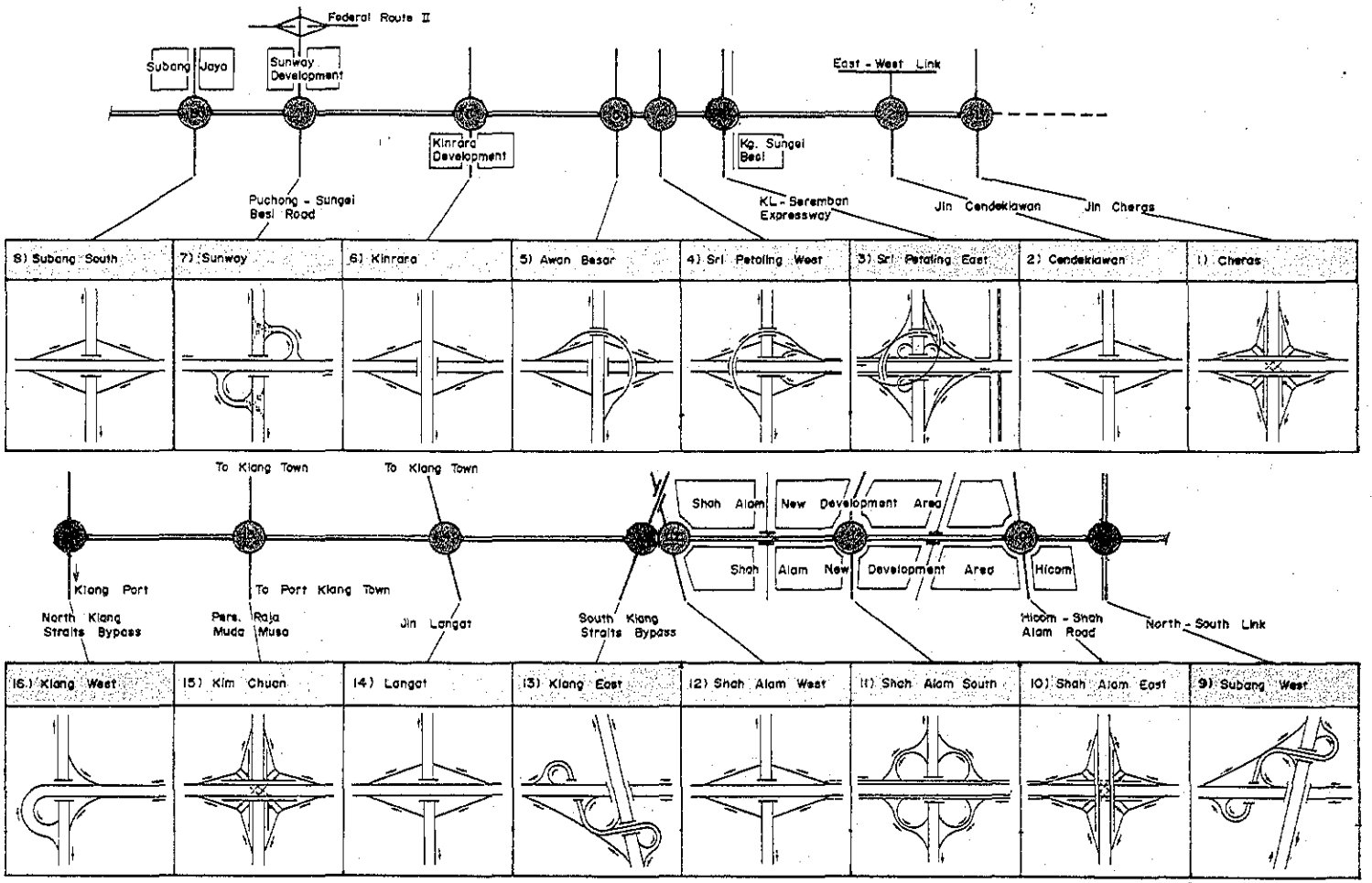

Figure 1.10: Proposed IC Design on Shah Alam Highway/MRR-II

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND :

- SYSTEM INTERCHANGE B
- SERVICE INTERCHANGE

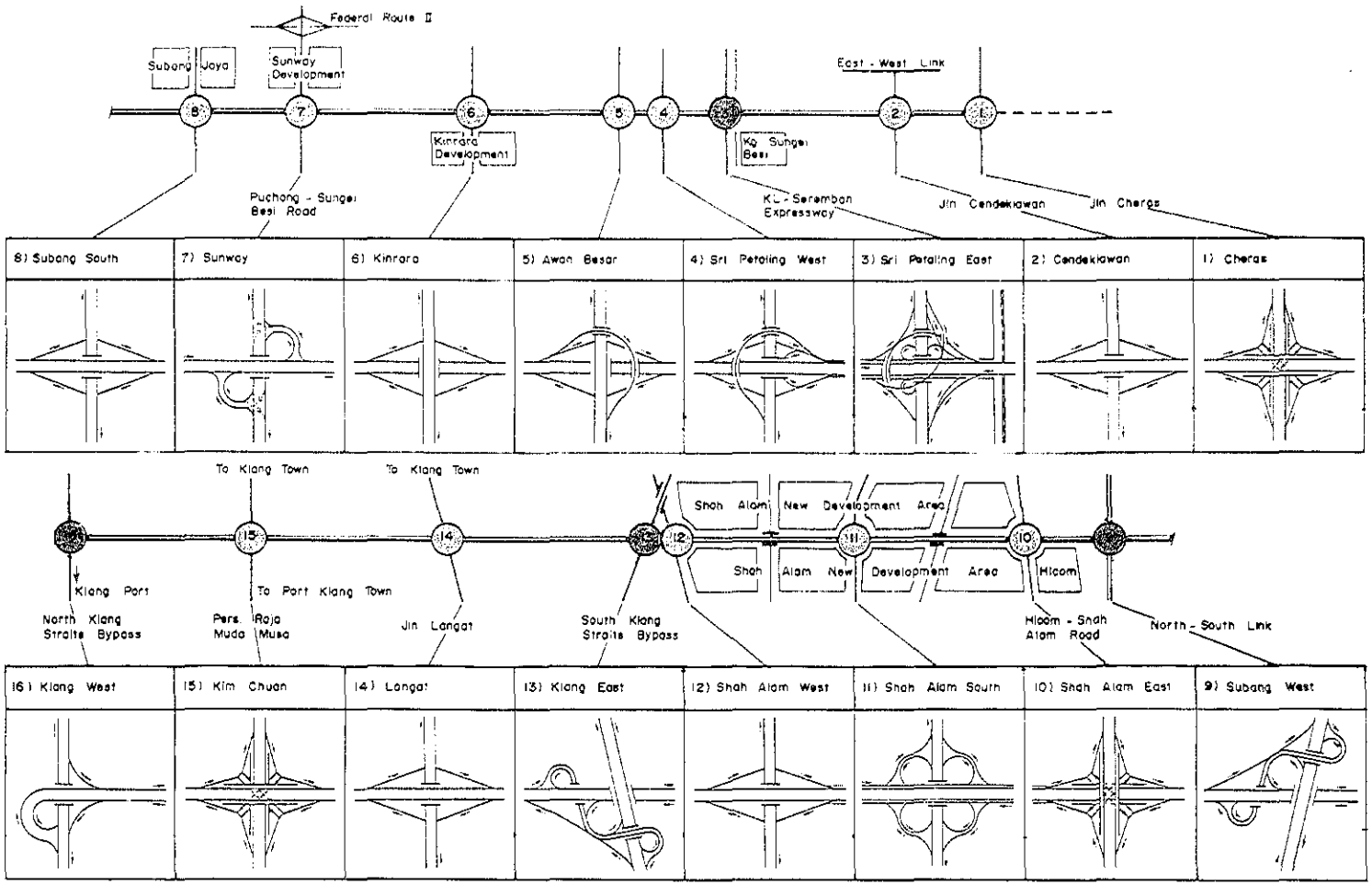

Figure 1.10: Proposed IC Design on Shah Alam Highway/MRR-II

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND :

- SYSTEM INTERCHANGE
- SERVICE INTERCHANGE

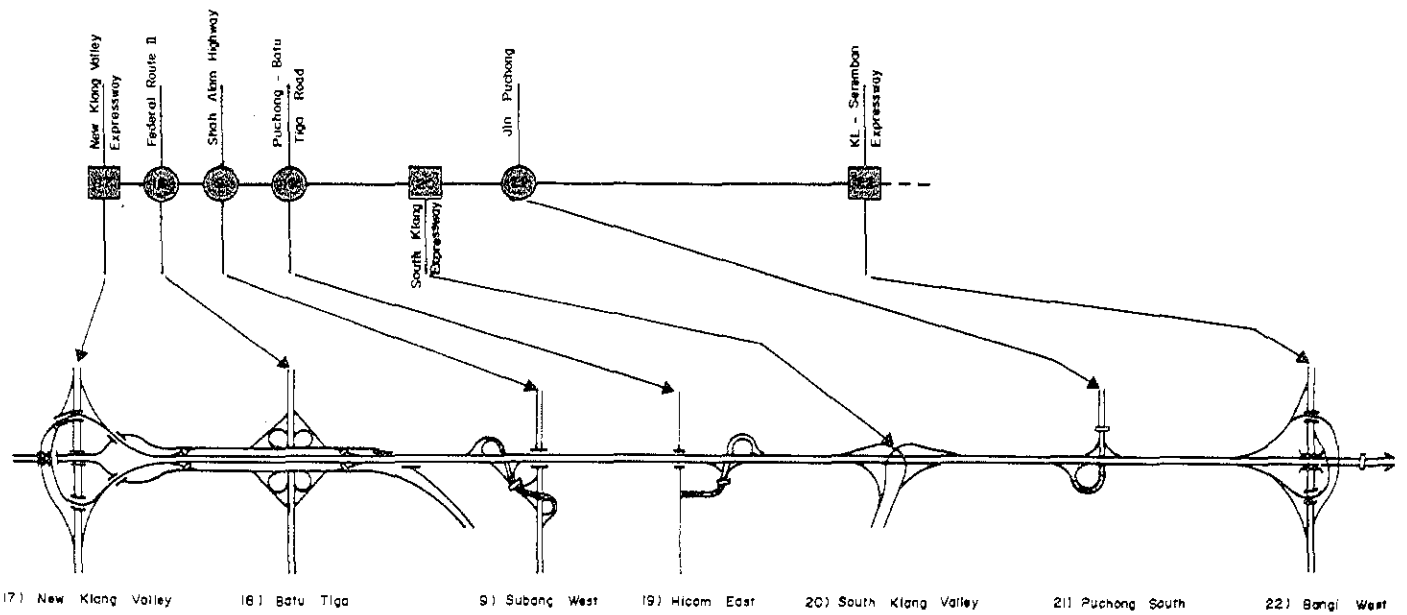

Figure 1.11: Proposed IC Design on N-S Link

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

LEGEND:

- SYSTEM INTERCHANGE A
- SYSTEM INTERCHANGE B
- SERVICE INTERCHANGE
- TOLL PLAZA

8. Economic Evaluation

The economic evaluation results show that both Shah Alam Highway/MRR-II and N-S Link are highly economically feasible projects.

Table 1.3: Results of Economic Evaluation

Project Road	B/C Ratio	NPV (M$mil)	IRR (%)
Total Project	1.96	525.0	21.3
Shah Alam Highway/MRR-II	2.52	570.5	25.7
N-S Link	3.24	390.1	28.5

Note: * The life of Project Roads is assumed to be twenty (20 years
* The discount rate is 12% per annum
* Benefit flow begins from the year 1995

Economic evaluation is also carried out by road section. The highest B/C ratio (4.8) is found for the short-stretch of N-S Link from New Klang Valley IC to Subang West IC (NKVE to Shah Alam Highway), followed by 4.6 for the section of Shah Alam Highway/MRR-II between KL-Seremban Expressway to HICOM) and 2.2 for the section between HICOM to Jalan Langat.

These sections are therefore given a higher priority than the other sections in implementation.

9. Financial Analysis

The objectives of financial analysis in this Study are to establish a phasing plan to implement the Project Roads and to find the conditions required for the privatization of these road projects.

Among the seven alternative plans tested for their financial performances, alternative plan No.6 which recommends a 4-lane highway for Shah Alam Highway/MRR-II between KL-Seremban Expressway to HICOM and a 4-lane connecting road for N-S Link is selected to be the best plan if a concession period of twenty (20) years is granted. This plan is therefore taken as the highest priority and thus Phase 1 projects. Phase 2 project consists of widening the section of Shah Alam Highway/MRR-II constructed in Phase 1 from 4-lane to 6-lane, as well as constructing the section between HICOM to SKSB as a 6-lane highway and from SKSB to Jalan Langat as a 4-lane highway. Phase 1 project is assumed to be implemented from 1991 to 1994 while Phase 2 project is assumed to be implemented from 1994 to 1997.

In examining the condition for privatization, three alternative plans are tested and the following conclusions are derived.

If the total project except the section on Jalan Cheras to KL-Seremban Expressway (Maximum Package) is to be implemented as a privatization project, the FIRR will exceed 10% only if the concession period above 25 years and land acquisition cost is borne by the Government.

If only the project in Phase 1 (Minimum Package - Total project cost: M$210.5 million) is privatized, a FIRR of 14.6% can be expected if the land cost is borne by the Government with a 10% equity share and a concession period of 20 years.

If the project up to Phase 2 (Medium Package - Total project cost: M$385.4 million) is privatized, a FIRR of 14.4% can be expected if the land cost is borne by the Government with a 10% equity share and a concession period of at least 25 years.

Sensitivity analysis is carried out to examine the effect of additional toll levy on the N-S Link section between NKVE to Shah Alam Highway and changes in the forecasted traffic volume on the financial performance of the project roads.

It is found that the additional toll levy on the N-S Link section has little effect on the financial performance of the total project while such a factor has reasonable effect on the FIRR if only the Phase 1 project or Phase 1 and 2 projects are implemented.

A 10% increase and decrease in the forecasted traffic volume are used to test the sensitivity of such a factor on the financial performance of the project road.

It is found that even if there is a 10% decrease in traffic volume, all the packages are still financially viable.

10. Implementation Program

The technical, economic and financial studies reveal that the Project Roads should preferably be implemented according to the following schedule:-

Phase 1: 1991-1994 (M$210 million)

(a) Shah Alam Highway/MRR-II
- Construction of the section from KL-Seremban Expressway to HICOM as a 4-lane highway.

(b) N-S Link
- Construction of a 4-lane connecting road from Jalan TUDM-Shah Alam to Shah Alam Highway along the section of N-S Link from NKVE to Shah Alam Highway.

Phase 2: 1994-1997 (M$385 million)

(a) Shah Alam Highway/MRR-II
- Widening of the section between KL-Seremban Expressway and HICOM as a 6-lane highway.
- Construction of the section from HICOM to SKSB as a 6-lane highway.
- Construction of the section from SKSB to Jalan Langat as a 4-lane highway.

Phase 3: 1997-2000 (M$647 million)

(a) Shah Alam Highway/MRR-II
- Construction of the section of MRR-II from Jalan Cheras to KL-Seremban Expressway as a 6-lane arterial.
- Construction of the section of Shah Alam Highway from Jalan Langat to NKSB as a 4-lane highway.

(b) N-S Link
- Construction of the section between NKVE and Shah Alam Highway as a 6-lane expressway.
- Construction of the section from Shah Alam Highway to KL-Seremban Expressway as a 4-lane expressway.

CHAPTER 2 : SUMMARY OF THE TRAFFIC CONTROL AND SURVEILLANCE SYSTEM PROJECT

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1. Introduction

The Traffic Control and Surveillance (TCS) System Project in Klang Valley is consists of three systems, namely, Kuala Lumpur Area Traffic Control (ATC) System, Petaling Jaya Area Traffic Control (ATC) System and Highway Traffic Surveillance (HTS) System. The objectives for the Kuala Lumpur ATC System are to introduce traffic responsive signal control and to expand the coverage area of existing KL ATC System besides reinforcing the traffic surveillance function of collecting updated traffic-related information and enhancing driver information function in conveying accurate and up-to-date traffic-related information to drivers.

The objectives of proposing an Area Traffic Control System in Petaling Jaya are to ensure an effective coordination and control of traffic, to introduce traffic responsive signal control and traffic surveillance function of collecting updated traffic-related information in Petaling Jaya.

Lastly, the objectives of proposing a highway traffic surveillance system in the Klang Valley are to introduce traffic surveillance function, driver information function and traffic management activities on the urban highway network in the region through systematic traffic data collection, processing and dissemination in achieving smooth traffic flow on the highway.

2. System Concept

The system is based on the established concept adopted in the United States and Japan. The Traffic Control and Surveillance system which encompass Area Traffic Control System and Highway Traffic Surveillance System has various functions such as:-

(a) Traffic responsive signal control
(b) Traffic surveillance
(c) Driver information
(d) Statistical data collection
(e) Information exchange

Traffic responsive signal control centralizes the operation of traffic signal controllers and seek an optimum control timing parameter based on the traffic responsive function. Traffic surveillance involves the collection of traffic information by various means, for instance, vehicle detectors, CCTV and emergency telephone whereas driver information function conveys traffic-related information to the drivers by changeable message sign and commercial radio. Statistical data collection system provides pertinent statistical data for

adjustment of control parameters, formulation of future traffic control policy and traffic research while information exchange enables system linkage with other systems.

As the core of the system, a center is established where traffic management activities such as incident detection, detour implementation, special enforcement, etc. are activated through monitoring the traffic situations. Besides, it takes the initiative to prepare traffic improvement programs and administer first-aid countermeasures.

3. Traffic Control and Surveillance System

The TCS System involves two ATC Systems and one HTS System, namely KL ATC System, PJ ATC System and JKR HTS System. Main features of the TCS System are shown in Figures 2.1 and 2.2.

KL ATC System is an integrated system consisting of area-wide traffic responsive signal control system, traffic surveillance system and driver information system. The system is to cover the entire Kuala Lumpur and its surrounding areas of Kepong, Selayang and Ampang. The system is to be implemented and managed by KL City Hall from the existing control center in its building.

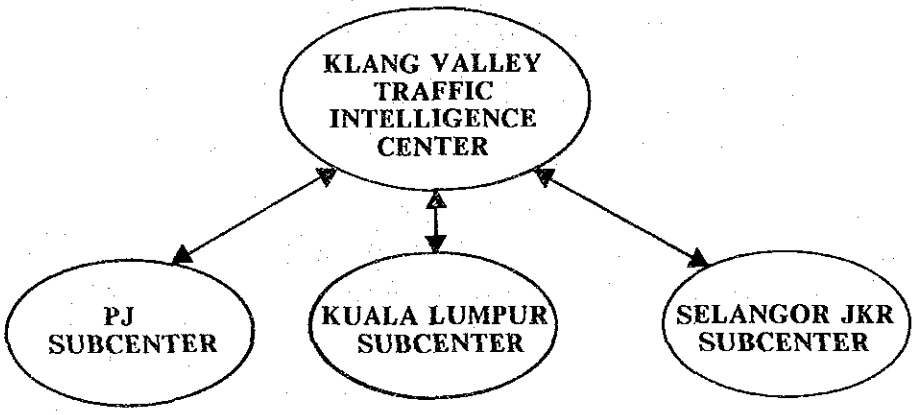
PJ ATC System whose coverage area is the entire Petaling Jaya Municipality is also a area-wide traffic responsive signal control system as well as traffic surveillance system and it must be compatible with the KL ATC System and ramp signal control of HTS System. It will be implemented and managed by the Municipal Council of Petaling Jaya from a proposed control center to be set up in Menara MPPJ.

In the case of JKR HTS System, it is an advanced form of real-time traffic surveillance and control system which is applicable to urban expressway. Traffic responsive signal control at the Federal Highway interchanges in Petaling Jaya is included. In addition, the coverage route is Federal Highway (from the Kuala Lumpur boundary to the junction with North Klang Straits Bypass) and Airport Highway. The executing agency is Federal Public Works Department (JKR) which may delegate this management responsibility to Selangor JKR. As such, the control center is proposed to be located in Bangunan Sultan Salahuddin, Shah Alam.

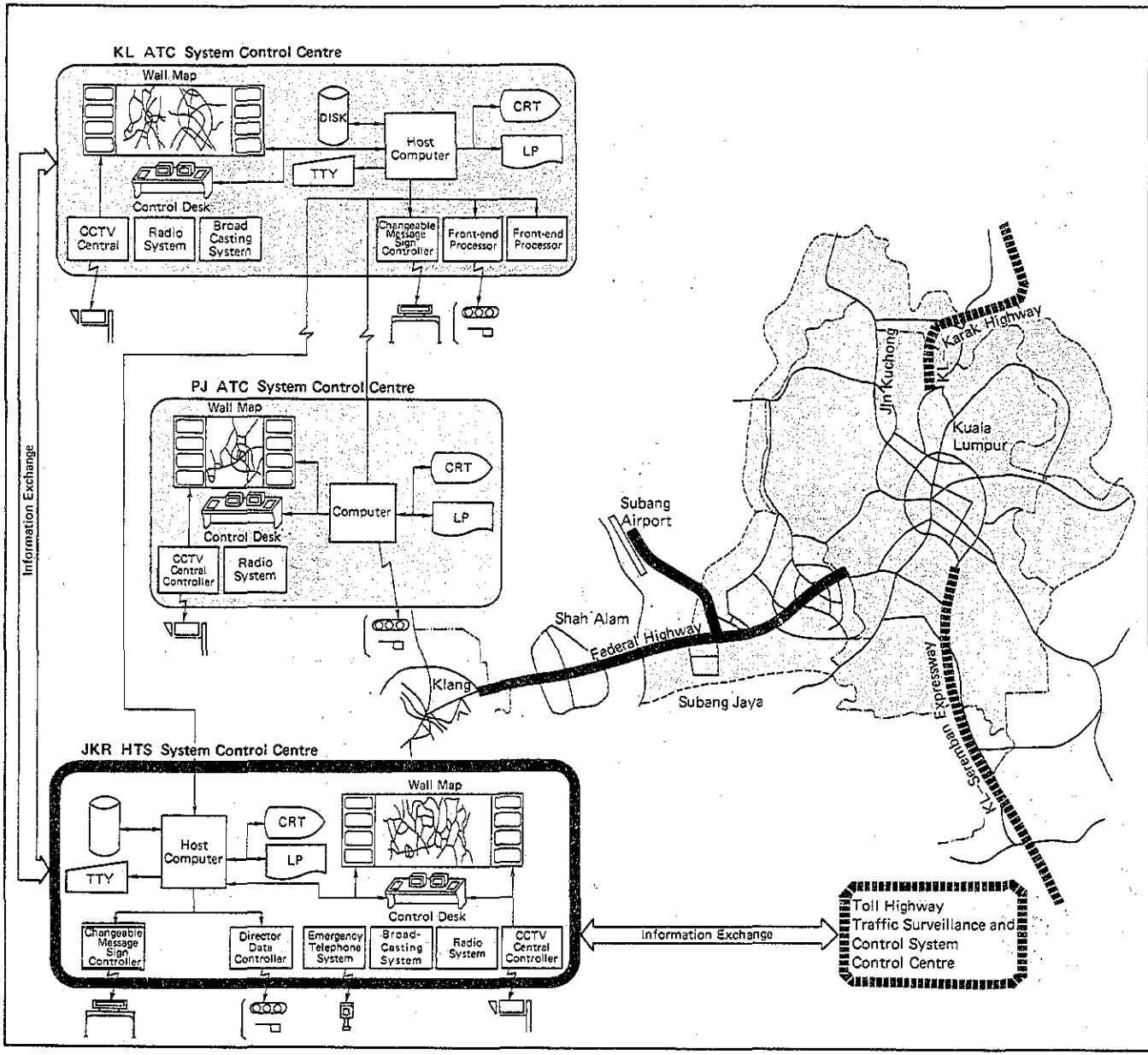
4. Concept of System Center

The TCS System is to be managed by a center-subcenter formation with one main center and a few subcenters.

The main center shall be set up in Kuala Lumpur and to be called the Klang Valley Traffic Intelligence Center. Linked to this main center are three (3) subcenters namely Kuala Lumpur Subcenter, Petaling Jaya Subcenter and Public Works Department (JKR) Subcenter.



The future urban structure of this region will consist of Kuala Lumpur, Shah Alam, Petaling Jaya, Klang, Bangi Newtown and Selayang Newtown. In pursuance with this perspective regional development strategy but faced with the inevitable fact that it is increasingly difficult to cope with the increasing demand for road development by the Government, it is envisaged that traffic control and surveillance system, capable of optimizing the utilization of road facilities, will be needed for better coordination of traffic in the region.



THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

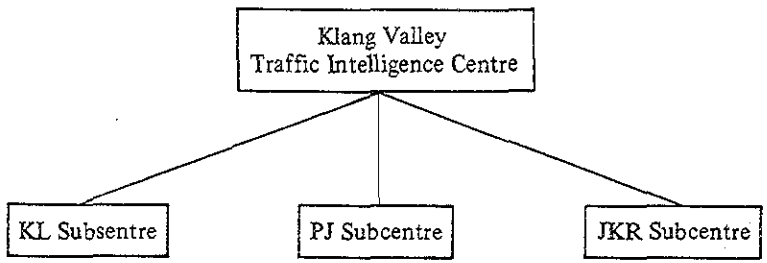
Figure 2.1: Main Features of the Proposed TCS System

LEGEND:

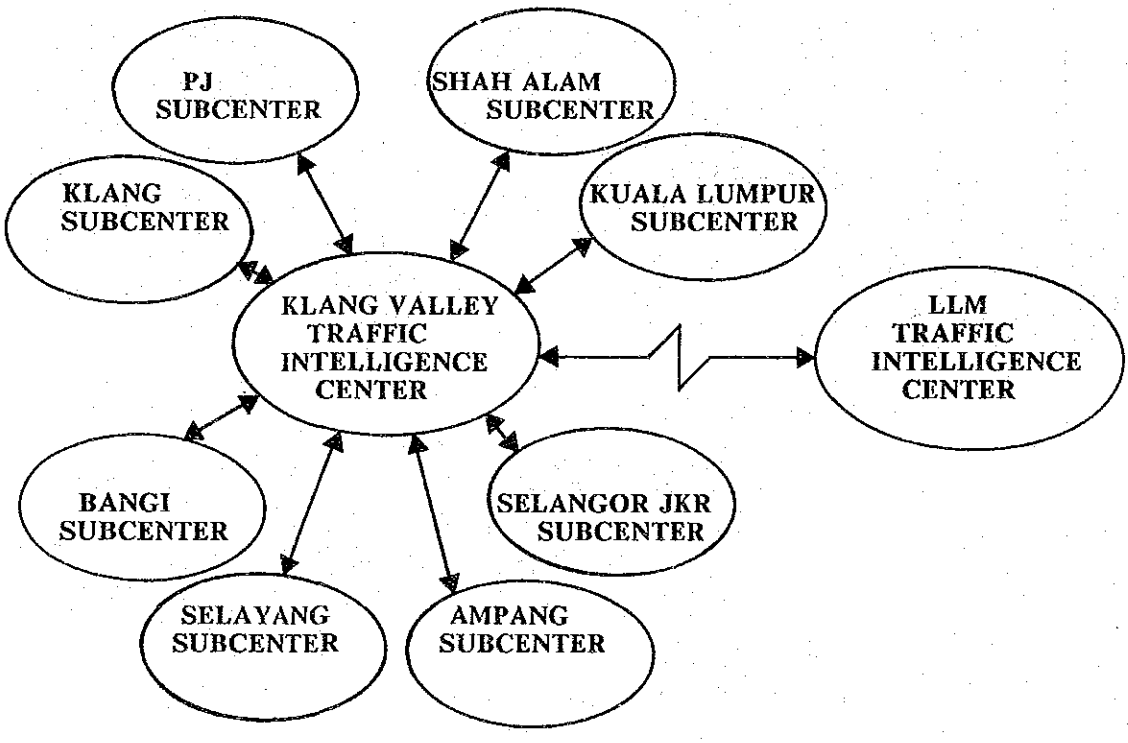
SCALE:

N

Figure 2.2: Main Features of the Proposed TCS System

	Klang Valley Regional System	Kuala Lumpur ATC System	Petaling Jaya ATC System	JKR HTS System
Coverage Area/Route	* Entire Klang Valley	* All signalized intersections within Kuala Lumpur and surrounding areas of Kepong, Selayang and Ampang * Federal Route 1 and 2 within Kuala Lumpur	* All signalized intersections in Petaling Jaya	* Federal Highway * Airport Highway * Signalized Ramp along Federal Highway in PJ
Main Functions	* Coordination * Traffic Surveillance * Driver Information * Statistical Data Collection * Information Exchange	* Traffic Responsive Signal Control * Traffic Surveillance on the surface road and Federal Route 1 and 2 * Driver Information * Statistical Data Collection * Information Exchange	* Traffic Responsive Signal Control * Traffic Surveillance * Information Exchange	* Traffic Surveillance * Driver Information * Statistical Data Collection * Ramp Signal Control in Petaling Jaya * Information Exchange
System Configuration				

In addition, the Traffic Control and Surveillance System is capable of maintaining close rapport with the being planned Traffic Control and Management System of Malaysian Expressways and Toll Highway under the responsibility of Malaysian Highway Authority (LLM) in order to ensure effective and safe traffic flow in the Klang Valley Region.



5. Staging Plan

The staging plan that illustrates the timing of area/route covered and functional subsystems introduced is divided into two phases. Phase I includes Stages 1 and 2 of KL and PJ ATC Systems and JKR HTS System whereas Phase II involves Stage 3 of the three systems.

For the KL ATC System, Stage 1 involves upgrading the existing ATC System within the Central Planning Area (CPA) and its periphery as well as expanding the system on the heavily trafficked radial roads. For other intersections within the CPA and its periphery that are not covered under the existing ATC System, they will be brought under the system in Stage 2. Finally, the expansion of ATC System to the outskirts of Kuala Lumpur will be materialized in Stage 3.

In the case of the PJ ATC System, it will be introduced in the vicinity area along Federal Highway and Jalan Kelang Lama in Stage 1. Subsequently, the system will cover other areas in Stage 2 and finally the whole PJ in Stage 3.

Under the JKR HTS System, Stage I involves ramp signal control at five (5) interchange ramps in Petaling Jaya. This system will cover the section of Federal Highway from Kuala Lumpur boundary to the junction with Airport Highway and the Airport Highway itself in Stage 2 and the section of Federal Highway to that with North Klang Straits Bypass in Stage 3.

However, the installation in Stage 3 is recommended to be determined and coordinated with the being planned Traffic Control and Management System of Malaysian Expressway and Toll Highway.

6. Cost Estimates

The Traffic Control and Surveillance System will require a total construction cost of M$116.3 million.

Table 2.1: Construction Cost (at 1988 Prices)

(Unit: M$ million)

Phase	Stage	KL ATC System	PJ ATC System	Selangor JKR HTS System	Total
I	1	24.1	5.8	13.6	43.5
	2	15.7	5.5	-	21.2
	Sub-total	39.8	11.3	13.6	64.7
II	3	20.3	2.5	28.8	51.6
	TOTAL	60.1	13.8	42.4	116.3

Note: * includes detail engineering, supervision and installation costs

The KL ATC System will require an annual operation cost of M$1.2 million, M$1.6 million and M$2.1 million after completion of Stages 1, 2 and 3 respectively.

For PJ ATC System, the annual operation cost after the completion of Stages 1, 2 and 3 is M$0.21 million, M$0.35 million and M$0.43 million respectively.

The JKR HTS System will incur an annual operation cost of M$0.3 million, M$0.8 million and M$1.1 million after the completion of Stages 1, 2 and 3 respectively.

7. Economic Evaluation

With the implementation of the Traffic Control and Surveillance (TCS) System, the following can be expected.

(a) Alleviation of traffic congestions;
(b) Ability to monitor malfunctioning equipment units;
(c) Ability to facilitate emergency vehicle users;
(d) Ability to control vehicular traffic volume;
(e) Ability to control vehicle speed; and
(f) Reduction of noise and air pollution.

In addition, incidents can be detected by the CCTV cameras and the information can be relayed to drivers via the driver information boards. Automatic recording of traffic volume and compilation of statistical reports can be facilitated by the statistical data collection system.

Table 2.2: Results of Economic Evaluation

Plan	Indicator		Value
KL ATC System	Internal Rate of Return, IRR (%)	..	69.1
	Benefit-Cost Ratio, B/C Ratio	..	3.0
	Net Present Value, NPV (M$'000)	..	73,229
PJ ATC System	Internal Rate of Return, IRR (%)	..	84.6
	Benefit-Cost Ratio, B/C Ratio	..	5.6
	Net Present Value, NPV (M$'000)	..	40,198

Furthermore, a sensitivity analysis performed on the economic evaluation indicates the feasibility of the plan even when benefit is reduced by 40% and the installation and operation costs are increased by 40%.

8. Implementation Program

Since there are many government agencies concerned with traffic control in the Klang Valley such as Kuala Lumpur City Hall (DBKL) and Municipal Council of Petaling Jaya (MPPJ), it is recommended that a task force be established under the Klang Valley Planning Secretariat with members from DBKL, MPPJ, JKR, HPU, Royal Police Department and other relevant agencies to undertake the implementation of the TCS System.

Since the traffic control and surveillance system in the Klang Valley Region is recommended as an integrated system, it is necessary to implement the detailed engineering work as one package.

The recommended implementation program is only applied for Phase I of the Traffic Control and Surveillance System and in view of its urgency, it is recommended to be completed by year 1992. Besides, it is formulated with consideration of the allocation of federal funds under the coming Malaysian Development Plans, that is, Sixth Malaysia Plan (1991-1995) and Seventh Malaysia Plan (1996-2000) for a sum of M$64.7 million and M$51.6 million respectively.

CHAPTER 3 : SUMMARY OF THE FREIGHT TERMINAL PROJECT

CHAPTER 3: SUMMARY OF THE FREIGHT TERMINAL PROJECT

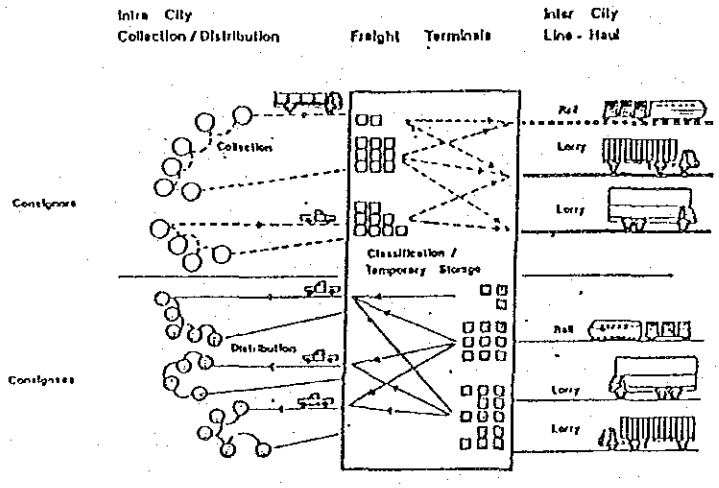
1. Introduction

The freight terminal project in Klang Valley is make up of three terminals, namely, North Terminal, South Terminal and Multi-modal (West) Terminal. The planning and development of freight transport terminals is to seek improved economics of freight transport through increased efficiency and hence the volume of goods handled, modernizing handling procedure, rationalizing distribution and collection. Among other things, the freight terminals are aimed at achieving:-

(a) Rationalization in Freight Transport System;
(b) Modernization of Freight Transport Industry;
(c) Reduction in Freight Transport Cost;
(d) Promotion of Better Landuse in the Urban Area;
(e) Improvement of Living Environment;
(f) Fostering Small-scale Transporters.

2. Functions at the Freight Terminals

The general functions of a Freight Terminal involving goods collection, processing (*loading/unloading, sorting, consolidating, etc.*) storage and distribution.



The terminal provides a place where line-haul transport operation can be linked up with collection and distribution operation. Collection and distribution lorries can carry out activities in loops, thus saving time and transport costs. Line-haul lorries can expect to increase their load factor by consolidating the collected consignments at the terminal.

3. Location of the Freight Terminals

Three freight terminals are proposed for the Klang Valley, namely the North Terminal, South Terminal and Multi-modal (West) Terminal.

The site selected for locating North Terminal is a piece of land (Lot No.10903) belonging to Selangor State JKR, located in the district of Gombak just north of Kuala Lumpur City limit. It is about 2km east of the intersection of Jalan Batu Caves and Jalan Ipoh (Federal Route 1) and fronting Jalan Batu Caves. Jalan Batu Caves will eventually be improved to be part of Middle Ring Road II as a divided urban arterial from which Karak Highway and Federal Route 1 radiates out to the east and north respectively.

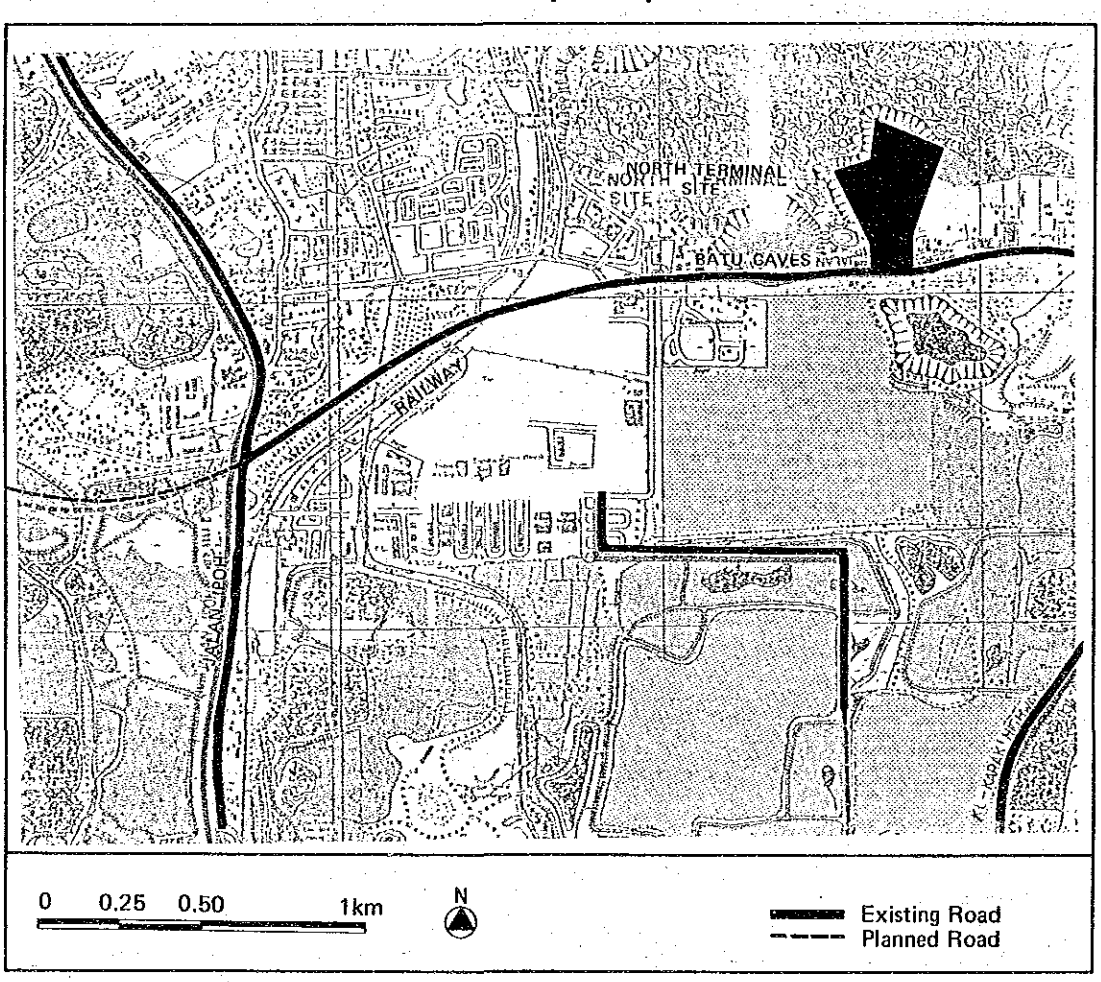


Figure 3.1: Proposed Location of North Terminal

The selected site for South Terminal is located some 13km to the south of Kuala Lumpur beside KL-Seremban Expressway. The site which consists of 2 lots (Lot 3050 and 3051) belongs to Selangor State Government. Although the site is on former tin mining area, geological survey has indicated that the ground is firm and suitable for construction.

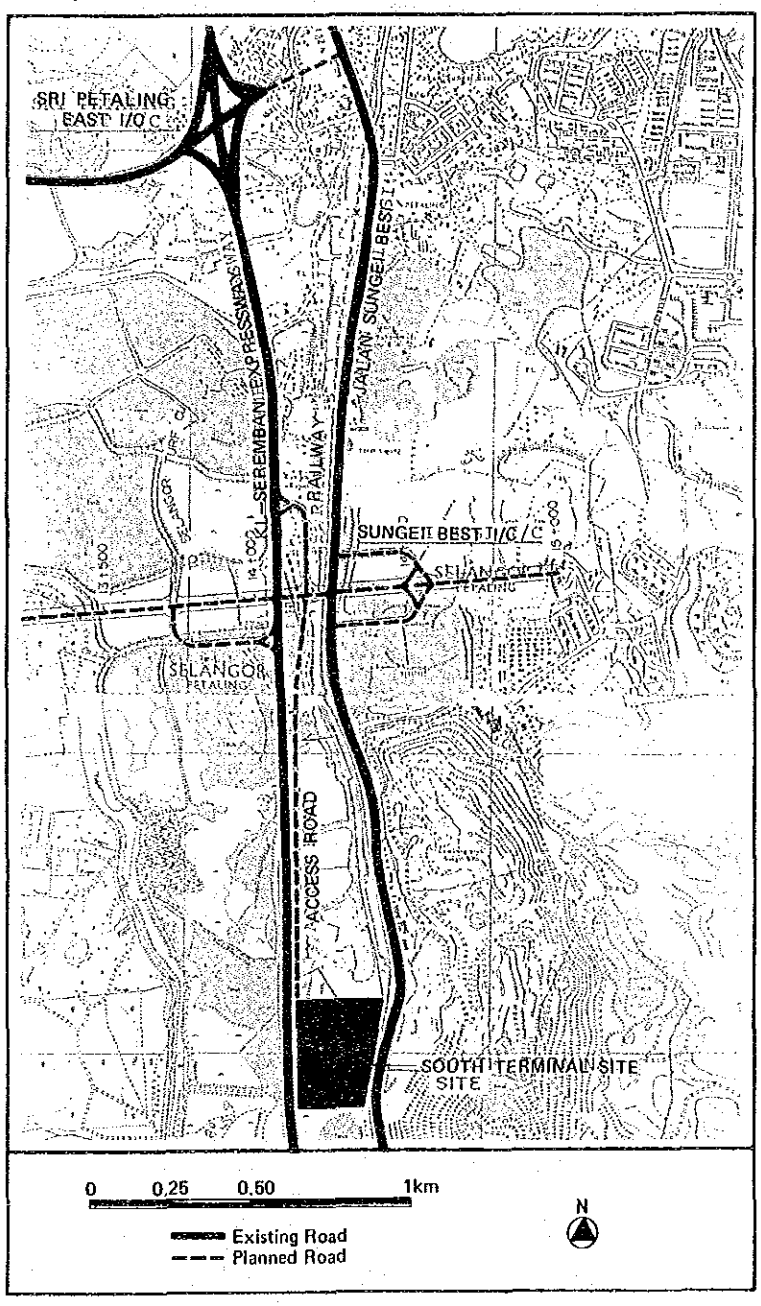


Figure 3.2: Proposed Location of South Terminal

The Multi-modal (West) Terminal is to be located within the North Port territory in Port Klang, some 45 km west of Kuala Lumpur. The site is a reclaimed area from swamp land but geological survey has indicated that the ground is well settled and suitable for construction. The land belongs to Port Klang Authority (LPK) and is available for constructing the terminal. The site is served by Jalan Parang which connects to North Klang Straits Bypass.

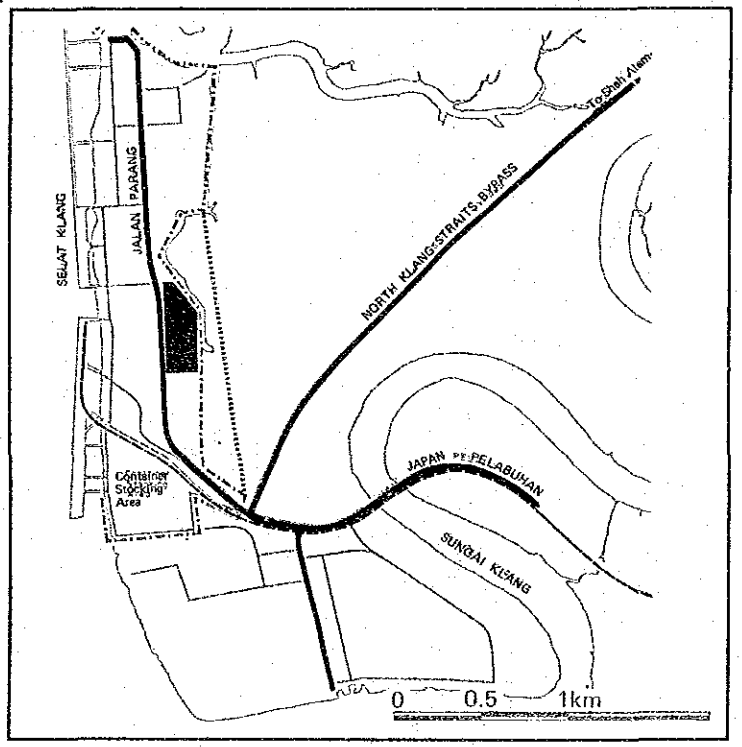


Figure 3.3: Proposed Location of Multi-modal (West) Terminal

4. Preliminary Design

In estimating the future freight volume, the existing OD pattern of goods movement and their consignment pattern were first analyzed. Using 1985 as the base year, future freight volume are forecasted using the annual growth rate of GRP by sector in Klang Valley. The North Terminal is expected to handle some 2,600 ton/day of cargo, the South Terminal, 2,000 ton/day and the Multi-modal Terminal 1,200 ton/day or 1,705 TEU/month. Based on these forecasts, the preliminary designs are prepared with particular consideration for site planning, functional zoning, traffic circulation system, terminal facility and utility provisions on sites. The preliminary layout plan of the three terminals are presented in Figures 3.4 to 3.6.

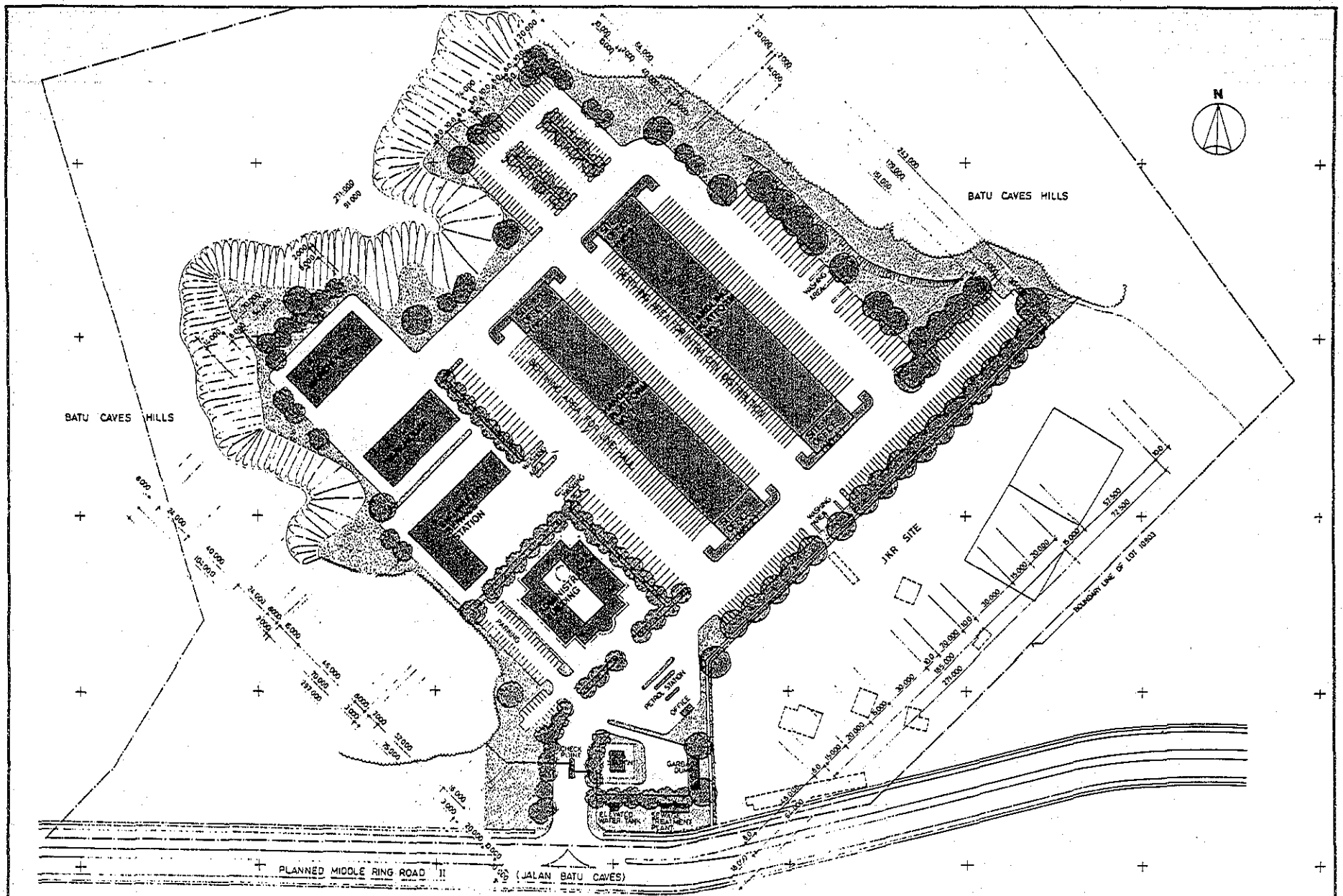


Figure 3.4: Proposed Layout Plan for North Terminal

SCALE : 1:2000	THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
DATE : JULY 1988	JAPAN INTERNATIONAL COOPERATION AGENCY

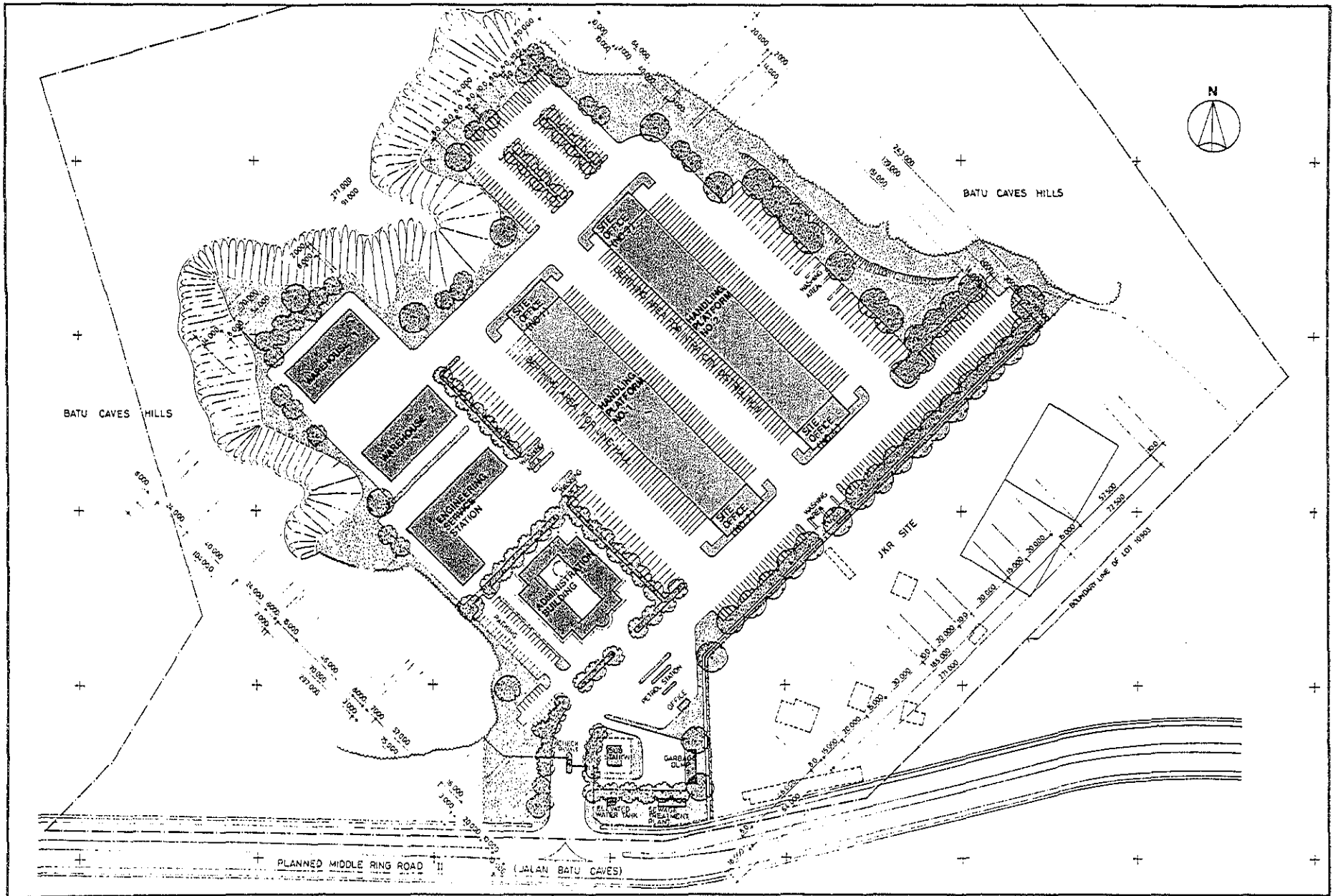


Figure 3.4: Proposed Layout Plan for North Terminal

SCALE : 1:2000	THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
DATE : JULY 1988	JAPAN INTERNATIONAL COOPERATION AGENCY

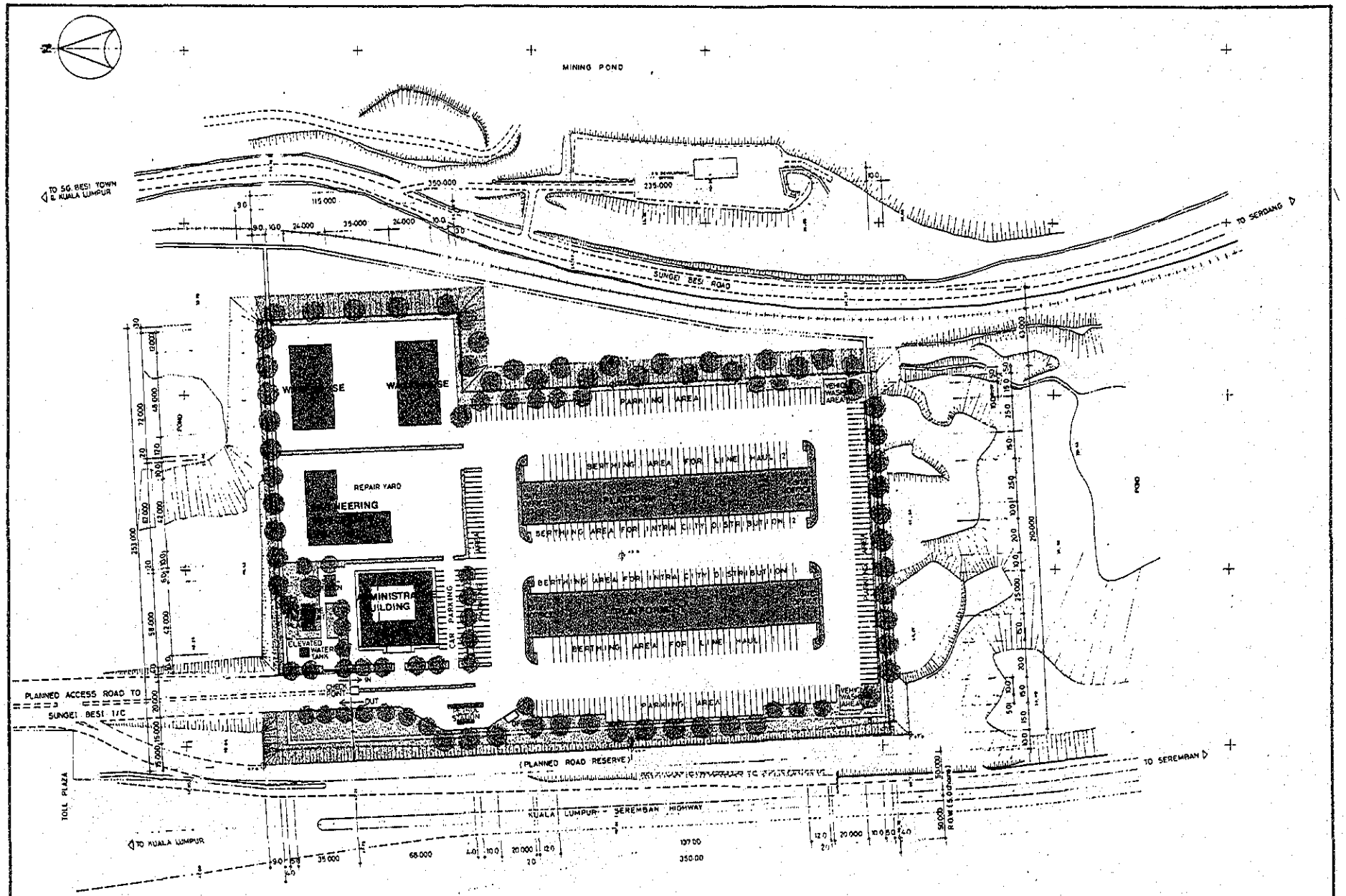


Figure 3.5: Proposed Layout Plan for South Terminal

SCALE : 1:2000

DATE : JULY 1988

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

JAPAN INTERNATIONAL COOPERATION AGENCY

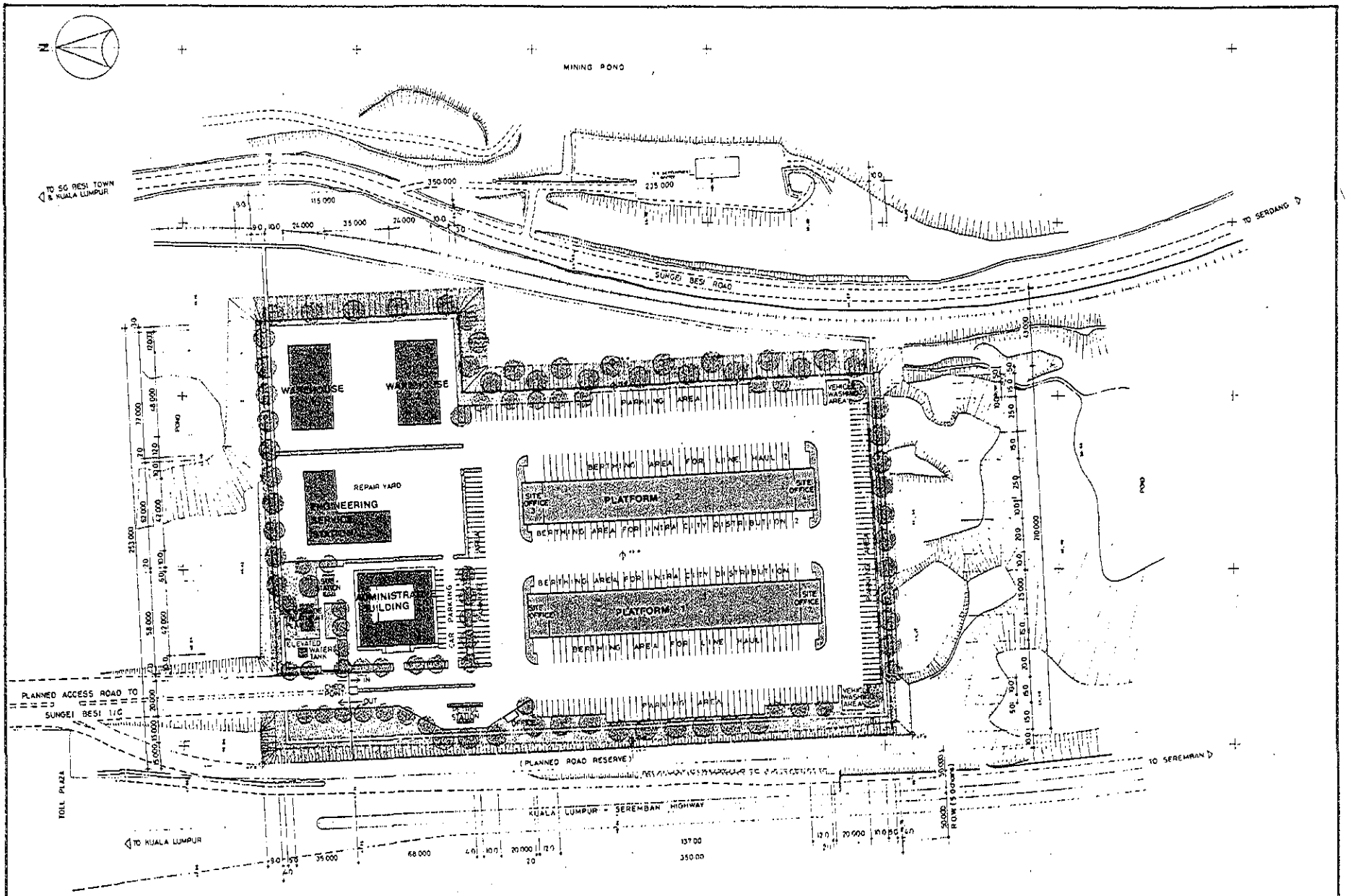
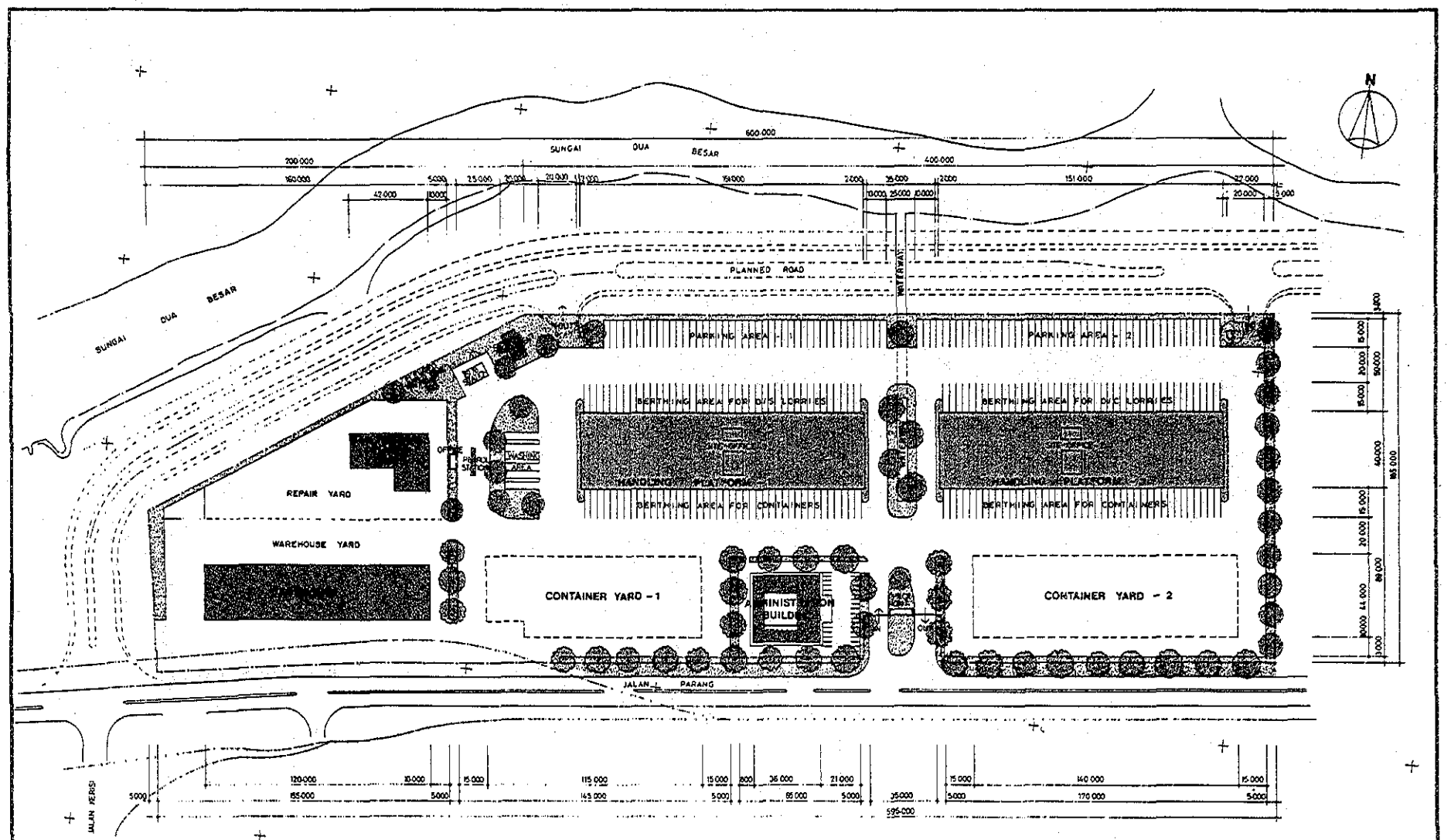


Figure 3.5: Proposed Layout Plan for South Terminal

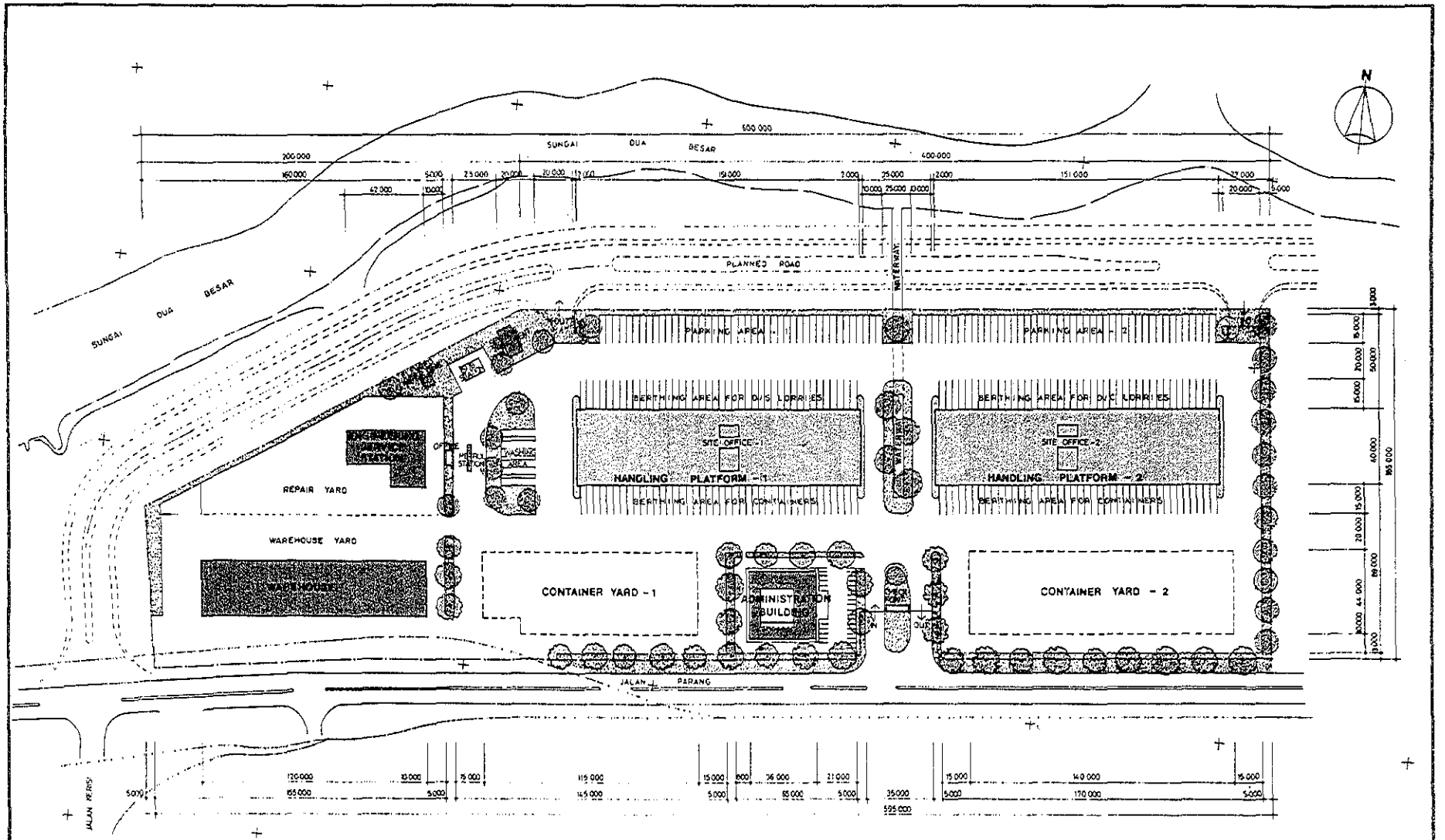
SCALE	1:2000
DATE	JULY 1988

THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY

JAPAN INTERNATIONAL COOPERATION AGENCY



FREIGHT TERMINAL PROJECT	SCALE : 1:2000		THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
MULTI-MODAL FREIGHT TERMINAL / SITE PLAN	DRAWING NO : M - 1	DATE : JULY 1988	JAPAN INTERNATIONAL COOPERATION AGENCY



FREIGHT TERMINAL PROJECT		SCALE : 1:2000		THE FEASIBILITY STUDY ON TRANSPORTATION FACILITIES PROJECTS IN KLANG VALLEY
MULTI-MODAL FREIGHT TERMINAL	SITE PLAN	DRAWING NO : M - 1	DATE : JULY 1988	JAPAN INTERNATIONAL COOPERATION AGENCY

5. Cost Estimates

The three terminals are estimated to cost some M$30.82 million for their implementation.

Table 3.1: Implementation Cost Estimates

Item	North Terminal	South Terminal	Multi-modal (West) Terminal
1) Construction Cost	9,264	7,681	8,741
2) Detailed Design & Supervision Fee	926	768	874
3) Contingencies	926	768	874
Total	11,116	9,217	10,489

Note: * Construction cost includes preparation work cost
* Detailed design and supervision fee is assumed as 10% of the construction cost
* Contingency cost is assumed as 10% of the construction cost
* Land is assumed to be provided by the Government

6. Economic Evaluation

Results of economic evaluation show that a benefit-cost (B/C) ratio of 1.55 to 1.79 can be achieved for North Terminal while that for South Terminal is 1.23 to 1.41 if the transporters can increase their transport efficiency by 20 to 25%. Therefore both North and South Terminals are economically viable. In the case of Multi-modal (West) Terminal, a B/C ratio of 1.29 to 1.40 can be achieved. The NPV and IRR indicate that it is economically viable to construct the Multi-modal (West) Terminal.

Table 3.2: Economic Indicators for the Projects

	B/C Ratio	NPV (M$'000)	IRR (%)
North Terminal			
Case 1: 20% Increase	1.55	29,159	26
Case 2: 25% Increase	1.79	33,719	32
South Terminal			
Case 1: 20% Increase	1.23	19,707	18
Case 2: 25% Increase	1.41	22,616	22
Multi-modal (West) Terminal			
Case 1: 20% Increase	1.29	21,704	19
Case 2: 25% Increase	1.40	23,661	22

Note: * Project life is assumed to be 20 years
* Discount rate is 12% per annum

7. Financial Analysis

Results of the financial analysis indicate that all three terminals are financially viable projects.

Table 3.3: Financial Indices of the Projects

Item		North Terminal	South Terminal	Multi-modal (West) Terminal
FIRR (%)	Nominal	14.5	13.7	14.9
	Real	10.1	9.4	10.5
FNPV (M$'000)	Nominal	5,056	3,462	3,564
B/C Ratio	Nominal	1.26	1.21	1.31
ROE	Nominal	18.8	17.0	22.3
	Real	14.2	12.5	17.7

Notes: * In the nominal case, FIRR as well as ROE is calculated based on the values at current prices and in the real case, based on the discounted values at current prices with a discount rate of 4%.

* The FNPV and B/C Ratio are calculated based on the discounted values at current prices with a discount rate of 10%.

* Project life is 20 years and inflation rate at 4%/year.

It is found that for the projects to be viable, the berth rental for the North and West Terminals have to be set at M$20,000/berth/year and at the South Terminal, M$18,000/berth/year. In addition, the following utilization rates of each of the terminals have to be achieved.

Table 3.4: Utilization Rates of Terminals

Year	North Terminal	South Terminal	Multi-modal (West) Terminal
1995	57 (65%)	51 (64%)	-
2000	71 (81%)	64 (80%)	-
2005	88 (100%)	80 (100%)	84 (100%)

Note: Number of berths utilized and figures in parenthesis are utilization rate to the total capacity

An analysis is also made on the acceptability/affordability of transporters towards the terminal usage charges. Although the terminal seems to be more expensive than the existing shophouse, the terminal is providing berthing areas for incoming and outgoing cargoes and other spatial allowances.

It is found that if the transporters are able to achieve 4% increase of transport efficiency, they can expect to gain net benefits. Since the Study has shown that an increase of about 20% in transport efficiency is possible when the transporters are relocated from the existing shophouses to the terminals, it is concluded that the transporters will accept a relocation to the terminals.

8. Operation, Administration and Legal Aspects

The terminals are recommended to be implemented by the private sector. However, due to the recognition that the Freight Terminals are but one of the public facilities for improving lorry transportation efficiency, public bodies such as Selangor State Investment Company (SSI), Selangor State Development Corporation (PKNS) and Port Klang Authority (LPK) should contribute part of the equity.

The participation of a public body can ensure the realization of a desirable policy on the establishment of nation-wide freight terminal network, monitoring and control of unit freight cost by the Government and enhancing the qualification of business entity for receiving long-term loan from development banks.

The Ministry of Transport has been identified to take on an active role in regulating the planning, construction and operation of the terminals.

The North and South Terminals are recommended to be managed by a single management entity while Multi-modal Freight Terminal by a separate entity. This proposal is based on the need to manage both North and South Terminals in a closely related manner for the transport of general cargoes while Multi-modal (West) Terminal is to be managed for the handling of container cargoes.

The management companies shall lease out the terminal berth space to lorry transporters and collect annual rental by a tariff rate to be set by the management but agreed to by the transporters. The auxiliary facilities like warehouse, petrol station, canteen, etc. are to be leased out to sub-contractors for their operation.

The leasing should ensure a good mix of large, medium and small transporters. This is to prevent any monopoly or oligopoly in transport operation and to help small entrepreneurs. Moreover, it is essential that a good mix of transporters be maintained for promoting

rationalization in cargoes consolidation. The management company shall oversee the performances of the leasee of terminal berths to ensure that the terminals are fully utilized.

The management companies shall be responsible for the general maintenance of all building structures, roadways and apron utilities. The companies must also oversee the general security by checking and recording incoming and outgoing lorries at the entrance/exit points.

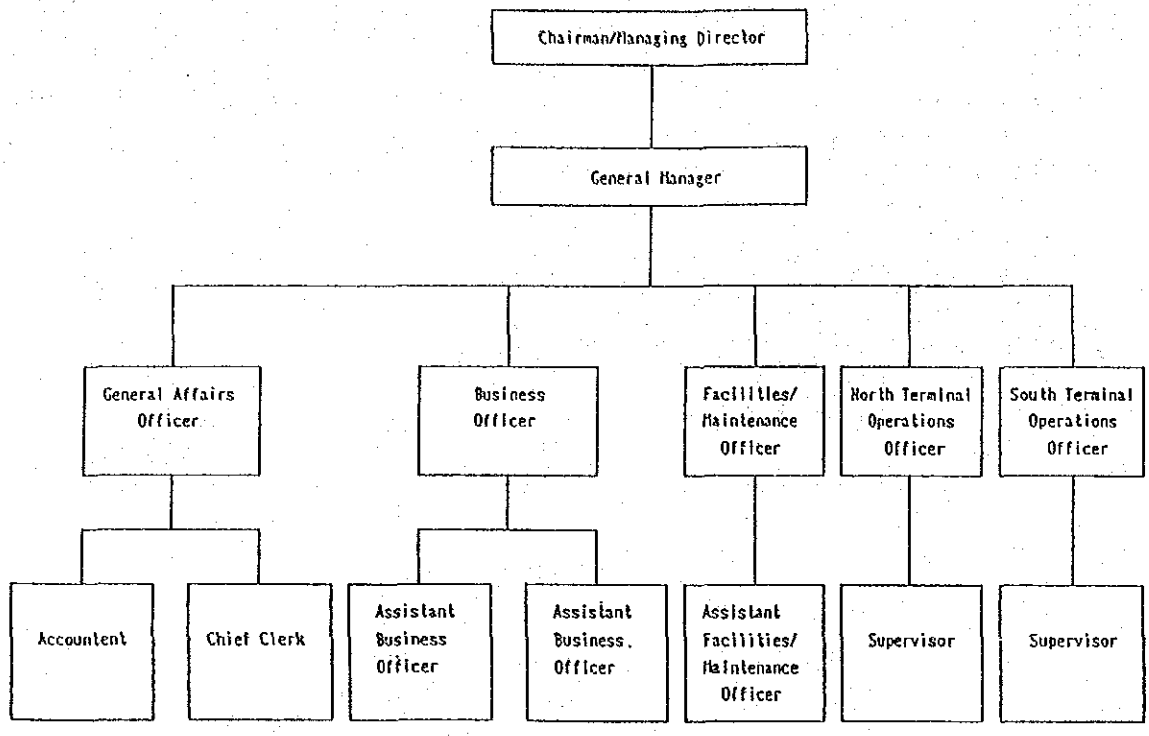
Legal provision for the construction of the terminals is contained in Section 72 of the Road Transport Act of 1987. The provision is not specifically for lorry terminals only but for the general construction and operation of public parking space and stands.
Salient points under this section of the Act are:-

* Any appropriate public body is allowed to construct Freight Terminals as long as it does not contravene other laws and its proposal to construct is approved by the Minister of Transport. Although the Act does not specify what are the public bodies concerned, reference to the existing bus terminals implementation within Klang Valley indicates that public body includes at least public organizations like City Hall, Municipal Councils, UDA and State Development Corporations like PKNS.

* Approval from the Ministry of Transport is required since the terminals are located near the Federal Road and involves goods vehicles.

* The terminals have among their facilities, parking spaces for hire. This, therefore requires the Government to gazette such provision and thus specify the location, type of parking, number of parking spaces, period of usage, charge or rate, manner of collection, etc. as required by the Act.

(i) North and South Terminals



(ii) Multi-modal Freight Terminal

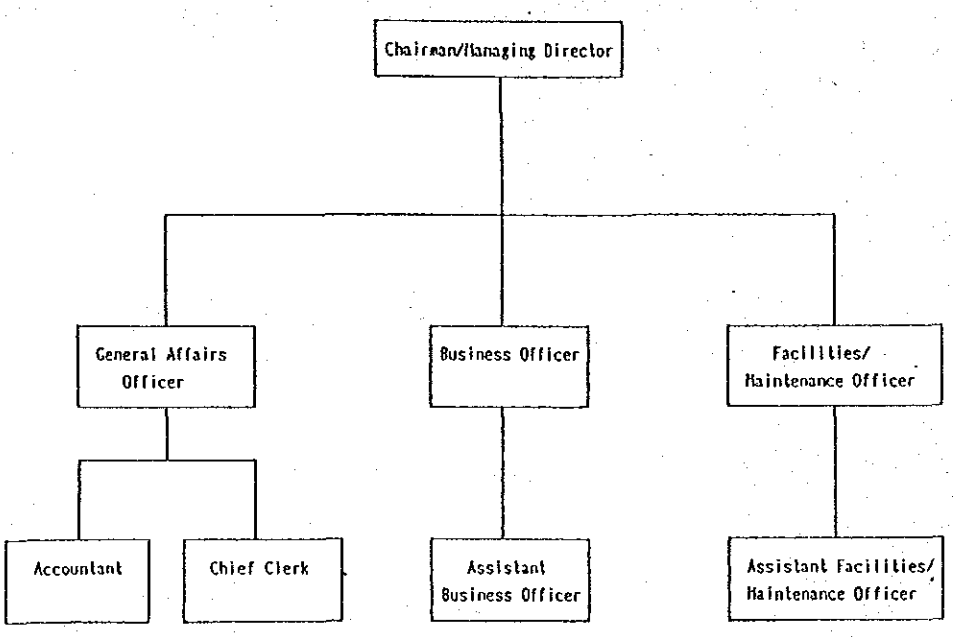


Figure 3.7: Organization Set-ups for the Proposed Freight Terminal Management Companies

Operation of the warehouse proposed in the Freight Terminals are governed by the Local Government Act, 1976 and the Custom Act, 1967. The former governs the construction and operation of public warehouse where a licence to operate has to be obtained from the local authority concerned. The Customs Act, 1967 governs and controls the operation of bonded warehouses where a licence from the Custom and Excise Department of the Ministry of Finance is necessary.

9. Implementation Programme

The technical, economic and financial studies suggest that the Freight Terminals should preferably be implemented according to the following schedules:-

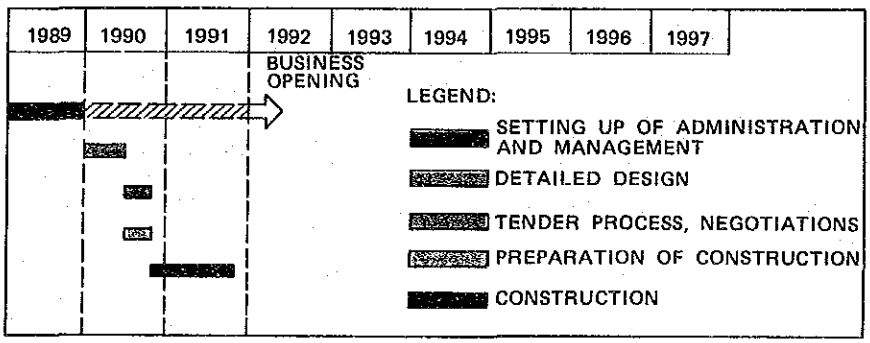


Figure 3.8: Recommended Implementation Schedule for North and South Terminals

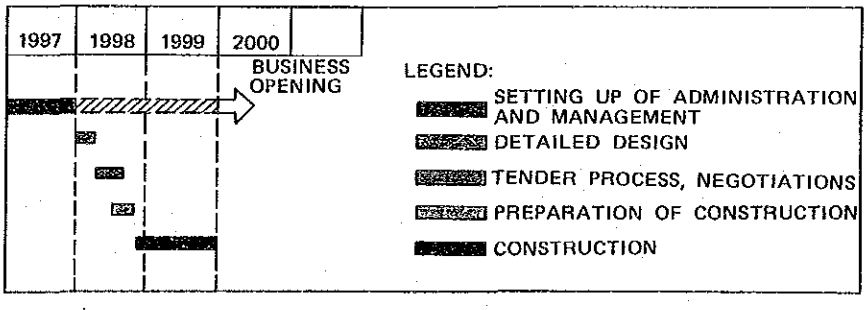


Figure 3.9: Recommended Implementation Schedule for Multi-modal (West) Terminals

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