

ALTERNATIVE ALIGNMENT IN THE EASTERN PART OF MPJB

1. Purpose of Study

Without the east coast road in the eastern part of MPJB, traffic congestion on Jalan Tebrau and Jalan Kebun Teh is expected to be greater in the year 2000 even if some of the traffic control measures are implemented. However, if there is no possibility at all of this road being built in the future, the Study Team must provide other alternatives for the in and outgoing traffic of Pasir Gudang and Toll Expressway and these are shown below:

2. Alternative Alignments (Refer to Figs. C.1 to C.4 and Table C.1)

Scheme 1 : Implemented if passageway by the foreshore of the Polo Ground is granted.

Scheme 2 : This scheme has been proposed in case the foreshore alignment on Jalan Pasir Pelangi is acceptable.

Scheme 3 : This scheme has been proposed in case Schemes 1 and 2 are not acceptable and if some land along Jalan Bakar Batu can be acquired.

Scheme 4 : This scheme has been proposed in case some land along Jalan Bakar Batu cannot be acquired.

3. Recommendation

The Study Team believes that Scheme 1 is the most desirable and appropriate network configuration in the year 2000 even with the difficulties arising from the construction of an off-shore road on the Polo Ground and partial acquisition of land from the Army Camp. This is an important matter, and the Study Team would like to

request the related committees to keep this proposal in mind as a conceptual plan for the year 2000 for the following reasons.

- a. The impact of the development of the housing estates and the commercial and industrial sectors in Pasir Gudang, just across Sg. Tebrau, upon the East Coast Federal Road (Jalan Kota Tinggi, Jalan Tebrau). Without an alternative road by-passing Jalan Tebrau and the densely populated residential areas, it is doubtful if any measures taken to relieve traffic congestion in the eastern sector and the C.B.D. will be effective.
- b. In case Scheme 1 can never be realized, then it would be necessary to construct a double deck structure on Jalan Tebrau by the year 2000.

Table C.1 Alternative Road Network in Eastern Area of MPJB

Legend : Good Fair Bad

	Scheme - 1	Scheme - 2	Scheme - 3	Scheme - 4
Conceptual Plan				
Land Acquisition	Army Camp	Required Partially	Required Partially	Required Partially
	East Coast (Polo Ground) Improvement of J. Pasir Pelangi	Not Required	Not Required	Not Required
Traffic Flow and Network Configuration	Others	Required	Not Required	Not Required
		Some land from the Army, along Jalan Bakar Baru is required. Affect the residents of Taman Kebun Teh. Some of Sultan's land and structures affected.	Some land from the Army, along Jalan Bakar Batu is required. The residents of Taman Kebun Teh affected.	Some residents to the north-side of the Army camp affected. The residents of Taman Kebun Teh affected.
Road Structures Alternatives		<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network 	<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network 	<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network
		<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network 	<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network 	<ul style="list-style-type: none"> <input type="radio"/> Smooth Traffic Flow <input type="radio"/> Desired Simple Network
Improvement Cost	Johor Bahru East Coast Road	Johor Bahru East Coast Road	Johor Bahru East Coast Road	Johor Bahru East Coast Road
Running Cost	<ul style="list-style-type: none"> 1. Ground Level 2. Tunnel (Box Culvert) 	<ul style="list-style-type: none"> 1. Ground Level 2. Tunnel (Box Culvert) 	<ul style="list-style-type: none"> 1. Widen to 6-8 lanes 2. Construct 4-lane viaduct along the road 	<ul style="list-style-type: none"> 1. Widen to 6-8 lanes 2. Construct 4-lane viaduct along the road
Recommendation	<ul style="list-style-type: none"> 1. Ground Level 2. Tunnel 	<ul style="list-style-type: none"> 1. Ground Level 2. Tunnel 	<ul style="list-style-type: none"> 1. Widen to 6-8 lanes 2. Construct 4-lane viaduct along the road 	<ul style="list-style-type: none"> 1. Widen to 6-8 lanes 2. Construct 4-lane viaduct along the road
	MS 91 Million	MS 91 Million	MS 131 Million	MS 151 Million
	MS 123 Million	MS 123 Million	MS 131 Million	MS 151 Million
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Fig. C.1 Alternative Schemes for J.B. Eastern Sector-Scheme 1

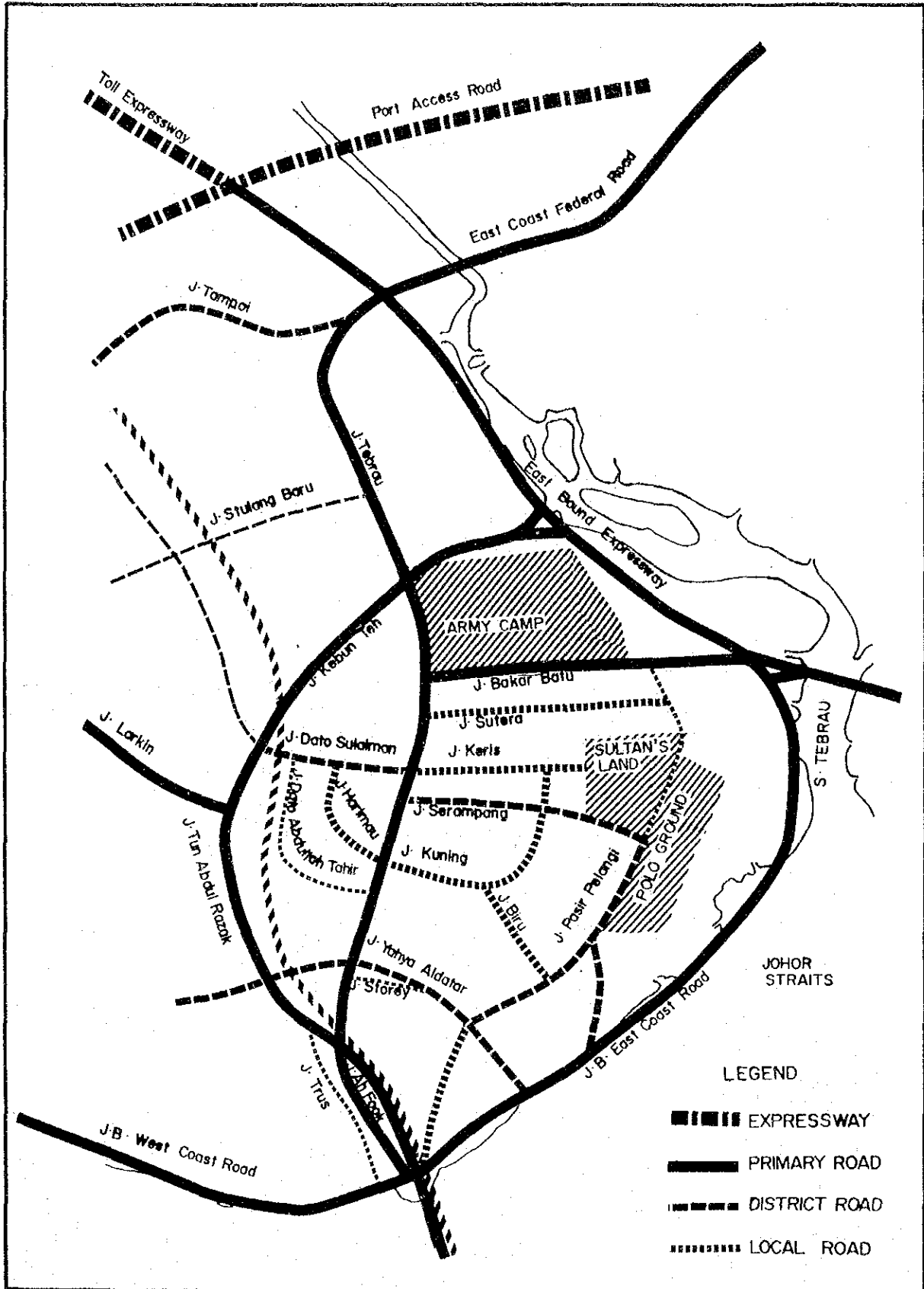


Fig. C.2 Alternative Schemes for J.B. Eastern Sector-Scheme 2

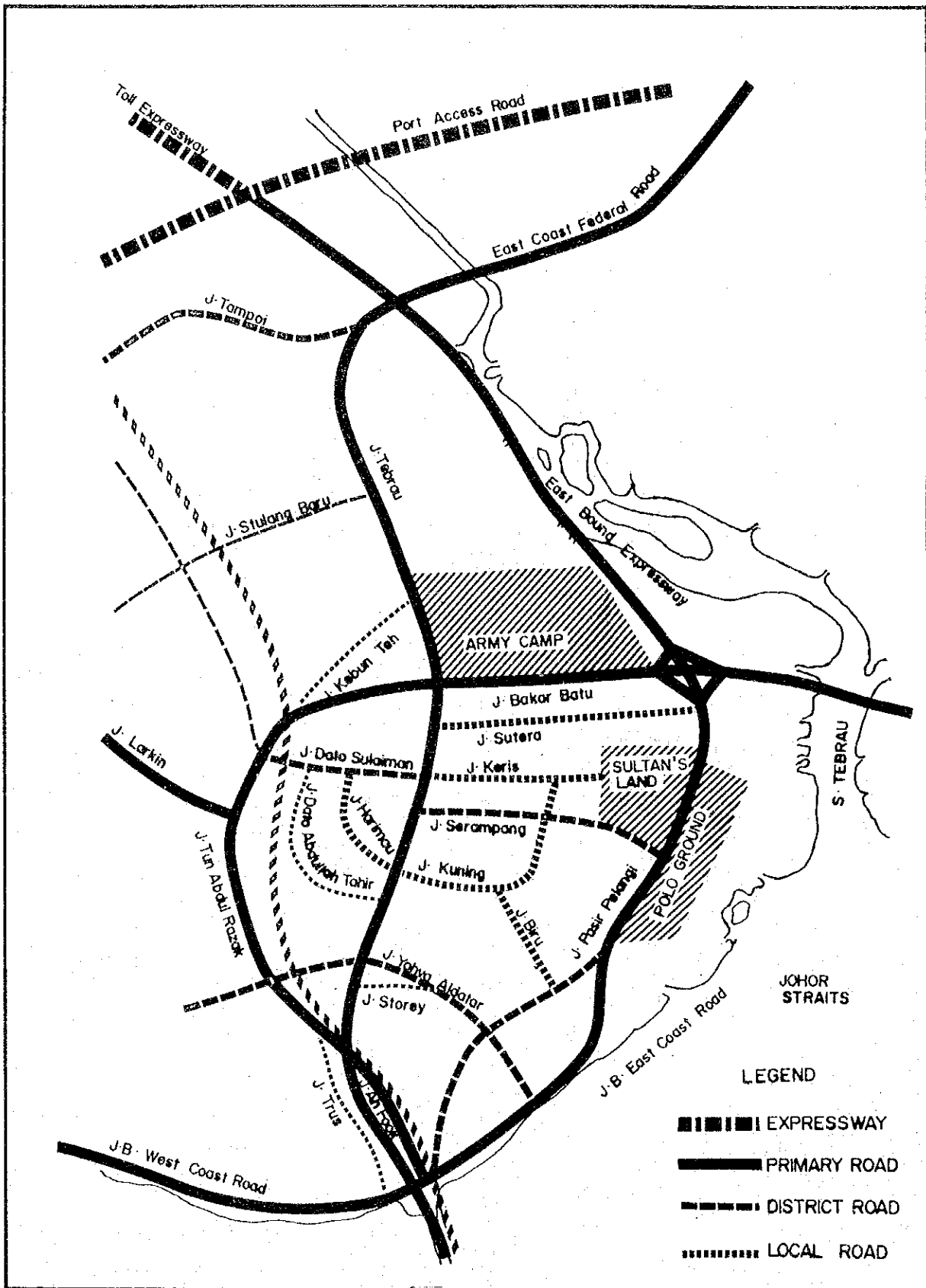


Fig. C.3 Alternative Schemes for J.B. Eastern Sector-Scheme 3

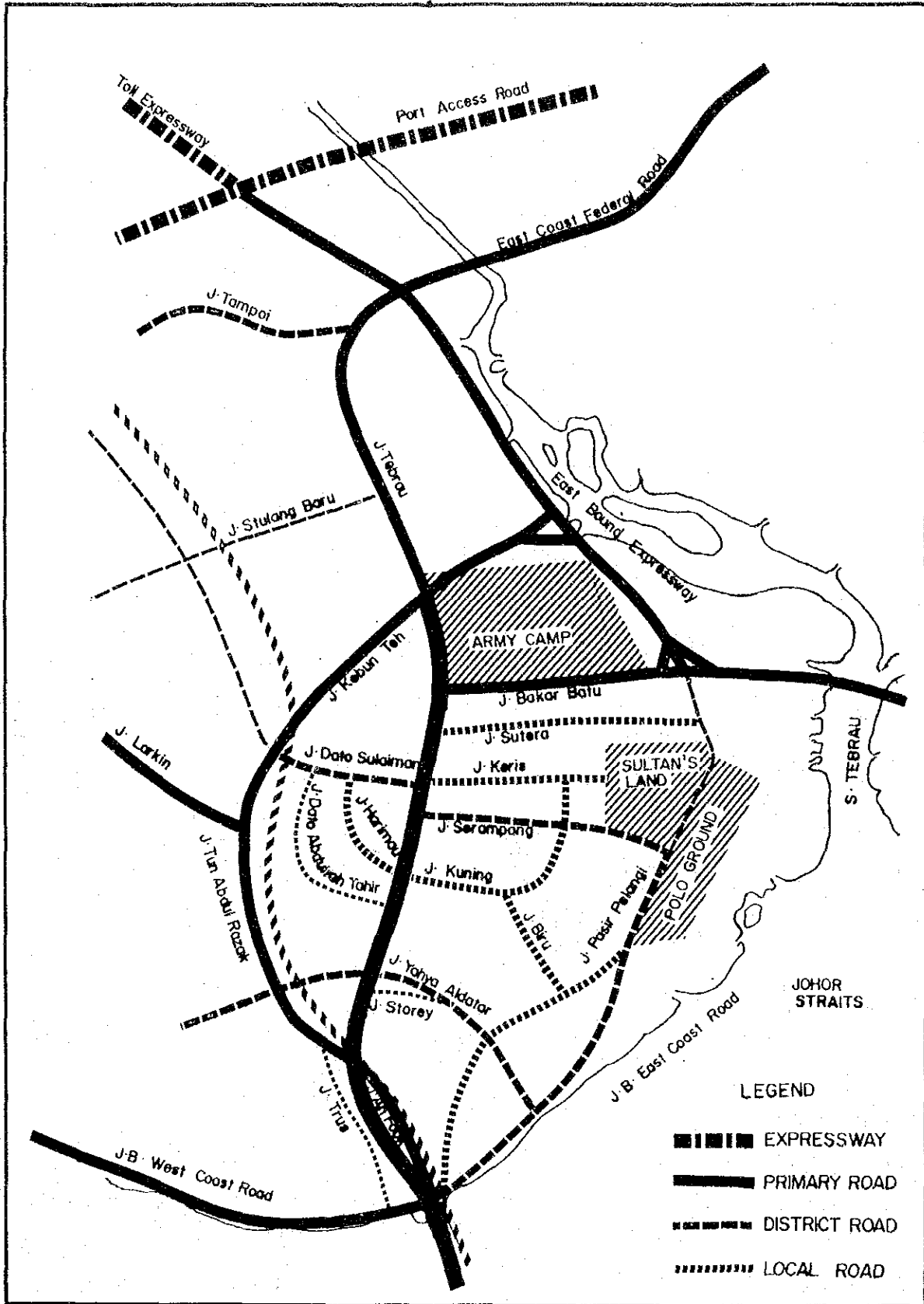
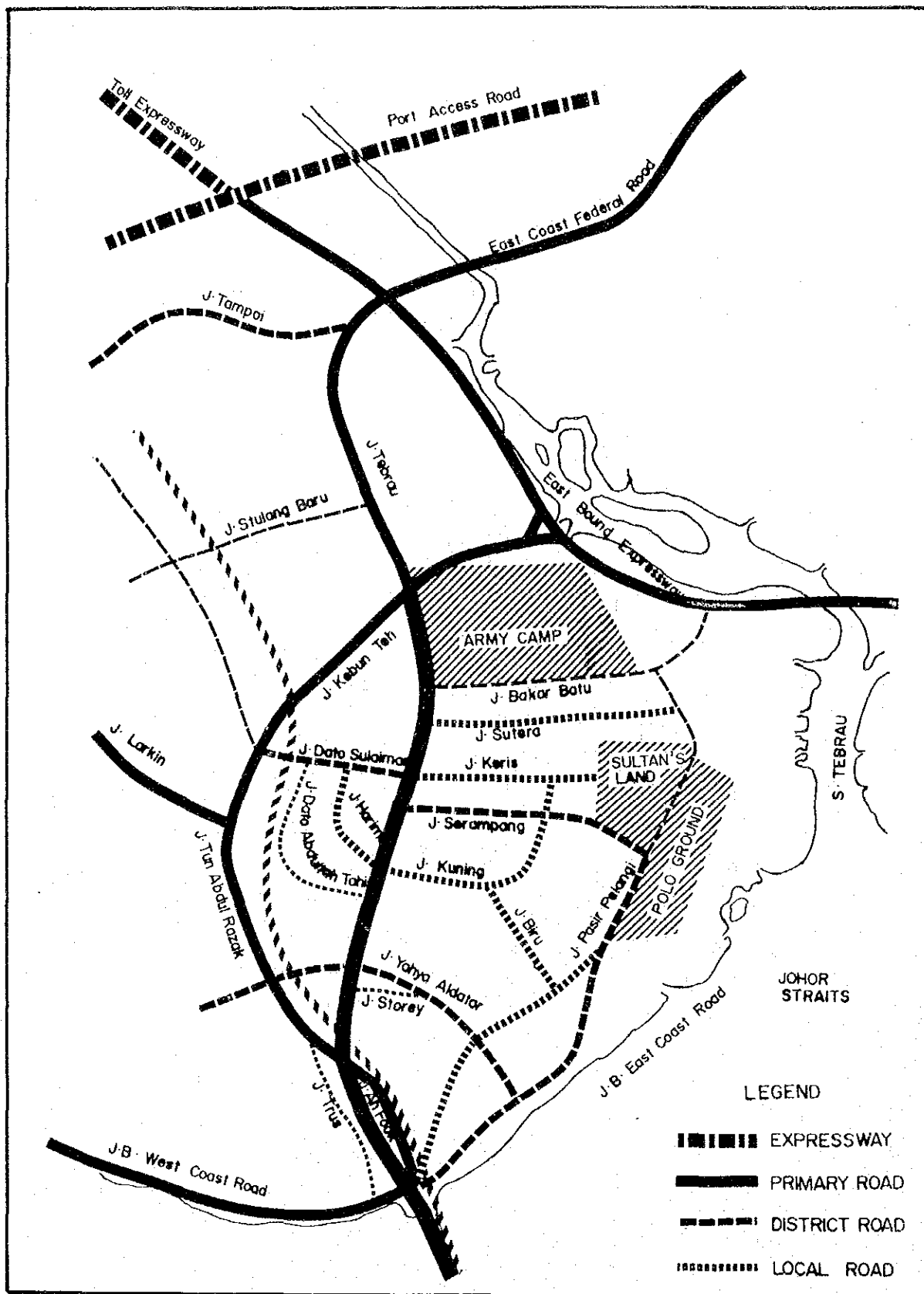


Fig. C.4 Alternative Schemes for J.B. Eastern Sector-Scheme 4



PRELIMINARY STUDY OF SENAI - ULU TIRAM ROAD

1. Brief Description of the Project

The proposed road is to connect Senai on the west to Ulu Tiram in the east. This linkage will be of about 21 km in length and divided into 4 sections as shown in Fig. D.1. Section 1 which is about 1.4 km in length is the existing Airport Access Road and as this road is newly completed, no improvement is necessary. Section 2 which is 4.94 km in length is part of the Seelong - Maju Jaya Road. At present this road is to be built up to the laterite surface only, and hence improvement is necessary. Section 3 which is 4.02 km in length is at present non-existent. It is proposed that this road be newly constructed by cutting through the oil palm estate. Section 4 is the existing Ulu Tiram - Ulu Tebrau road which is 10.5 km long. This road needs to be improved, since certain stretches are in need of repairs.

2. Socio-Economic Input

Socio-economic data used are mainly from the Johor Bahru Urban Transport Masterplan Study and are as listed below:

3. Population

Table D.1 Population Distribution in 1981 - 2000

Year	Population
1980	55,350
1990	63,624
2000	76,340

4. Employment

Table D.2 Employment Distribution

Year	Primary	Secondary	Tertiary	Total
1980	18,039	2,388	2,961	23,388
1990	19,379	3,751	3,351	26,481
2000	20,860	8,750	4,820	34,480

5. Vehicle Ownership

Table D.3 Vehicle Ownership Pattern

Year	Car	Motorcycle	Good Vehicle	Total
1980	2,904	7,210	572	10,686
1990	5,940	10,532	1,134	17,606
2000	10,581	24,007	1,914	36,502

6. Traffic Volume

Traffic volume using the route, by section, obtained from the traffic count survey and by traffic assignment is as tabulated below:

Table D.4 Traffic Volume

Section	Volume by Traffic Count Survey (12 hrs count)	Volume by Traffic Assignment		Growth (%)
		1981	2000	
1	2.4	4.7	19.8	7.9
2	0.8	2.2	10.2	8.3
3	non-existence	2.4	10.2	7.9
4	0.7	3.1	12.4	7.7

7. Geometric Design Standard

The Malaysian Design Standard is adopted for this proposed road and the Geometric Design Standard is as shown below:

Fig. D.1 Proposed Road by Section

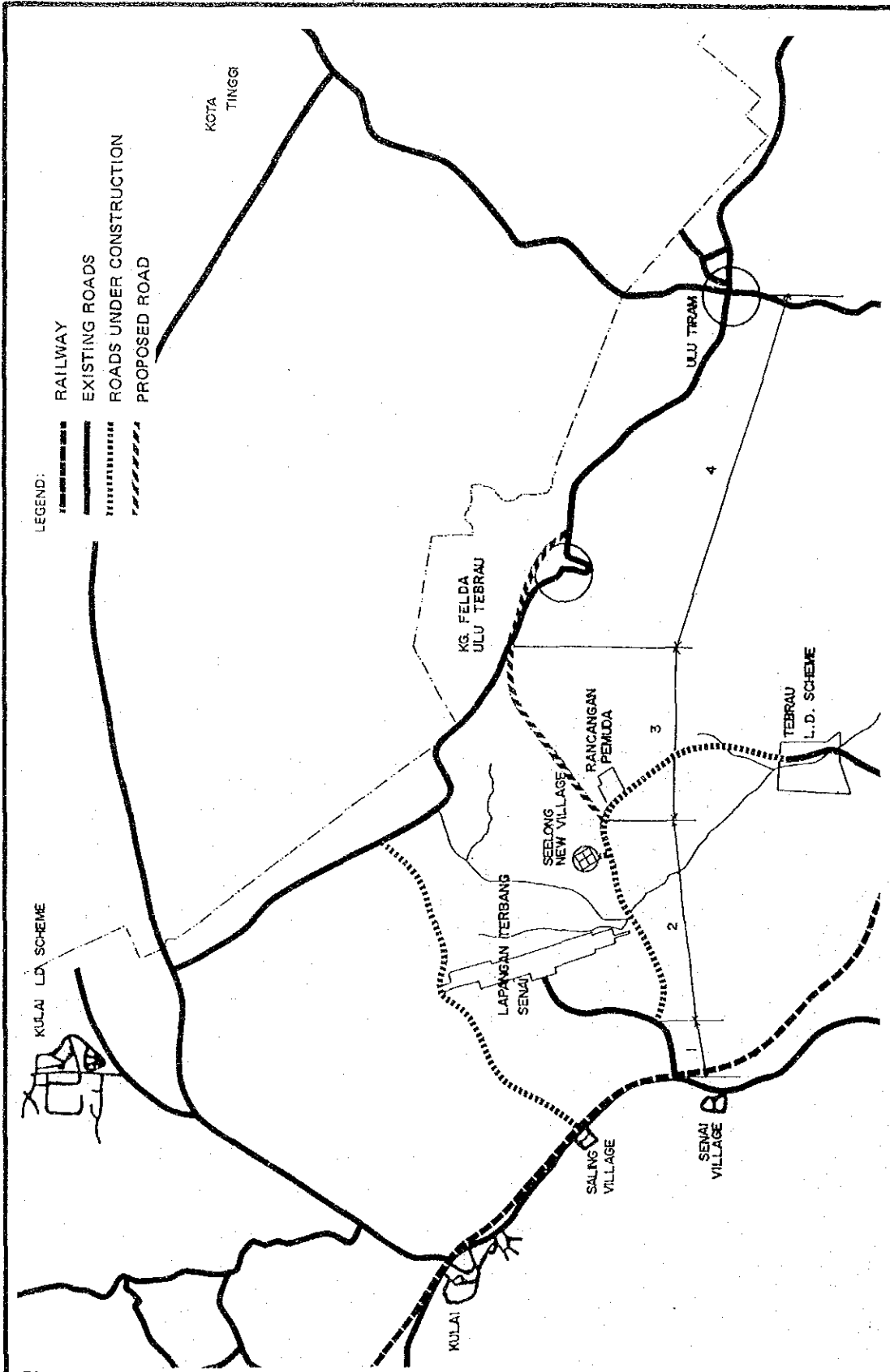


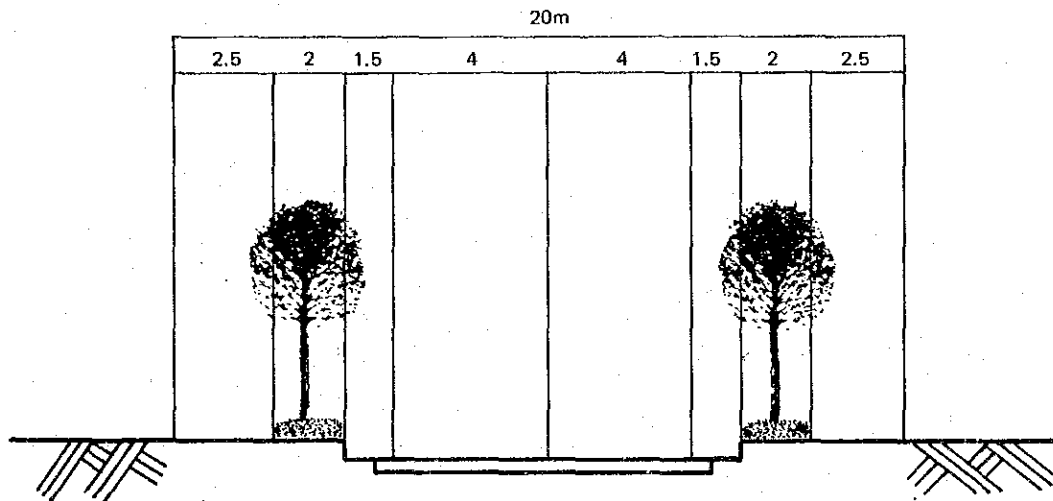
Table D.5 Design Standard

Items	Unit	Description
Adopted Group	-	02
Design Vehicles	-	All Vehicle
Design Speed	Km.p.h.	40
Carriageway Width	m	7.5
Shoulder Width	m	1.5

8. Preliminary Design

The Malaysian Geometric Design Criteria is adopted for this route and the typical cross-section is as shown below:

Fig. D.2 Malaysian Typical Geometrical Design of Roads



9. Project Cost Estimates

As described earlier, the Senai - Ulu Tiram road is divided into 4 sections.

However, for economic evaluation purposes, estimated costs are only for constructing section (3) and paving section (2). The summary of project cost estimates are as shown in the Table below:

Table D.6 Summary of Project Cost Estimates

Section	Construction Cost							Row Cost	Project Cost			
	Road	Structure	Inter-change	F.C.	L.C.	Tax	Total		F.C.	L.C.	Tax	Total
1	Existing Airport Access Road											
2	2.27	--	--	0.86	1.30	0.11	2.27	--	0.86	1.30	0.11	2.27
3	3.58	0.81	0.044	1.84	2.37	0.22	4.43	0.81	1.84	3.18	0.22	5.24
4	Existing Ulu Tiram - Pelda Ulu Tebrau Road											
Total Project Cost											7.51	

10. Annual Maintenance Cost

After some discussion with the J.K.R. it was estimated that the cost of maintaining a similar road would be about M\$6,250.00 per kilometer.

11. Economic Evaluation

For project appraisal, three types of economic indicators are used:

- a. Internal Rate of Return (IRR)
- b. Net Present Value (NPV)
- c. Benefit Cost (B/C) Ratio

To obtain the economic indicator, the following conditions are assumed:

1. Project Life of 20 years
2. Opening year for Traffic - 1986
3. Opportunity Cost of Capital - 12%

The result of the economic evaluation is as listed below, and it shows that the proposed project is feasible.

Discounted Benefits	=	\$11,670,219
Discounted Cost	=	\$ 6,086,476
B/C Ratio	=	1.92%
Net Present Value	=	\$ 5,583,743
IRR	=	23.3%

12. Sensitivity Analysis

The sensitivity analysis of the project is made by

postulating a change in the following conditions:

1. Increase in Project Cost
2. Decrease in Project Benefit
3. Increase in the Project Cost and a Decrease in the Project Benefit
4. Shortening of Project Life

Table D.7 Result of Sensitivity Analysis

Condition	B/C Ratio	NPV M\$ ('000)	IRR (%)
1. Original Results	1.92	5,584	23.3
2. 20% Cost Increase	1.60	4,393	19.0
3. 20% Benefit Decrease	1.53	3,250	18.9
4. 20% Cost Increase 20% Benefit Decrease	1.28	2,059	16.0
5. Project Life 15 Years	1.57	3,463	21.5

PRELIMINARY STUDY FOR THE WIDENING OF JALAN TEBRAU

1. Introduction

Jalan Tebrau is part of the East Coast Federal Route which links Johor Bahru with the east coast area of Johor as an arterial road.

The importance of this road is increasing year by year with the rapid development of housing schemes along the road as well as the industrial and housing developments in the Pasir Gudang area.

In addition to these various development programmes, the Port Access and the Toll Expressway are expected to be completed in 1983 and 1986 respectively; thus the importance of the road will further increase.

Jalan Tebrau is a single carriageway, while the existing traffic volume is about 30,000 p.c.u/day. Thus, the demand is nearing full capacity and traffic jams can sometimes be observed.

To cope with this situation and to meet the future demand, an engineering study for this widening is now being undertaken by J.K.R.

Hence this paper aims to examine the economic viability of the project which is "Widening of Jalan Tebrau to a 6-lane road".

The section to be widened is:

Interchange with Jalan Tun Abdul Razak

Interchange with the Port Access

The location of the project road is shown in Fig. E.1.

2. Widening Plan and Construction Cost

The outline of the widening plan is as follows:

Project Road Length : 10.45 kilometers

No. of Lanes : 6 lanes

Typical Cross-Section: Refer to Fig. E.2

Fig. E.1 Location Map of Project Road

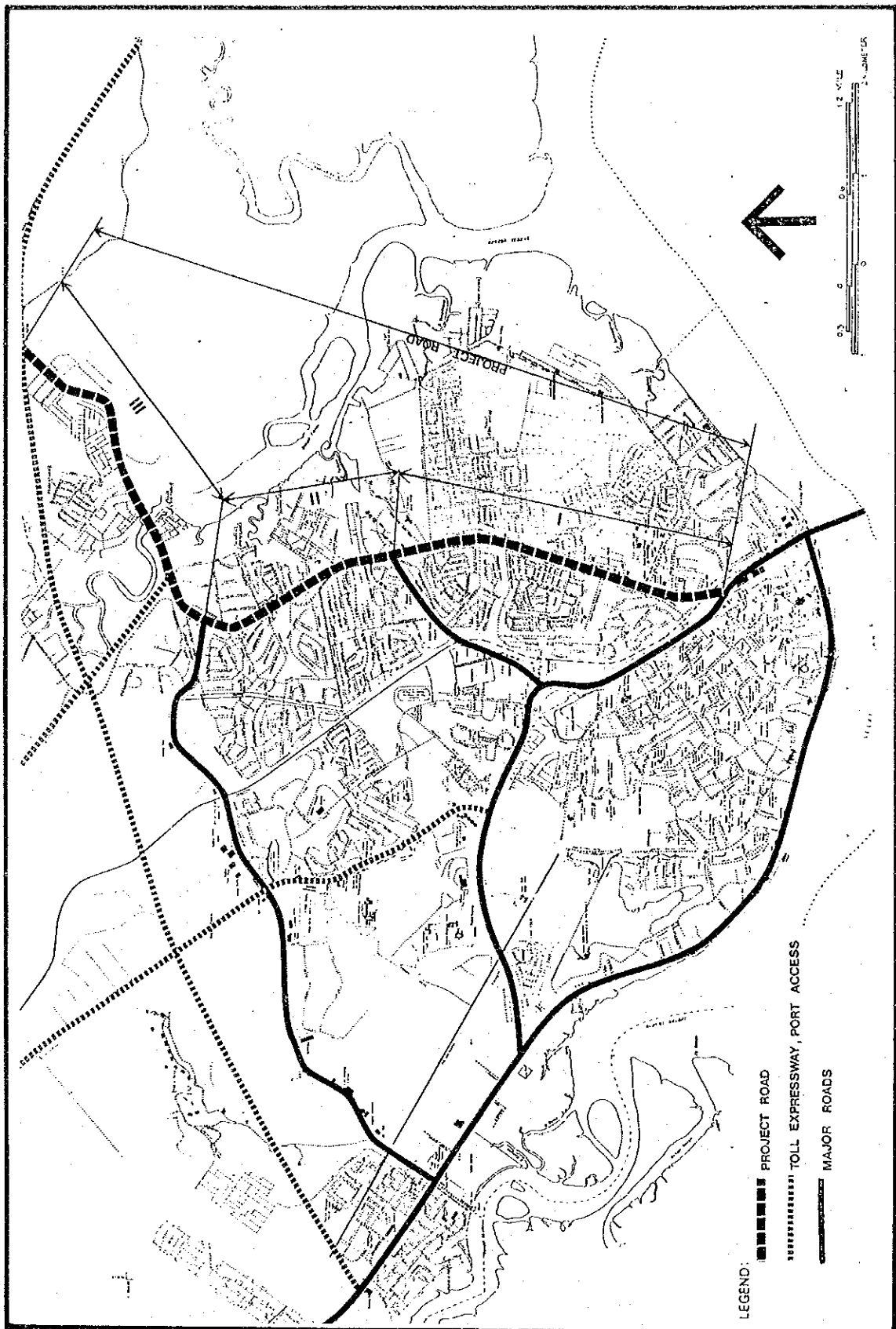
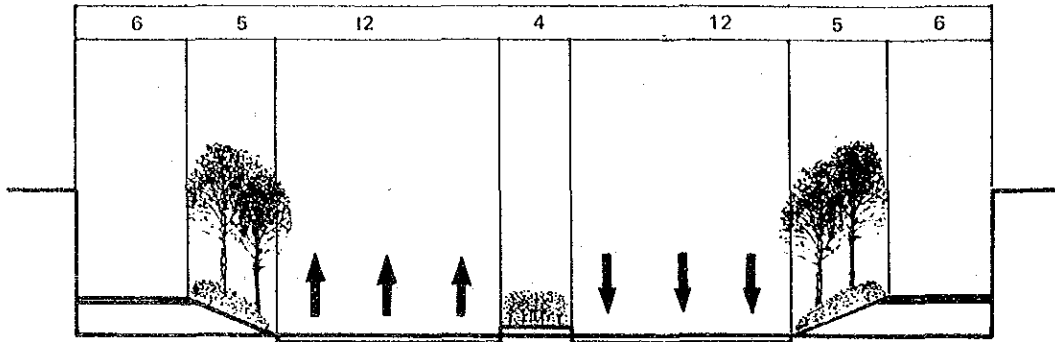


Fig. E.2 Typical Cross-Section

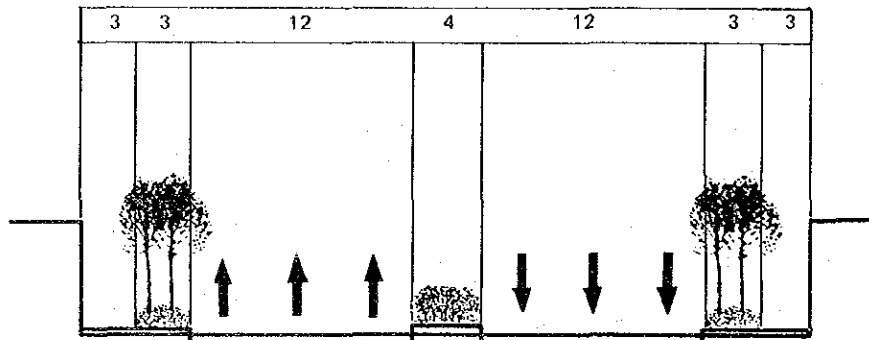
FEDERAL RD NO. 1—JLN BAKAR BATU

50m



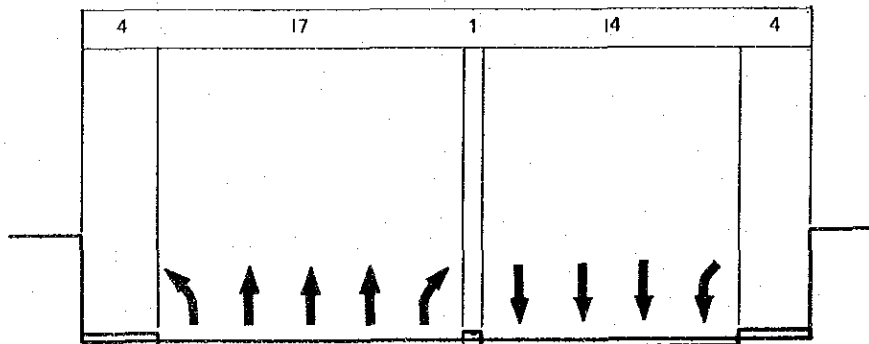
JLN BAKAR BATU – PORT ACCESS ROAD

40m



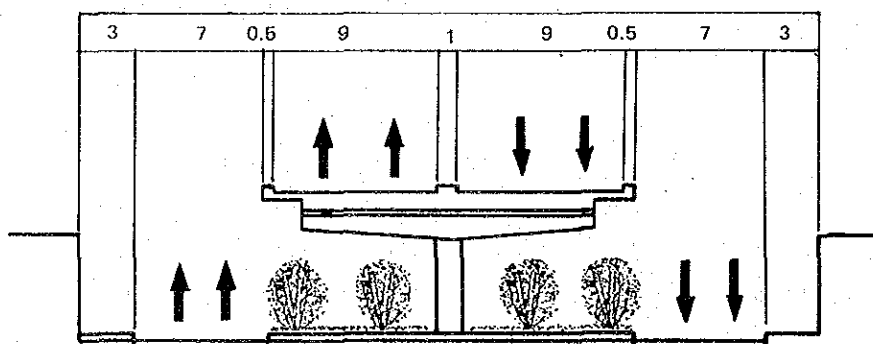
INTERSECTION

40m



INTERCHANGE

40m



Based on the plan, the construction cost was estimated for the two cases: widening from 2 lanes to 4 lanes, and widening from 2 lanes to 6 lanes as shown in Table E.1.

Table E.1 Cost Estimates -- (in M\$ Million at 1981 Prices)

Contents of Widening	Construction Cost
From 2 lanes to 4 lanes	39.35
From 2 lanes to 6 lanes	53.37

Note: For more detail, refer to the Technical Report "Cost Estimation".

In this working paper, the economic evaluation is made for the case in which Jalan Tebrau is widened from 4 lanes to 6 lanes.

Accordingly, the project cost for the widening from 4 lanes to 6 lanes is regarded as the difference of the above costs: namely

Project Cost : \$14.02 million

3. Effects of the Project

In order to classify the effects desired of the project, the assignment of traffic demand in 1980 was made for the following road networks.

1. Base Network

Base network consists of the existing roads and the committed road projects. In this case, Jalan Tebrau is regarded as a 4-lane road for the section from the junction with Jalan Tun Abdul Razak to the interchange with the Port Access Road.

2. Network with Widened Tebrau

In this case, Jalan Tebrau is regarded as a 6-lane road for the corresponding section. Other roads are exactly the same as the base case.

It can be seen from the figures that the widening of Jalan Tebrau concentrates traffic flow more on Jalan Tebrau, and that the traffic volumes on the minor district roads such as Jalan Yahy Awal are reduced.

These changes in traffic flow pattern indicate the following:

1. The traffic demand for Jalan Tebrau is considerably high.
2. In the base network case, some traffic penetrates minor roads to reduce travel time since the primary roads including Jalan Tebrau are congested.

To understand the effect of the project on the traffic flow as a whole, the total vehicle-kilometers and the total vehicle-hours were calculated for each case.

**Table E.2 Vehicle-Kilometers in 1990
(1000 vehicle kms)**

	MPJB	Other Area	Total
Base Network	3,971.5	7,427.1	11,398.6
Network with widened Tebrau	3,953.2	7,636.3	11,589.5

Table E.3 Vehicle - Hours (1000 vehicle hrs)

Base Network	289.4
Network with widened Tebrau	247.2

(Note: Local and Access Roads are excluded)

Compared with the base network case, the total vehicle hours is expected to decrease while the total vehicle kilometers has slightly increased due to the widening of Jalan Tebrau.

4. Preliminary Economic Evaluation

In the project evaluation, the following assumptions were made:

1. The project will be completed by the end of 1984, and then service for traffic is started at the beginning of 1985.
2. The project life is assumed to be 15 years.
3. For maintenance purposes, overlay is provided every 5 years after completion.
4. The annual benefit increases at a constant growth rate for the years 1985 - 1990 and remains at constant value after the year 1990, since the travel speed becomes unstable and the traffic volume approaches full capacity.
5. Annual discount rate is assumed to be 12%.

Based on the above assumptions, the benefit and cost stream is as shown in Table E.4.

The calculation results of the indicators for the project evaluation are shown in Table E.5.

Table E.4 Benefit and Cost Stream
(M\$'000 at 1981 Prices)

Year	Project Cost	Benefit
1983	10,500	
1984	3,500	
1986		7,104
1987		8,342
1988		9,796
1989	1,670	13,509
1990		15,863
1991		15,863
1992		15,863
1993		15,863
1994	1,670	15,863
1995		15,863
1996		15,863
1997		15,863
1998		15,863
1999	1,670	15,863

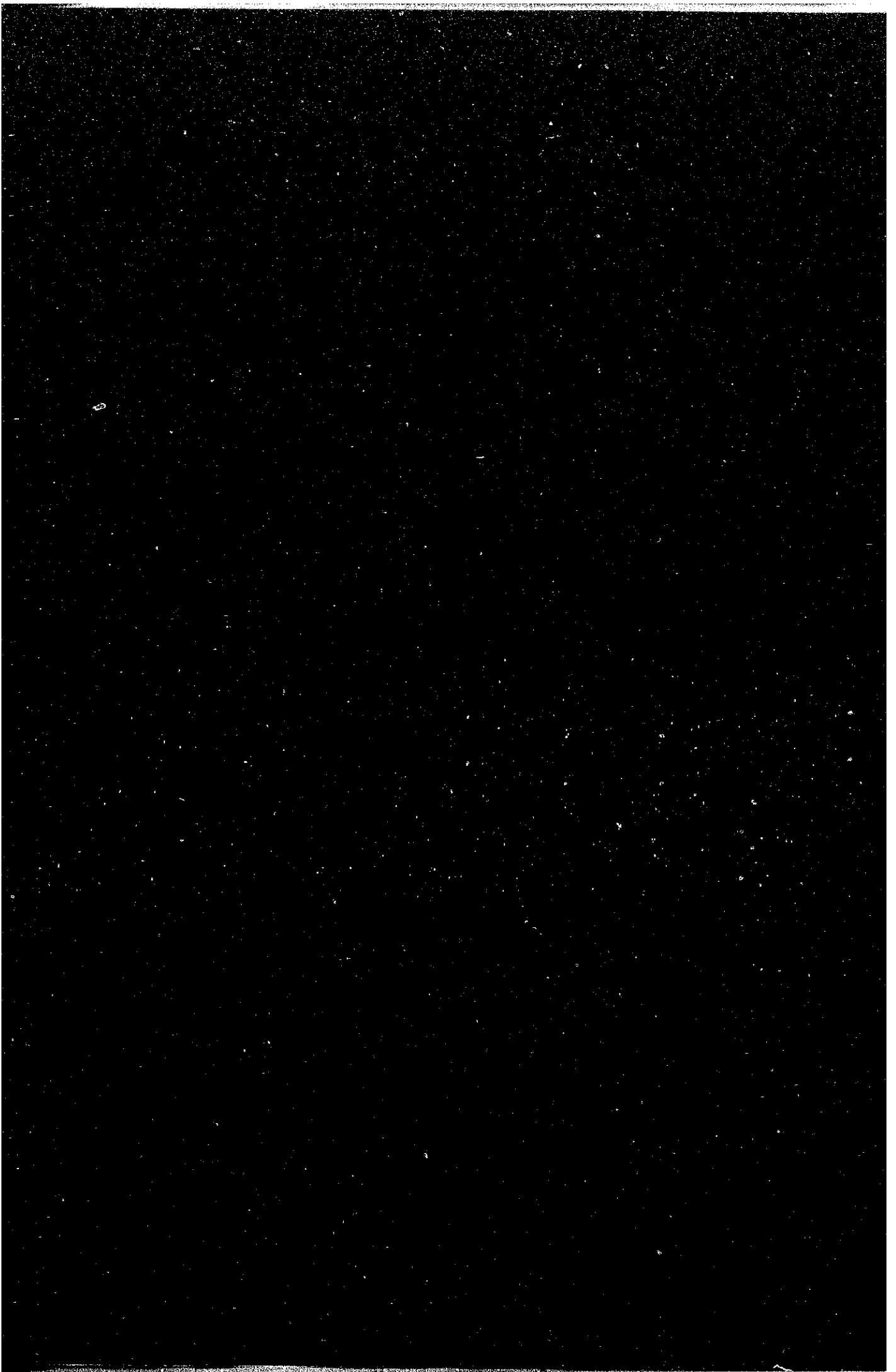
Table E.5 Project Evaluation
(in 1981 Prices)

Discounted Benefit (M\$'000)	61,070
Discounted Cost (M\$'000)	12,150
Net Present Value (M\$'000)	48,920
B/C Ratio	5.0
Internal Rate of Return	50.0%

As shown above, the project is economically justified.

6. Conclusion and Recommendations

1. It is found that the project "Widening of Jalan Tebrau into a Six-Lane Road" is economically feasible.
2. Accordingly, it is recommended that the project be implemented immediately.
3. After the completion of the project, it is recommended that an exclusive bus lane be introduced to promote the development of public transport.
4. Even if the project is implemented, the traffic demand is expected to exceed the capacity expanded by the project in the early 1990's. Additional road construction such as a coastal road, therefore, will be required to disperse the traffic.
5. With traffic growth, the urban environment might be aggravated. It is recommended that sufficient space for sidewalk and crossing facilities for pedestrians be provided and that adequate counter-measures for public nuisance be taken.



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