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REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS

THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

KABUPATEN REPORT 10

KABUPATEN KAPUAS

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

This is the Kabupaten Report of the Feasibility Study of the Local Road Development in the Republic of Indonesia for Kabupaten Kapuas in Kalimantan Tengah Province. The report has been prepared by the Study Team of the Japan International Cooperation Agency (hereinafter called JICA).

Based upon a request from the Government of Indonesia, the Government of Japan arranged for JICA to conduct the Study and JICA accordingly organized a Study Team. The study was carried out using data which were generally prepared by the Kabupaten, routed through the province, under the instructions of Bina Marga of the Ministry of Public Works and Bangda of the Ministry of Home Affairs.

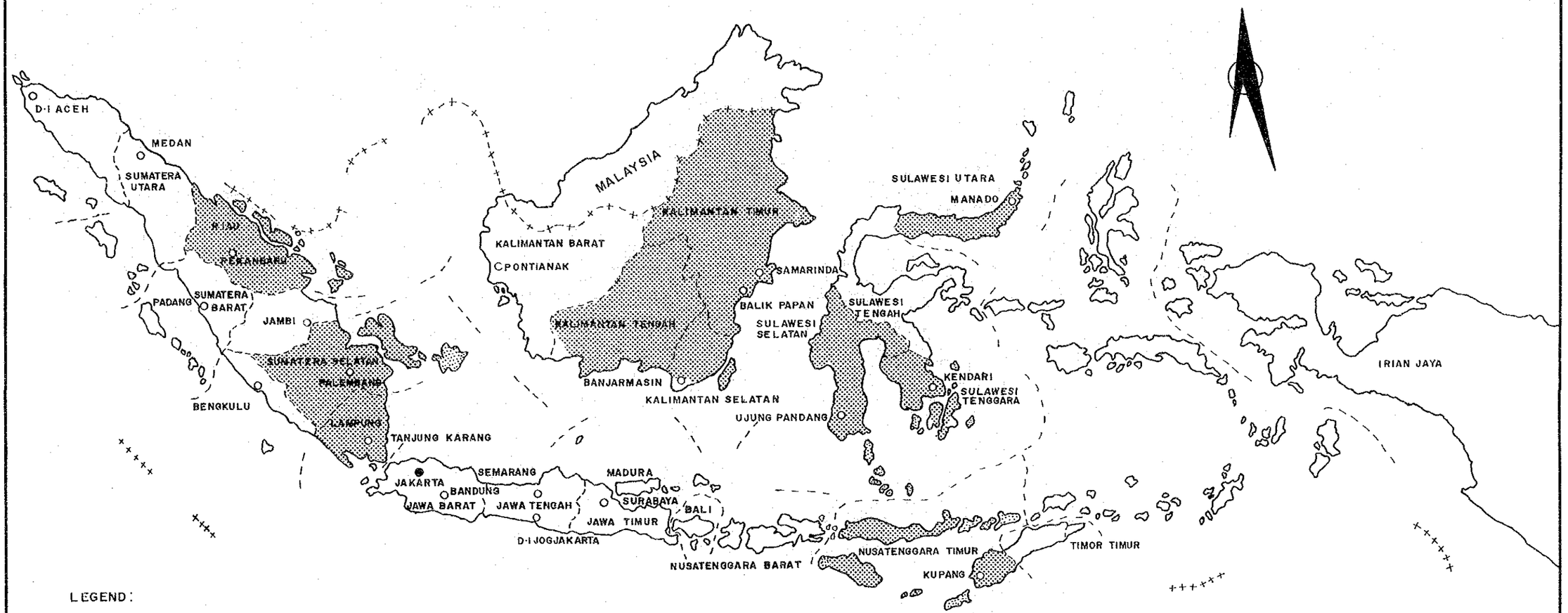
Since the study period was limited, without cooperation of Bina Marga, Bangda and local governments of both province and Kabupaten in collecting the data, the study would not have been completed within the period.

The report consists of the results of the feasibility study and proposed implementation programme of the local road development in the Kabupaten.

The simplified economic feasibility evaluation methodology utilized for the study was established by the Study Team in Phase I Study through a pilot study of seven (7) model Kabupatens, and is described in the Main Report.

The purpose of the study for the Kabupaten is mainly to estimate the total Project Cost for the local road development but only limited data is available for study base. Therefore a detailed survey and design for the improvement of the Kabupaten roads should be carried out before commencing the Project together with a review of this report.

LOCATION MAP OF THE PROJECT AREAS



IV · PROPINSI KALIMANTAN TENGAH
- 09 · KAB · KOTA WARINGIN TIMUR
- 10 · KAB · KAPUAS
- 11 · KAB · BARITO SELATAN
- 12 · KAB · BARITO UTARA

V · PROPINSI KALIMANTAN TIMUR
- 13 · KAB · PASIR
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VI · PROPINSI KALIMANTAN SELATAN
- 17 · KAB · TANAH LAUT
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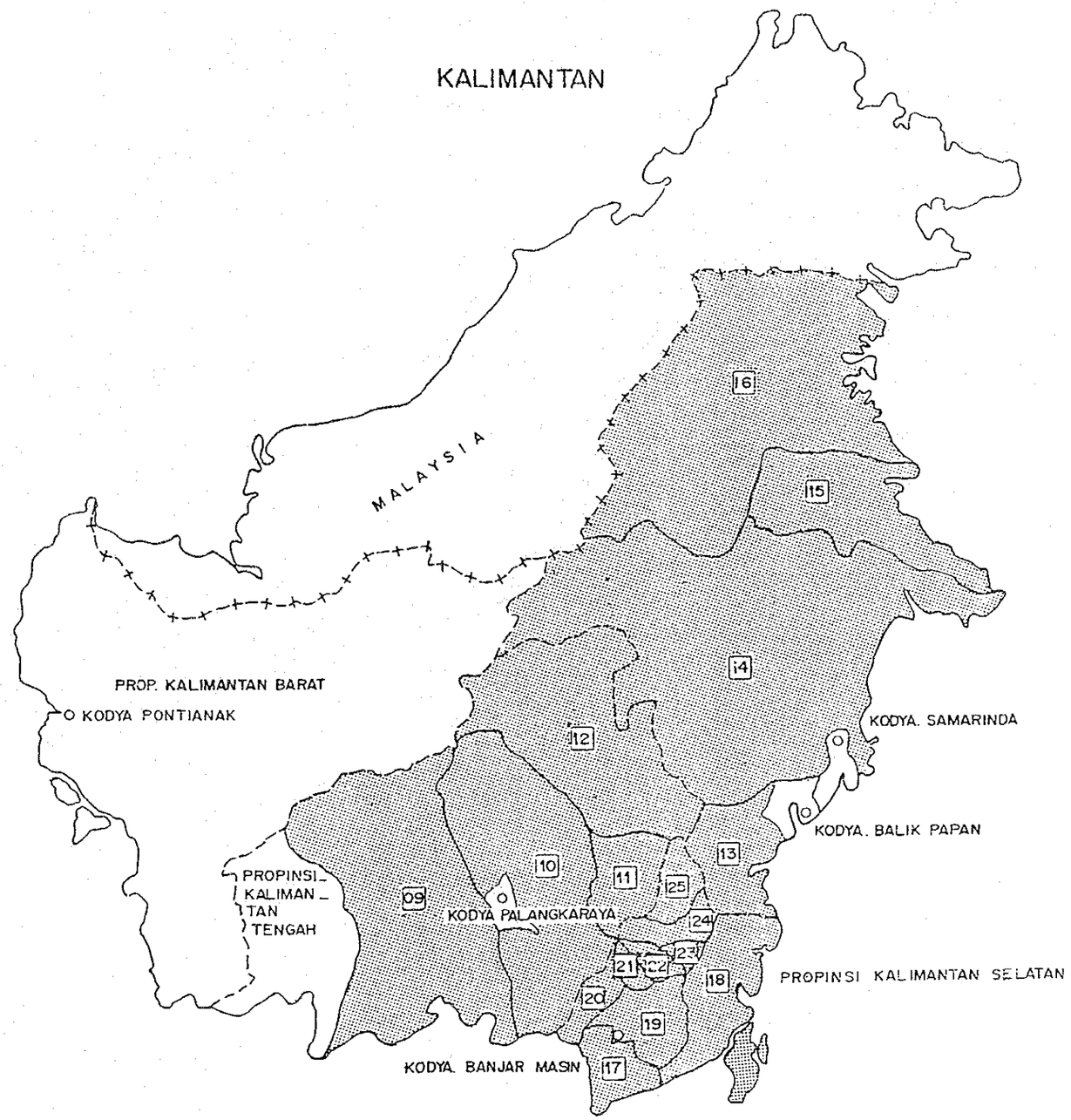
- 20 · KAB · BARITO KUALA
- 21 · KAB · TAPIN
- 22 · KAB · HULU SUNGAI SELATAN
- 23 · KAB · HULU SUNGAI TENGAH
- 24 · KAB · HULU SUNGAI UTARA
- 25 · KAB · TABALONG



LEGEND :
- −+−+ NATIONAL BOUNDARY
- ---- PROVINCIAL BOUNDARY
- LOCATION OF THE PROPOSED AREA

SCALE :

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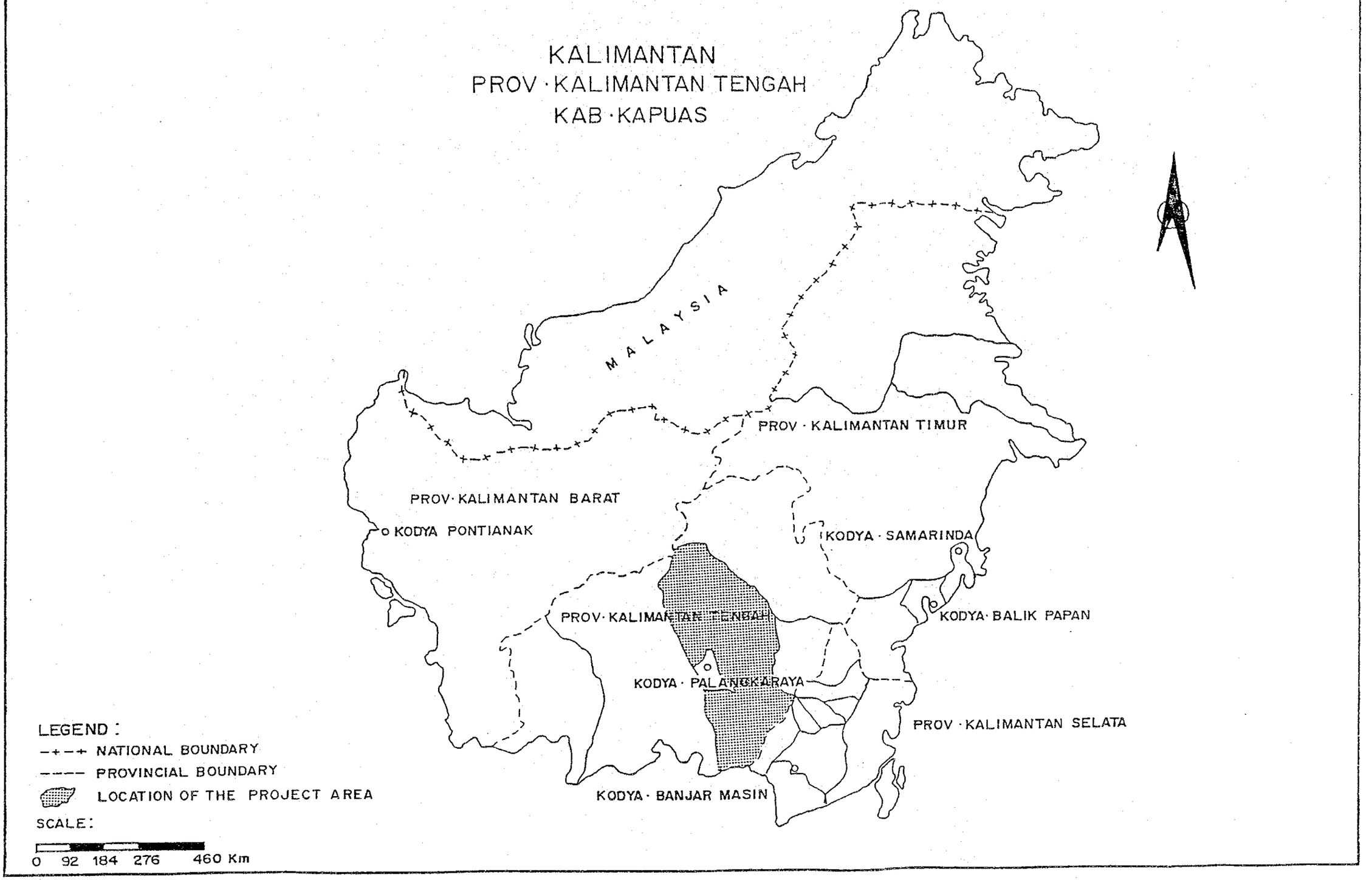
KALIMANTAN
PROV · KALIMANTAN TENGAH
KAB · KAPUAS
MALAYSIA
PROV · KALIMANTAN TIMUR
PROV · KALIMANTAN BARAT
KODYA PONTIANAK
KODYA · SAMARINDA
PROV · KALIMANTAR TENGAH
KODYA · BALIK PAPAN
KODYA · PALANGKARAYA
PROV · KALIMANTAN SELATA
KODYA · BANJAR MASIN
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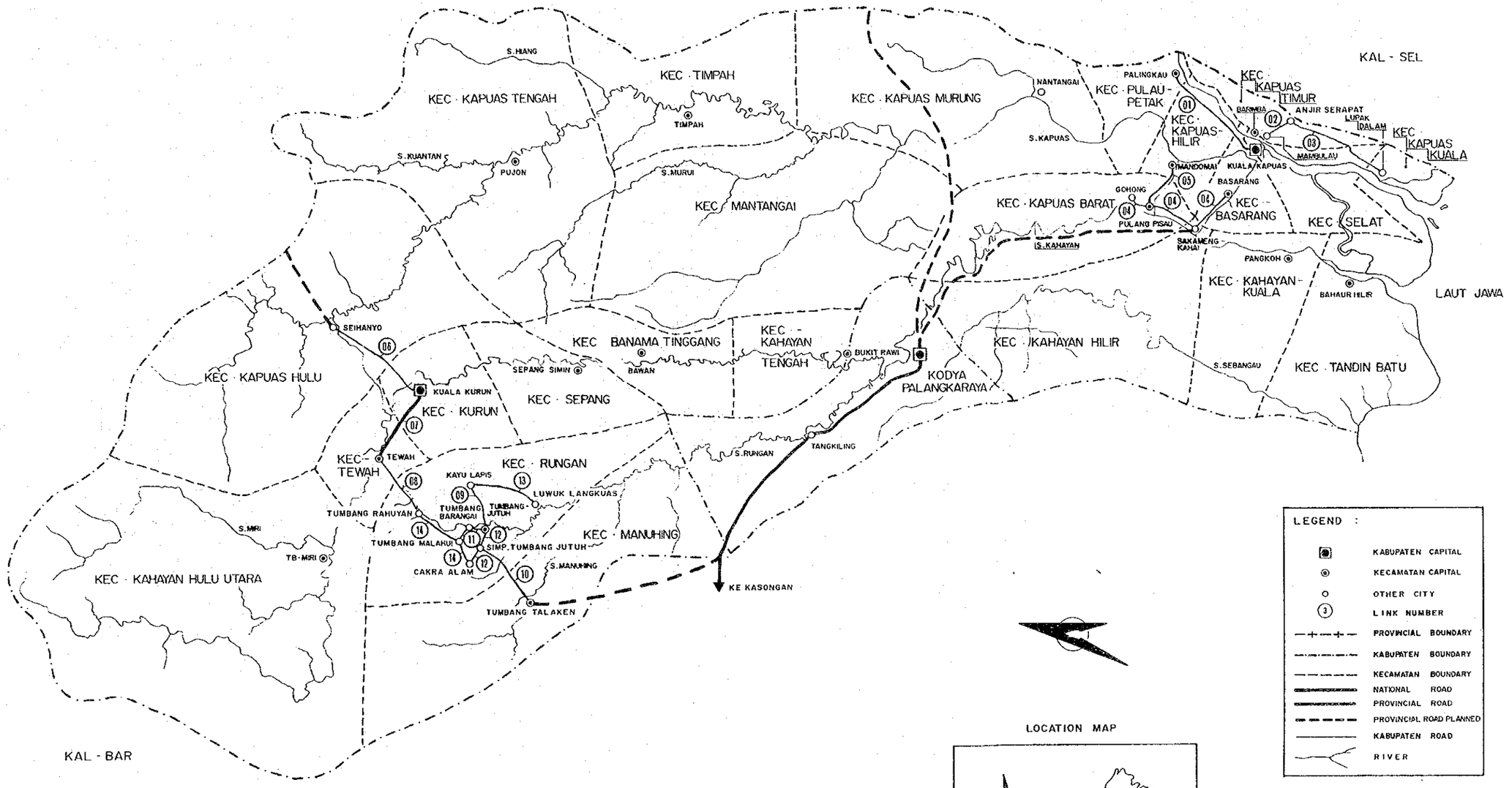
LOCATION OF THE PROJECT AREA
SCALE:
0 92 184 276 460 Km

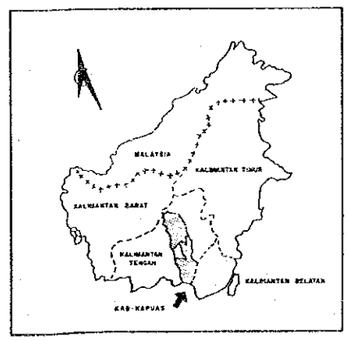
KAB · KAPUAS



SCALE :

0 10 20 30 Km

LOCATION MAP



LEGEND :

- KABUPATEN CAPITAL
- KECAMATAN CAPITAL
- OTHER CITY
- LINK NUMBER
- PROVINCIAL BOUNDARY
- KABUPATEN BOUNDARY
- KECAMATAN BOUNDARY
- NATIONAL ROAD
- PROVINCIAL ROAD
- PROVINCIAL ROAD PLANNED
- KABUPATEN ROAD
- RIVER

THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

TITLE : ROAD LINK MAP

SOURCE :	SCALE :	PROVINCE : KALIMANTAN TENGAH
DIREKTORAT JENDERAL AGRARIA	AS SHOWN	KABUPATEN : KAPUAS

C O N T E N T S

Chapter 1 BACKGROUND OF THE KABUPATEN

1.1 Topographic and Meteorological Conditions

1.1.1 Location and Topography

Kabupaten Kapuas administratively consists of two Kabupatens i.e. Kabupaten Kapuas itself and the mandatory Kabupaten Kahayan Hulu. Kabupaten Kapuas is located in the southeast of Kalimantan Tengah. On the north it is bordered by Kabupaten Kahayan Hulu. Palangkaraya City, the capital of the province, stands on the boundary between these two Kabupatens. Both these Kabuaptens shall be studied as one, namely Kabupaten Kapuas.

On the south Kabupaten Kapuas faces the Jawa sea, while it is bordered on the southeast by Kalimantan Selatan Province. On the east, northeast, north and west the two Kabupatens are bordered by Kabupaten Barito Selatan, Barito Utara, Murung Raya and Katingan respectively.

Two main rivers, the Kapuas and the Kahayan flow in parallel from the north to the south through the Kabupatens, and the Rungan River meets the Kahayan River at Palangkaraya. Numerous branches of these rivers spread throughout the whole areea of the Kabupatens. There are undulating hills covered by tropical forests in the area north from Palangkaraya while south from Palangkaraya is entirely a low swamps area.

The total area of both the Kabupaten is about 34,800 square kilometers, approximately 23 percent of the total of Kalimantan Tengah Province. They consists administratively of 23 Kecamatans in all.

1.1.2 Meteorological Conditions

The average number of rainy days and the average amount of yearly rainfall in Kabupaten Kapuas are 134 days and 3,282 mm respectively.

One year in the Kabupaten consists of a rainy season and a dry season. The dry season is in general from May through October. However this is variable as Table 1-1-1 shows.

The number of working days per year, which is necessary for planning the construction schedule in chapter 6, is estimated at 240 days using the following formula based upon the data shown in the table referred to above.

$$\text{Working Days} = 365 - \text{Holidays} - \text{Rainy Days} + \left(\text{Rainy Days} \times \frac{\text{Holiday}}{365}\right) + (0.10 \times \text{Rainy Days})$$

Where :

- Holidays consist of 52 Sundays and 13 national holidays; and
- 10% of rainy days are assumed to be workable days.

Table 1-1-1

METEOROLOGICAL CONDITIONS

PROVINCE : Kalimantan Tengah
KABUPATEN : Kapuas STATION : Kuala Kurun

MONTH	1980		1981		1982		1983		1984	
	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)
January			12	255	13	331	16	333		
February			12	305	15	109	13	495		
March			10	210	21	444	10	456		
April			17	427	15	389	4	28		
May			7	425	14	243	19	254		
June			-	-	8	153	15	487		
July			-	-	1	24	9	381		
August			4	180	3	58	11	348		
September			14	342	6	110	7	247		
October			13	342	3	38	7	235		
November			20	360	11	321	11	331		
December			22	445	21	427	10	315		
Total	-	-	131	3,291	131	2,644	141	3,910	-	-

1.2 Socio-Economic Conditions

1.2.1 Population

The population of Kabupaten Kapuas in 1982 was 369,172 which was approximately 35.7% of the 1,021,400 total population of Kalimantan Tengah Province as shown in Table 1-2-1.

The population density of the Kabupaten was 0.10 persons per ha and indicates the underpopulation of the Kabupaten, even though the Kabupaten density was higher than the provincial density of 0.07.

The recent annual average growth rate of population of the Kabupaten is 6.0% which is higher than both the provincial rate of 3.4% and the national rate of 2.2%. This may be due to the fact that the Kabupaten accepts the largest transmigration programme in the province.

The population of each Kecamatan and its proportion to the Kabupaten population is shown in Table 1-2-2.

Table 1-2-1 POPULATION BY KABUPATEN

DESCRIPTION	POPULATION	AAGR (%)	AREA (ha)	POPULATION DENSITY (persons/ha)	SURVEY YEAR
KABUPATEN:					
KOTAWARINGIN TIMUR	293,800	3.3	5,070,000	0.06	1984
KAPUAS	364,172	6·0	3,480,000	0·10	1982
BARITO SELATAN	125,014	1·0	1,290,000	0.10	1983
BARITO UTARA	126,398	1.6	3,200,000	0.04	1984
PROVINCE:					
KALIMANTAN TENGAH	1,021,400		15,260,000		1982
	1,054,600	3.4	15,260,000	0.07	1983
	1,088,700		15,260,000		1984
JAWA IS.(Excluding DKI JAKARTA)	91,126,900	1.7	13,159,700	6.92	-
INDONESIA	161,579,500	2·2	191,944,300	0·84	-

Notes :

1. Sources:

   Kabupaten; Kabupaten concerned with the study

   Province ; *Jawa and Indonesia:*

   Statistical yearbook of Indonesia 1984, published by the Central Statistics Bureau.

2. AAGR ; Average Annual Growth Rate.

Table 1-2-2 POPULATION BY KECAMATAN

Year : 1982

PROVINCE : KALIMANTAN TENGAH

KABUPATEN : KAPUAS

KECAMATAN	POPULATION	PROPORTION (%)
SELAT	54,056	14.8
KAPUAS HILIR	12,846	3.5
KAPUAS TIMUR	20,187	5.5
KAPUAS KUALA	28,566	7.8
KAPUAS BARAT	15,574	4.3
PULAU PETAK	22,026	6.0
KAPUAS MURUNG	16,799	4.6
BASARANG	15,657	4.3
MANTANGAI	15,570	4.3
TIMPAH	5,003	1.4
KAPUAS TENGAH	11,259	3.1
KAHAYAN HILIR	21,690	6.0
PANDIH BATU	41,625	11.5
KAHAYAN KUALA	13,759	3.8
KAHAYAN TENGAH	5,027	1.4
BANAMA TINGANG	6,397	1.8
MANUHING	5,273	1.4
RUNGAN	11,913	3.3
SEPANG	5,686	1.6
KURUN	8,100	2.2
TEWAH	8,052	2.2
KAPUAS HULU	10,611	2.9
KAHAYAN HULU UTARA	8,496	2.3
TOTAL	364,172	100

1.2.2 Land Use

In Kabupaten Kapuas, 831,754 ha of the current available land use area, which is approximately 23.9% of the 3,480,000 ha total area of the Kabupaten, is used for living purposes and for industrial activity of the inhabitants of the Kabupaten. It is the total value of columns (1) through (6) in Table 1-2-3.

The current available land use area consists of 831,754 ha of agricultural harvest area only according to the survey data. However there are necessarily residential areas and other open space included.

The agricultural harvest area consists of 179,054 ha of paddy field and 652,700 ha of other cultivated area which are 21.5% and 78.5% of the agricultural harvest area respectively.

It can be realized from the land use that the main industrial production in the Kabupaten is food crops, especially paddy.

Table 1-2-3 LAND USE

PROVINCE : KALIMANTAN TENGAH

(ha)

KABUPATEN	WET PADDY FIELD	UPLAND PADDY FIELD	OTHER GUL-TIVATED AREA	PLANTATION AREA	RESIDENTIAL AREA	USABLE OPEN SPACE	RIVER & LAKE	FORESTRY AREA	OTHERS	TOTAL AREA	SURVEY YEAR
KOTAWARINGIN TIMUR	5,760 (0 7)	-	69,930 (8 3)	42,630 (5 1)	3,370 (0 4)	-	23,820 (2 8)	699,500 (82 8)	-	844,710 (100)	1984
KAPUAS	179,054 (5.1)		652,700 (18.8)	-	-	-	10,380 (0.3)	2,101,600 (60.4)	536,266 (15.4)	3,480,000 (100)	1982
BARITO SELATAN	7,291 (0.6)	6,561 (0.5)	106,265 (8.2)	45,299 (3.5)	13,364 (1.0)	156,000 (12.1)	285,060 (22.1)	498,599 (38.6)	171,598 (13.3)	1,290,000 (100)	1983
BARITO UTARA	2,503 (0.1)	21,110 (0.7)	243,354 (7.6)	17,984 (0.6)	912 (0.03)	-	2,670 (0.1)	2,715,717 (84.9)	172,801 (5.4)	3,200,000 (100)	1984

Notes :

1. The value in ( ) denotes the proportion
2. Source ; kabupaten concerned with the study

1.2.3 Agriculture

The cultivated area and food crop production in Kabupaten Kapuas in 1982 were 76,952 ha and 160,051 ton respectively as shown in Table 1-2-4. Of food crops, the area and production of paddy which consists of wet paddy and upland paddy was 74,067 ha and 135,809 ton respectively which are 96.3% and 84.8% of the total food crops. The yield rate of paddy production is 1.83 ton per ha. Thus, paddy is the most predominant agricultural crop of the Kabupaten.

As the table shows, average annual growth rates of area and production of paddy in 1979 through 1982 were 6.0% and 0.5% respectively which show an unfavourable development of paddy production. At present the productivity of paddy is not being improved due to the poor market restricted both geographically and by the transportation system. Thus, it is desirable that productivity of paddy becomes higher and this depends upon raising the inhabitants will to produce through the development of the transportation system.

The population of the agricultural sector which is assumed from the employment in the Kabupaten is 90% of the total population as shown in Table 1-2-6. Thus it is an agricultural Kabupaten.

Future agricultural development will be needed to improve the productivity of paddy production with encouragement of transmigration programmes and also to promote plantations commodity crops.

Table 1-2-4 AREA AND PRODUCTION OF FOOD CROPS

KABUPATEN : KAPUAS

CULTIVATED AREA

(ha)

ITEM	YEAR						AAGR
	1979	1980	1981	1982	1983	1984	(%)
PADDY	60,291	62,391	73,827	74,067	-	-	
OTHERS	1,006	1,228	2,203	2,885	-	-	
TOTAL	61,297	63,619	76,030	76,952	-	-	

PRODUCTION

(ton)

ITEM	YEAR						AAGR
	1979	1980	1981	1982	1983	1984	(%)
PADDY	137,743	106,260	130,502	135,809	-	-	
OTHERS	7,148	12,041	18,372	24,242	-	-	
TOTAL	144,891	118,301	148,874	160,051	-	-	

YIELD RATE

(ton/ha)

ITEM	YEAR						AAGR
	1979	1980	1981	1982	1983	1984	(%)
PADDY	2.28	1.70	1.77	1.83	-	-	-5.4

Notes :

1. AAGR : Average annual growth rate
2. Source : Kabupaten concerned with the study

Table 1-2-5 AREA AND PRODUCTION OF PLANTATION CROPS
Year : 1983

PROVINCE : KALIMANTAN TENGAH

KABUPATEN	AREA (ha)	PRODUCTION (ton)	AAGR (%) AREA	AAGR (%) PRODUCTION
KOTAWARINGIN TIMUR	0	0	0	0
KAPUAS	0	0	0	0
BARITO SELATAN	48,245	22,948	13.3	11.0
BARITO UTARA	10,062	1,703	2.6	8.8

Table 1-2-6 POPULATION OF AGRICULTURAL SECTOR

PROVINCE : KALIMANTAN TENGAH

KABUPATEN	AGRICULTURAL SECTOR	TOTAL POPULATION	PROPORTION (%)	AAGR (%)	SURVEY YEAR
KOTAWARINGIN TIMUR	182,000	293,800	61.8	4.0	1984
KAPUAS	328,000	364,172	90.0	5.5	1982
BARITO SELATAN	102,000	125,014	81.7	3.6	1983
BARITO UTARA	66,000	126,398	52.3	2.3	1984

Notes :

1. AAGR : Average annual growth rate
2. Source : Kabupaten concerned with the Study

1.2.4 Other Economic Activities

Central Kalimantan Province has rich forest resources and Kabupaten Kapuas has favorable timber industrial activities. However this is managed by outside investors and therefore only its related transportation services are managed by the local people in Kabupaten Kapuas.

There are no notable industrial activities besides the agricultural and forest industries in Kabupaten Kapuas. The tertiary industry has been promoted by the business activities related to river transportation services such as passenger and cargo boats, fuel and food crops suppliers etc.

1.3 Present Status of kabupaten Roads

1.3.1 Outline of Road Networks

The major transportation system of Kabuapten Kapuas is river transportation consisting of Kapuas River, Kahayan River and Rungan River. It is assumed that almost 100% of the transportation in the Kabupaten is by river except for local transportation.

The national road starts from Kotamadya Palangkaraya (Municipality) to Kabupaten Kitingan and crosses the west part of the Kabuapten. However this road does not serve the inland part of the Kabupaten at the present time. There is an extention plan of the national road from Palangkaraya to Banjarmasin of South Kalimantan Province via Kuala Kapuas, the Kabupaten capital, along the Kahayan river.

However early realization of construction will be very difficult because the road will be constructed in the swampy area of the sourthern part of the Kabupaten and it is necessary to construct two major river crossings and many smaller river crossings.

There is no road network in the Kabupaten at the present time and only two groups of road links exist i.e. road links through Kuala Kurun in the northern part of the Kabupaten and road links near Kuala Kapuas in the southern part of the Kabupaten.

At the northern road links, only a road link between Kuala Kurun and Tewah is provided being the provincial road. A new road construction from Tumbang Talakan to the national road is being carried out by DPUP.

Existing links are earth roads and many existing timber bridges are impassable because of their poor condition. The road links cannot serve as a part of the regional trunk roads and are only used for transportation by local residents. The ADTs on the road links are less than 10 vpd even including motorcycles. The ADTs on the road links in the southern area of the Kabuapten are almost zero.

1.3.2 Road Inventory

From the road inventory data prepared by the Kabupaten, the number and total length of Kabupaten roads to be studied in Kabupaten Kapuas are confirmed as 14 links and 348 Km respectively. These figures exclude Kabupaten roads with no data.

According to the data the present status of the Kabupaten roads is as follows:

(1) Density of Kabupaten Roads

The density of the Kabupaten roads is 0.02 m per ha. This is distinctly lower than the national density of 0.48 m per ha and far lower than 2.11 m per ha which is the density in Jawa Island, excluding DKI Jakarta, as shown in the following table. Thus, the Kabupaten lags behind greatly in density of Kabupaten roads.

	Total Length (km)	Area (ha)	Density (m/ha)
Kabupaten : Kapuas	348	15,140,000	0.02
Province : Kalimantan Tengah	1,076	20,474,710	0.05
Jawa Is.(Excluding DKI Jakarta)	27,715	13,159,700	2.11
Indonesia	92,038	191,944,300	0.48

Notes : 1. The value for the province is the total value for the Kabupatens included in the study.

2. The sources of data are as follows:
Kabupaten and Province : Bina Marga Inventory
Jawa and Indonesia : Statistical Yearbook of Indonesia 1984, published by the Central Statistics Bureau

(2) Kabupaten Road Surface Type

The type of surface on the Kabupaten roads in the Kabupaten is shown in Table 1-3-1.

Table 1-3-1 EXISTING ROAD LENGTH BY SURFACE TYPE

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(Km)

ROAD (7)	INN	L.L	TOTAL
LINK 1	25		25
LINK 2	14		14
LINK 3	50		50
LINK 4	50		50
LINK 5	15		15
LINK 6	30	1	31
LINK 7			
LINK 8	26		26
LINK 9	9		9
LINK 10	21		21
LINK 11	13		13
LINK 12	28		28
LINK 13	49	1	50
LINK 14	16		16
TOTAL	346	2	348
RATIO	99	1	(%)

The legend used in the table is as follows:

ASP : Asphalt

KRK : Gravel/Stone/Telford/Water Bound Macadam

TNH : Earth

LL : Others

Comparison of the proportions of surface type in the Kabupaten with other regions is as follows:

	ASP	KRK	TNH/LL
Kabupaten : Kapuas	-	-	100.0
Province : Kalimantan Tengah	-	29.0	71.0
Jawa Is.(Excluding DKI Jakarta)	56.2	25.0	18.8
Indonesia	26.0	26.6	47.4

Thus, there are no asphalt paved roads and the proportion of low grade roads such as earth roads and others is one hundred percent. Accordingly the road classification in this Kabupaten is the lowest.

(3) Surface Condition of Kabupaten Roads

The surface condition of the Kabupaten roads classified as good, fair, poor and bad which are shown as BA, SD, RU and RB respectively, are summarized in Table 1-3-2.

Comparison of the proportions of the various surface conditions of the Kabupaten roads in the Kabupaten with other regions is as follows:

	Good	Fair	Poor	Bad
Kabupaten : Kapuas	38.8	10.0	47.1	4.0
Province : Kalimantan Tengah	30.6	25.2	37.5	6.7
Jawa Is.(Excluding DKI Jakarta)	45.6	29.8	19.6	5.0
Indonesia	43.5	21.8	21.1	13.6

Table 1-3-2 EXISTING ROAD CONDITION BY SURFACE TYPE

PROVINCE : KALIMANTAN TENGAH

KABUPATEN : KAPUAS

(%)

ROAD										
NO.										
LINK NO.										
1		11	87							
2		4	96							
3		59	39	2						
4	63	9	28							
5		1	99							
6	1	23	76					99	1	
7										
8			50	50						
9	86		14					1		
10	77	7	16							
11	80		20							
12	60		40							
13	50		50		50			50		
14	89	11								
AVERAGE	39	10	47	4	25	0	75	1		
LENGTH		346 Km			1		2 Km			
(Km)	135	15	163	69	1	0	2	0		

The surface condition level of the Kabupaten roads in the Kabupaten is subjectively rated as fair. However considering the fast that the roads are all of very low class the road condition is in reality extremely poor and much improvement is desirable.

(4) Terrain Conditions of Kabupaten Roads

The difficulty of road improvement is mainly dependent upon the terrain conditions.

The terrain conditions of the Kabupaten roads, classified as flat, hilly, mountainous and swampy which are shown as DT, BK, GN and RW, are summarized in Table 1-3-3.

The proportions of terrain conditions in the Kabupaten are 16.0% flat, 47.0% hilly, and 36.0% swampy.
There is no mountainous area in the Kabupaten. Road construction is anticipated to be difficult because of the large proportion of swamp.

1.3.3 Bridge Inventory

A bridge inventory showing the existing condition of bridges on the Kabupaten roads in Kabupaten Kapuas was prepared by the Kabupaten.

The bridge types are classfied as timber, concrete, steel and others which are shown in the inventory as KY, BT, BJ and LL respectively.

The inventory shown in Table 1-3-4 and Table 1-3-5 indicates a total of 293 bridges with a total length of 2324 m of which 263 or 89.7% are timber and 28 or 9.5% are others. On the other hand, 83 bridges with a total length of 4,477 m are required to be newly constructed.

Table 1-3-3 EXISTING ROAD LENGTH BY TERRAIN CONDITION

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(Km)

I02 (3) I	RW	DT	BK	TOTAL
LINK 1	25			25
LINK 2	14			14
LINK 3	22	28		50
LINK 4	50			50
LINK 5	15			15
LINK 6			31	31
LINK 7				
LINK 8			26	26
LINK 9		9		9
LINK 10		4	17	21
LINK 11		7	6	13
LINK 12		3	25	28
LINK 13			50	50
LINK 14		6	10	16
TOTAL	126	57	165	348
RATIO	36	16	47	(%)

Table 1-3-4 NUMBER AND LENGTH OF BRIDGES

PROV : KALIMANTAN TENGAH KAB : KAPUAS

<<<< BRIDGE >>>> (UNIT: m)

	EXISTING		NOT EXIST		TOTAL	
LINK NO	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
1	44	353.00	1	10.00	45	363.00
2	23	81.00			23	81.00
3	88	596.00	8	80.00	96	676.00
4	72	371.39	1	60.00	73	431.39
5	24	301.64			24	301.64
6			73	4327.00	73	4327.00
7	4	73.00			4	73.00
8	9	151.00			9	151.00
10	9	112.00			9	112.00
11	8	70.00			8	70.00
13	9	140.00			9	140.00
14	3	75.00			3	75.00
TOTAL	293	2324.03	83	4477.00	376	6801.03

Table 1-3-5 NUMBER OF EXISTING BRIDGES BY BRIDGE TYPE

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(No)

103 (18)	KY	BJ	LL	BT	TOTAL
LINK 1	44				44
LINK 2	23				23
LINK 3	82	1	4	1	88
LINK 4	72				72
LINK 5	24				24
LINK 6					
LINK 7	1		3		4
LINK 8			9		9
LINK 10	9				9
LINK 11	8				8
LINK 13			9		9
LINK 14		1	3		3
TOTAL	263	1	28	1	293
RATIO	90	0	10	0	(%)

The number of existing bridges by span length is as follows:

Bridge Type	Span Length (m)										
	〈3	〈5	〈8	〈10	〈12	〈14	〈16	〈18	〈20	〈99	Total
Timber	136	110	4	5	2	-	2	-	4	-	263
Concrete	-	1	-	-	-	-	-	-	-	-	1
Steel	-	1	-	-	-	-	-	-	-	-	1
Others	3	1	-	6	2	1	3	4	2	6	28
Total	139	113	4	11	4	1	5	4	6	6	293

Thus, most of the existing bridges on the Kabupaten roads is timber and the majority of spanlengths is within the range of less than 3 m.

1.3.4 Traffic

Inventories of the average daily traffic (ADT) on the Kabupaten roads in Kabupaten Kapuas were prepared by the Kabupaten and are shown in Chapter 2.

From the inventories, total value of average daily trips by vehicle type and their proportions in the Kabupaten in 1984 are summarized as follows:

	SEDAN	BUS	TRUCK	MOTOR-CYCLE	TOTAL
Total Trips	7	7	27	77	118
Proportion (%)	5.93	5.93	22.88	65.26	100.00

Source : Bina Marga Inventory

The proportions of registered vehicles by vehicle type are as follows:

	SEDAN	BUS	TRUCK	MOTOR-CYCLE	TOTAL
Proportion (%)	-	-	-	-	-

Source : Kabupaten.

Thus, the proportion of motorcyles in the Kabupaten is by far the highest.

From the above tables the following can be observed:

- Number of total trips might be underestimated
- Proportions are probably reasonable.

Essentially, for estimation of future traffic volumes past and present traffic data together with the trend in the number of registered vehicles are important basic data. However the data obtained for the study was traffic count data for each road link in 1985 and of low reliability.

Therefore the future traffic volumes are estimated by the calculation process recommended in chapter 3 of the Main Report.

Chapter 2 ESTIMATIONS OF FUTURE TRAFFIC VOLUME AND BENEFIT

2.1 Future Traffic Volume

2.1.1 Traffic Growth Rate

The traffic growth rate used for estimation of the future traffic volume on the Kabupaten roads was estimated by the following calculation process.

Growth of Production Basis "A":

$$\sqrt{\text{Annual Population Growth of the Kabupaten} \times \text{Growth of the Total Cultivated Area}}$$

Growth of Productivity "B" :

$$\sqrt{\text{Growth of the Total Paddy Field Area} \times \text{Growth of the Paddy Production per ha}}$$

Traffic Growth Rate: Initial estimated figure:

$$\overline{GR'} = \sqrt{A \times B}$$

Traffic Growth Rate GR =Final adjusted figure:

$$\sqrt{GR' \times \text{Trend of GDP/Capita of the Province Concerned}}$$

Results of the estimation are shown in Table 2-1-1.

Table 2-1-1 TRAFFIC GROWTH RATE ESTIMATION

PROV : KALIMANTAN TENGAH KAB : KAPUAS

A)	Growth Rate of Population	:	6.00 (%)
B)	Growth Rate of Cultivated Area	:	7.00 (%)
C)	Growth Rate of Rice field	:	6.00 (%)
D)	Growth Rate of Rice yield rate	:	-5.60 (%)
E)	Growth Rate of GDP / capita	:	9.50 (%)
a)	Geometrical Mean (A x B)	:	6.50 (%)
b)	Geometrical Mean (C x D)	:	0.03 (%)
c)	Geometrical Mean (a x b)	:	3.21 (%)
d)	Geometrical Mean (c x E)	:	6.31 (%)
	TRAFFIC GROWTH RATE	:	6.31 (%)

2.1.2 Present and Future Traffic Volume

The future traffic volumes on the Kabupaten roads in 1998 for the Project life time of ten years were estimated by the following formula :

$$Tn = Te\ (1 + r)^n$$

Where :

Tn : Future traffic volume n years later
Te : Traffic volume in 1984
r : Traffic growth rate

The results are shown in Table 2-1-2 together with the traffic volume in 1984.

Table 2-1-2 EXISTING AND FUTURE TRAFFIC VOLUME

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(SPD : 1/2)

	INVENTORY (1984)					RATE	AFTER 14 YEARS (1998)					CLASS
LINK NO	MBL	BUS	TRUK	SPD	TOTAL		MBL	BUS	TRUK	SPD	TOTAL	
1	1	1	1	3	5	6.3%	2	2	2	7	12	IIIC
2	1	1	1	3	5	6.3%	2	2	2	7	12	IIIC
3	1	1	1	2	4	6.3%	2	2	2	5	9	IIIC
4	1	1	1	1	4	6.3%	2	2	2	2	9	IIIC
5	1	1	1	2	4	6.3%	2	2	2	5	9	IIIC
6	1	1	1	1	4	6.3%	2	2	2	2	9	IIIC
7	0	0	1	6	4	6.3%	0	0	2	14	9	IIIC
8	0	0	5	6	8	6.3%	0	0	12	14	19	IIIC
9	0	0	1	4	3	6.3%	0	0	2	9	7	IIIC
10	0	0	4	10	9	6.3%	0	0	9	24	21	IIIC
11	0	0	2	10	7	6.3%	0	0	5	24	16	IIIC
12	0	0	2	15	10	6.3%	0	0	5	35	24	IIIC
13	1	1	4	10	11	6.3%	2	2	9	24	26	IIIC
14	0	0	2	4	4	6.3%	0	0	5	9	9	IIIC
PERCENT	5.93	5.93	22.88	65.25			5.93	5.93	22.88	65.25		

2.2 Benefit

2.2.1 Benefit Estimation Method

Generally, estimation of the benefit on each Kabupaten road due to the Project was made by analyzing the direct benefit i.e. the VOC reduction benefit, which was estimated by comparing "with project" and "without project" based upon the future traffic volume on the road. However for the following road links it was decided to estimate the indirect benefit through the producer's surplus benefit.

a) Road links with present traffic volume (ADT) less than 60 equivalent 4-wheel vehicles.

b) Road links with no 4-wheel vehicle operation at present.

The indirect benefit was changed into the future traffic volume and the VOC reduction benefit was estimated.

The VOC adopted for the estimation is shown in Table 2-2-1.

Table 2-2-1 VEHICLE OPERATION COST ON KABUPATEN ROADS

(KM)

SURFACE	CONDITION	SEDAN	BUS	TRUCK	MOTORCYCLE
ASPHALT	GOOD	104.7	86.2	85.4	15.9
	Fair	125.5	101.0	98.0	18.2
	Poor	164.1	135.2	138.5	22.8
	Bad	222.1	202.0	205.0	29.1
GRAVEL	Good	125.7	101.4	102.5	18.5
	Fair	145.0	124.6	127.1	21.1
	Poor	198.6	172.6	178.4	27.1
	Bad	242.7	228.9	231.2	31.8
EARTH	Fair	201.8	180.0	185.1	28.0
	Poor	240.7	218.2	225.8	31.8
	Bad	264.9	278.0	281.7	35.5

Source : Bina Marga

Table 2-2-2 FUTURE TRAFFIC VOLUME ESTIMATED BY THE PRODUCER'S SURPLUS

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1998)

LINK NO	CLASS	SURFACE	MOBIL	BUS	TRUCK	SEPEDA	TOTAL
1	IIIA	ASP	55	55	212	605	625
2	IIIB-2	KRK	11	11	42	120	124
3	IIIB-1	ASP	31	31	121	344	355
4	IIIB-1	ASP	28	28	107	306	316
5	IIIB-2	KRK	10	10	39	110	114
6	IIIB-2	KRK	9	9	36	104	106
8	IIIC	KRK	3	3	12	36	36
9	IIIC	KRK	0	0	1	3	3
10	IIIC	KRK	2	2	8	23	24
11	IIIC	KRK	0	0	2	4	4
12	IIIC	KRK	1	1	3	10	10
13	IIIC	KRK	2	2	6	17	19
14	IIIC	KRK	0	0	2	5	5

2.2.2 Benefit

The benefit estimation was carried out for each Kabupaten road. Table 2-2-3 shows a sample of the result of benefit estimation. In the table "surplus" and "VOC" show the estimation method utilized and III A, III B-1, III B-2 and III C show the road classification.

Table 2-2-3

RESULTS OF BENEFIT ESTIMATION

KABUPATEN : KAPUAS

(1000Rupiah)

	LINK 1	LINK 2	LINK 3	LINK 4	LINK 5	LINK 6	LINK 8	LINK 9	LINK 10	LINK 11
	25 Ka	14 Ka	50 Ka	50 Ka	15 Ka	31 Ka	26 Ka	9 Ka	21 Ka	13 Ka
	IIIA	IIIB-2	IIIB-1	IIIB-1	IIIB-2	IIIB-2	IIIC	IIIC	IIIC	IIIC
YEAR	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus	Surplus
1988	0	0	0	0	0	0	0	0	0	0
1989	330108	33733	360679	274886	31794	23989	9778	33	916	49
1990	342188	34555	366719	286548	32684	25822	10065	33	994	49
1991	357204	35444	379742	299173	33575	29070	11644	33	3191	49
1992	373320	38121	392515	313589	36476	36270	13511	33	3191	528
1993	388589	38944	407431	325973	37439	42194	16253	33	4108	528
1994	405129	39833	420203	338504	39075	47135	18120	357	4791	528
1995	422910	42510	431281	351160	41304	54614	20130	357	5708	577
1996	443344	43399	451037	369942	42940	63646	21997	357	7983	577
1997	462649	44909	459721	387110	45240	72818	28041	390	8899	625
1998	479047	46966	472243	399735	46877	81990	30195	390	9815	1056
SUM	4004488	398414	4141571	3344620	387404	477548	179734	2016	49596	4566
COST	2284650	209468	2290670	1796460	199521	200109	47068	-17202	-16755	-23934
/Ka	91386	14962	45813	35929	13301	6455	1810	-1911	-798	-1841

Chapter 3 ENGINEERING

3.1 Design Criteria and Specification

3.1.1 Geometric Design Criteria

Currently a technical standard for improvement of Kabupaten roads i.e. PETUNJUK TEKNIS INPRES PENUNJANGAN JALAN KABUPATEN, TAHUN 1984-1985 is established by Bina Marga.

The geometric design criteria in the above standard are recommended to be adopted in general for the Project. Following discussions with Bina Marga, exceptions to this are allowed for Pavement width and pavement type to minimize the construction cost of the Kabupaten road improvement, if necessary. The geometric design criteria adopted for the Project are shown in Table 3-1-1. The typical cross sections of Kabupaten roads are shown in Fig. 3-1-1.

3.1.2 Loading Specification

The LOADING SPECIFICATIONS FOR HIGHWAY BRIDGES BY DIRECTORATE GENERAL BINA MARGA is used in principle as the basic specification of loading and the TECHNICAL STANDARD FOR KABUPATEN ROADS compiled by Bina Marga shows that the design live load for bridges on Kabupaten roads is 70% of the Bina Marga live road. However, after discussions with Bina Marga the following loads were decided as the design live loads for the standard bridges of Kabupaten roads:

a. 50% of Bina Marga live load (hereinafter BM 50) is applied for concrete and timber bridges on roads of III A classification.

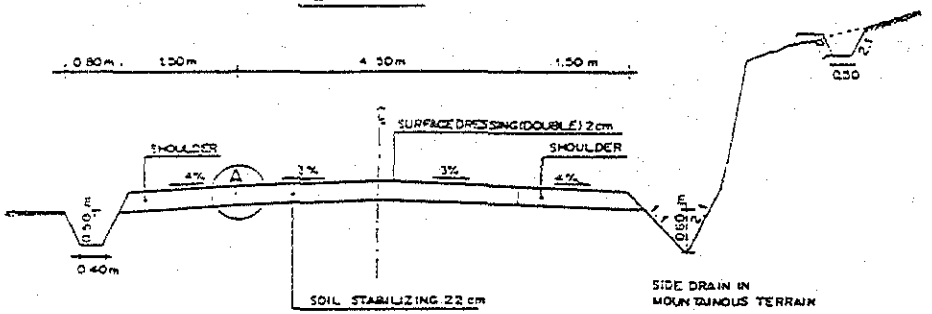
b. 10-ton truck load is applied for timber bridges on roads of III B-1, III B-2 and III C classification.

Table 3-1-1 DESIGN CRITERIA FOR KABUPATEN ROADS

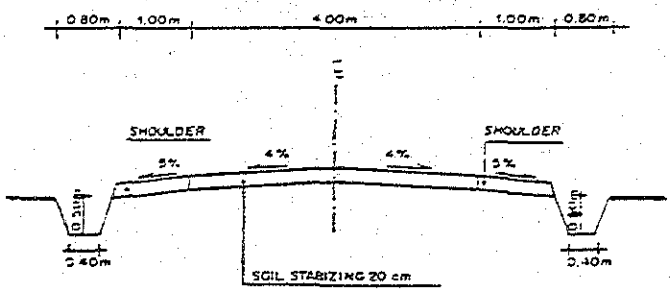
ROAD CLASSIFICATION		CLASS III A			CLASS III B-1			CLASS III B-2			CLASS III C		
SURFACE TYPE		ASPHALT SEAL (DOUBLE)			ASPHALT SEAL (SINGLE)			GRAVEL			GRAVEL		
TRAFFIC VOLUME : ADT (Forecast 10 th year average per day)		3000 - 500			500 - 200			200 - 50			50		
T E R R A I N		FLAT TO ROLLING	HILLY	MOUNT-AINOUS	FLAT TO ROLLING	HILLY	MOUNT-AINOUS	FLAT TO ROLLING	HILLY	MOUNT-AINOUS	FLAT TO ROLLING	HILLY	MOUNT-AINOUS
TRAFFIC LANES		1+	1+	1+	1+	1+	1+	1+	1+	1+	1	1	1
DESIGN SPEED (Km/hr)	DESIRABLE	70	60	40	70	40	30	60	40	30	50	30	AS PRACTI-CABLE
	MINIMUM	30	30	30	30	30	AS PRACTI-CABLE	30	30	AS PRACTI-CABLE	30	AS PRACTICABLE	
GRADIENT (LIMITING) (%)	DESIRABLE	4	5	8	4	6	8	4	7	8	5	8	12
	MAXIMUM	7	7	10	7	8	10	7	9	12	7	12	16
PAVEMENT WIDTH (M)	DESIRABLE	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5
	MINIMUM	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0
SHOULDER WIDTH (M)	DESIRABLE	2.0	1.5	1.5	1.5	1.5	1.0	1.5	1.0	1.0	1.0	1.0	0.75
	MINIMUM	1.5	1.0	0.75	1.0	1.0	0.75	1.0	0.75	0.5	0.75	0.5	0.5
ROAD BED WIDTH (M)	DESIRABLE	10.0	9.0	9.0	8.0	7.5	6.5	7.5	6.5	6.5	5.5	5.5	5.0
	MINIMUM	6.0	6.0	6.0	5.5	5.5	5.0	5.5	5.0	4.5	4.5	4.0	4.0
RIGHT OF WAY (M)	DESIRABLE	16			12			12			12		
	MINIMUM	12			10			10			8		
ROAD CAMBER (%)	PAVEMENT	3			3			4			4		
	SHOULDER	4			4			5			5		

Fig. 3-1-1 STANDARD ROAD CROSS SECTIONS

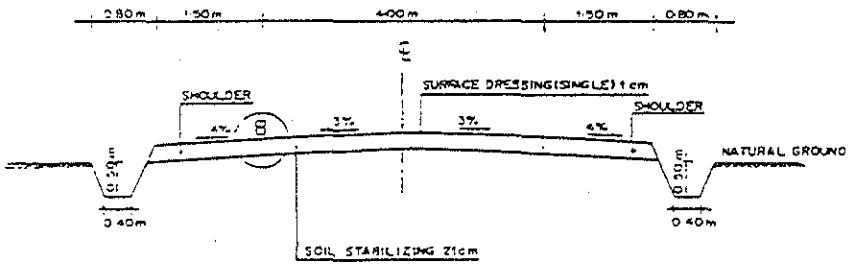
CLASS III A



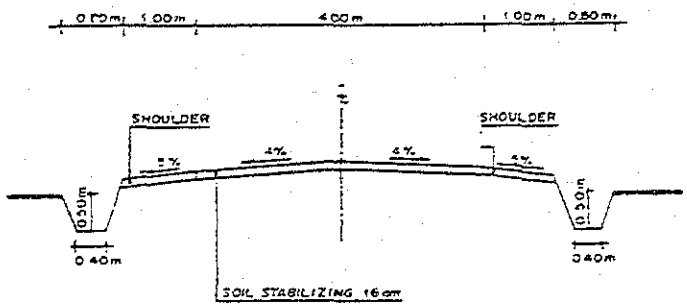
CLASS III B-2



CLASS III B-1



CLASS III C



3.2 Pavement Design

3.2.1 Design Conditions

From the engineering data prepared by the Kabupaten it is noted that the pavement structure of the Kabupaten roads seems to have been determined without adequate designs, therefore the Kabupaten roads generally have insufficient capacity. The standards generally used for highway pavement design such as Road Note 29, Road Note 31 and AASHTO are not suitable for Kabupaten roads with small traffic volumes and loads.

Therefore formulae suitable for the pavement design of Kabupaten roads are recommended as described in Chapter 5 of the Main Report.

The following are important factors for the design of pavement thickness.

1) Design Traffic Volume

As the pavement thickness is designed for each road classification the design traffic volume of which the target year is 1998, is adopted for each classification as follows:

Road Classification	Design Traffic Volume (vpd)
III A	1,000
III B-1	500
III B-2	200
III C	50

2) Strength of Roadbed

The CBR value of the existing roadbed is a very important factor for the pavement design but no results are available from CBR tests on the Kabupaten roads.

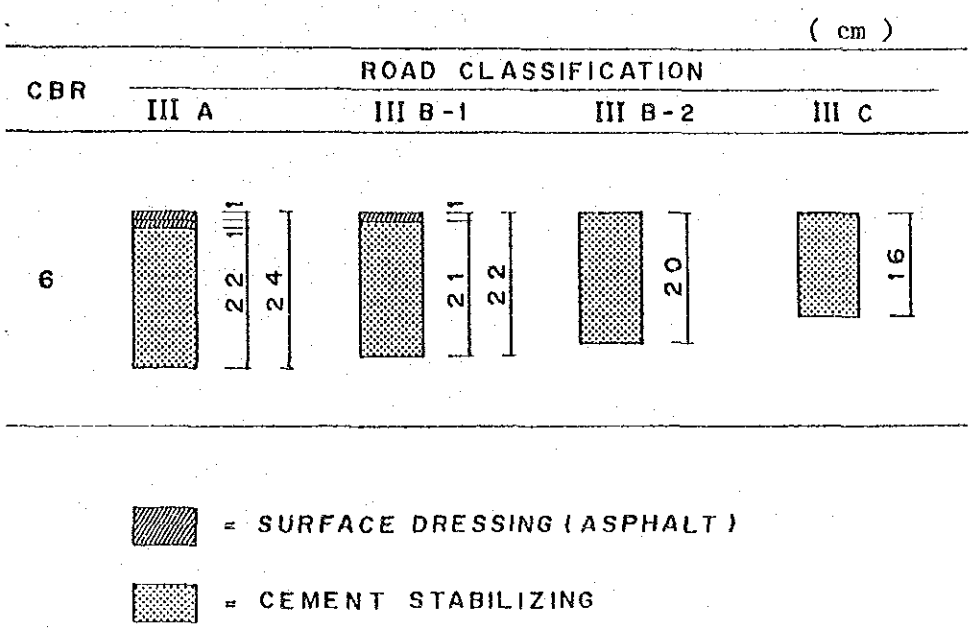
CBR of the laterite is generally in the range of CBR 4 to 10. However site CBR tests should be conducted before construction to finally decide the pavement thickness.

3.2.2 Pavement Structure

Fig. 3-2-1 shows the standard pavement structures adopted for the Kabupaten roads. In the Kabupaten aggregate material is difficult to obtain and so the price is extremely high, therefore the cement stabilization method is recommended for both the base and sub-base courses as a substitute for crusher run or river gravel.

Fig. 3-2-1

PAVEMENT STRUCTURE
(CEMENT STABILIZING)



3.3 Design of Bridges and Other Structures

3.3.1 Standard Bridge

There are so many bridges to be improved or to be newly constructed on the Kabupaten roads in the Project Area that it is very difficult to prepare an individual design for each bridge. Therefore, standardization is recommended as being necessary for the bridge design with conclusions as deseribed below.

(1) Bridge Type

1) Superstructure

A timber beam bridge (hereinafter timber bridge has been finally selected regardless of road classification by the agreement of Bina Marga after studying the actual rurall condition of bridge construction. Fig. 3-3-1 shows the cross section of the standard type.

2) Substructure

Taking account of the actual combinations of super and substructure types noted from the field survey, timber pile barts are recommended as standard because of ease of construction and economy.

3) Foundation

There is no information of subsoil conditions in the inventory data. However, timber piles of 20 cm diamenter are generally recommended as piles of this type are in common use.

The pile length is suggested to be a minimum of 3 meters under the bottom of the foundation or river bed.

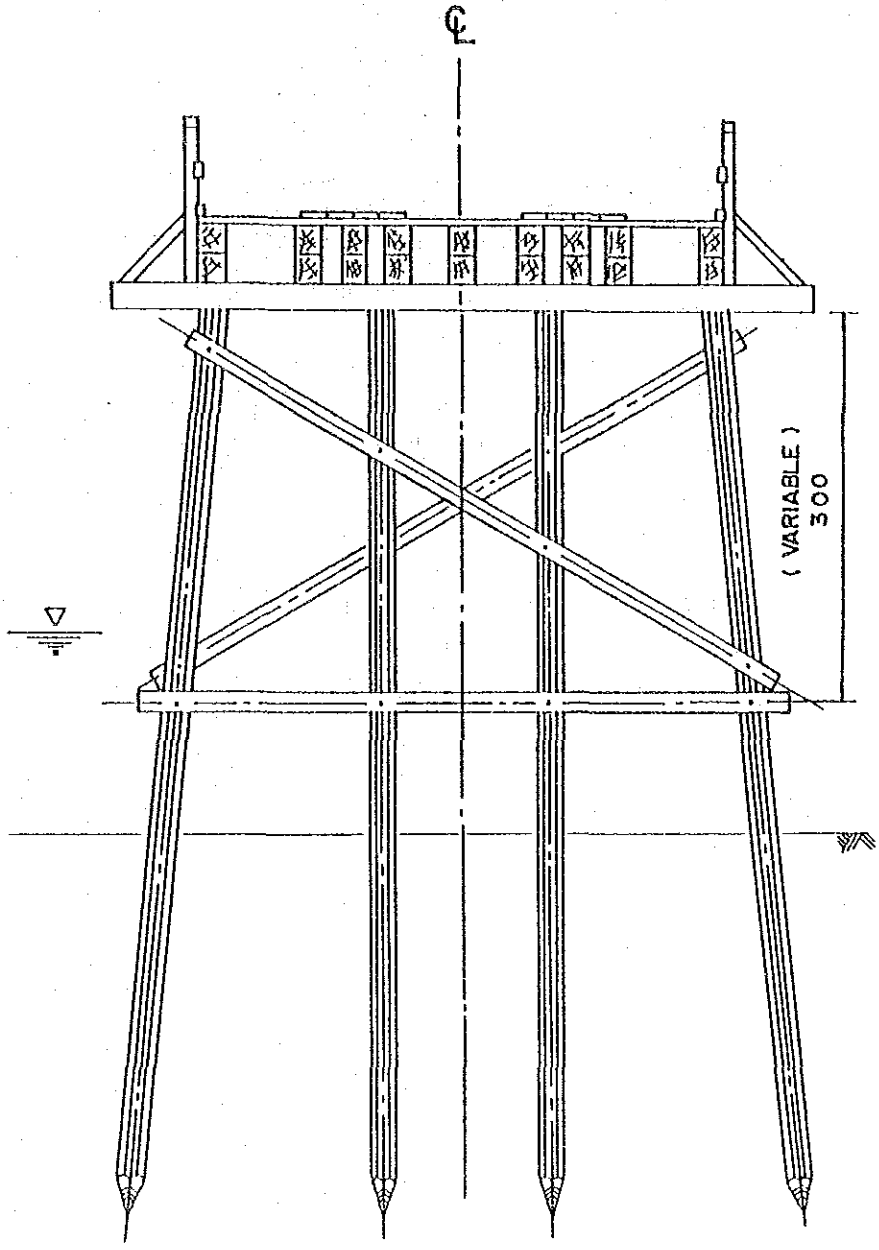
The length and number of piles should be decided in order to be adequate for the condition of the foundation materials.

(2) Bridge Width

The effective bridge width for the standard bridge has been generally decided as 4.0 m through discussions with Bina Marga and considering the actual width of Kabupaten roads.

Fig. 3-3-1 CROSS SECTION OF STANDARD BRIDGE

TIMBER BRIDGE



(3) Span Length

The range of span lengths are determined as:

Timber bridge: 3.0, 5.0 and 8.0 m

3.3.2 Other Structures

Culverts and retaining walls shown in Fig. 3-3-2 and Fig. 3-3-3 are recommended as standard structures.

(1) Culvert

The following two culvert types have been adopted for the tranverse drainage.

a) Reinforced concrete pipe culvert Ø 80 cm m
b) Rubble in mortar box culvert with RC slab 80 cm X 80 cm

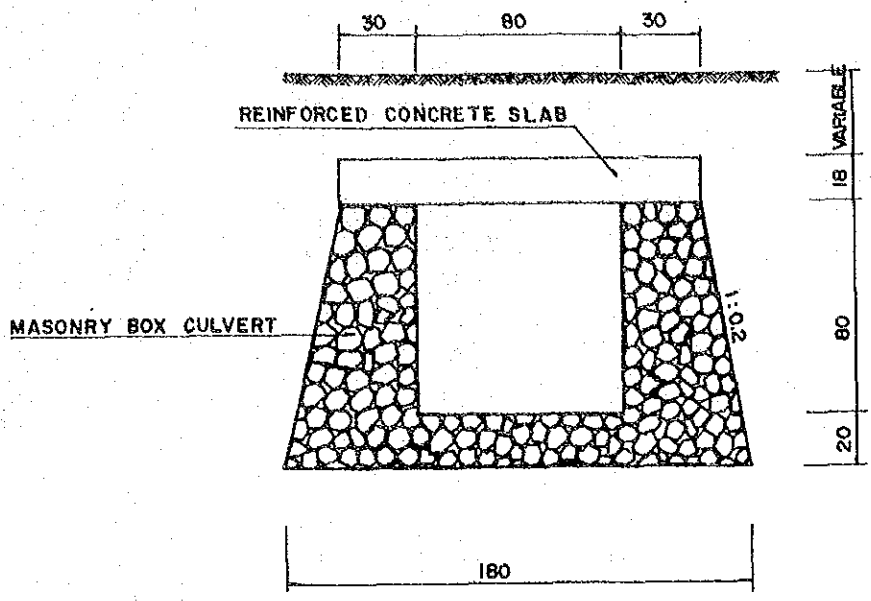
(2) Retaining Wall

The following two types of retaining walls have been adopted because of ease of construction, economy and familiarity in Indonesia.

a) Rubble in mortar retaining wall
b) Timber retaining wall

Fig. 3-3-2 STANDARD CULVERTS

80 x 80 RUBBLE IN MORTAR BOX CULVERTS



Ø 80 RENFORCED CONCRETE PIPE CULVERT

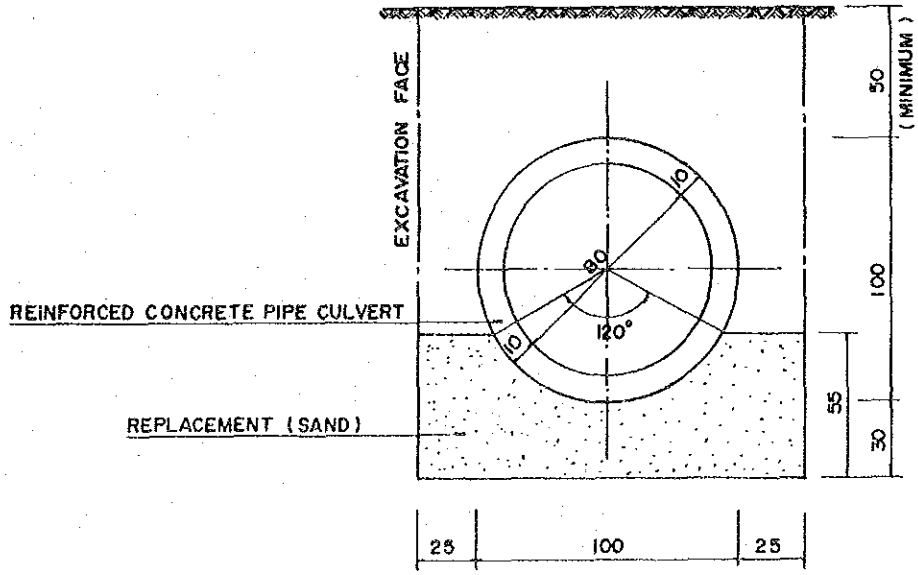
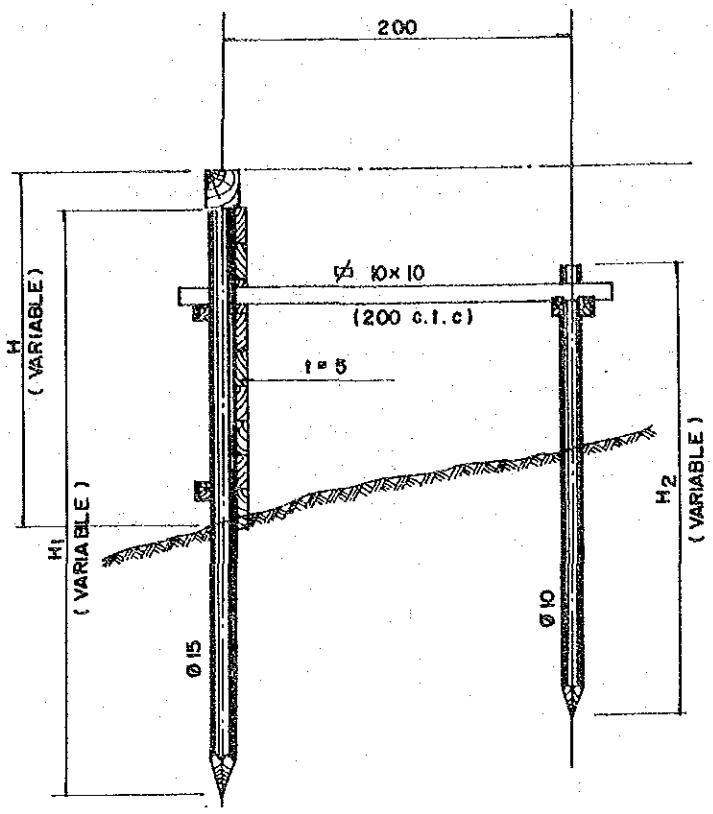
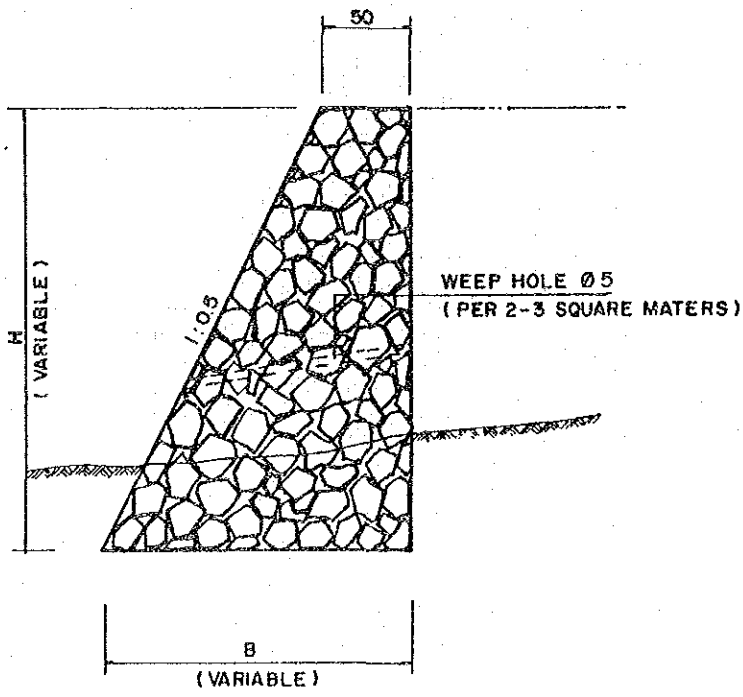


Fig. 3-3-3 STANDARD RETAINING WALLS

TIMBER RETAINING WALL



RUBBLE IN MORTAR WALL



3.4 Selection of Equipment Types

From the results of comparison of two types of Kabupaten road construction methods, i.e. equipment intensive method and labour intensive method construction methods for major works were basically decided as shown in Table 3-4-1.

Table 3-4-1 CONSTRUCTION METHODS FOR MAJOR WORKS

METHOD	WORK TYPE
Equipment Intensive	Earthwork, Base Course and Subbase Course
Labour Intensive	Surface Dressing, Drainage, Bridge and Other Structures.

3.4.1 Points to be Considered for the Selection

Full consideration was given to the following points in studying the selection of equipment type.

a. Most of the construction in the Project is pavement works for road improvement.

b. The pavement width adopted is equal to or less than 4.5 m and therefore large sized equipment is omitted from the selection process.

c. Equipment should be capable of with standing the heavy rainfall and poor soil quality. Equipment for construction in swampy areas is considered if necessary.

d. Uniformity of equipment types with existing equipment is considered to facilitate repair of the equipment in the provincial work shop.

e. Since the scale of the construction is small and transportation of equipment will frequently be necessary, wheel type equipment has been selected as much as possible as this can move by itself or by being towed.

f. The road like to be improved are scattered all over the Kabupatens and therefore a low bed truck or equivalent is necessary for transportation of crawler type equipment. It is desirable to protect the existing pavement from damage caused by the movement of crawler type equipment on the existing roads.

g. The capacity of the equipment has been decided taking into consideration the construction volume and the combination of equipment in the main work.

3.4.2 Combinations of Equipment for Major Works and Maintenance

The combinations of equipment for major works and maintenance are listed in Table 3-4-2 and 3-4-3 respectively.

Table 3-4-2 EQUIPMENT OF ONE WORK GANG FOR MAJOR TYPES OF WORK

TYPE OF WORK	EQUIPMENT REQUIRED	
1. Site Clearing in Light Bush	1- Bulldozer 90 HP 2- Dump Truck 3.0 Ton	1- Wheel Loader 1.2 m^3
2. Excavation & Embankment		
i) Normal Fill	1- Bulldozer 90 HP 1- Vibratory Roller 4.0 Ton (D&T)	1- Water Tank Truck 4,000 Ltr
ii) Fill by Borrow Material	1- Bulldozer 90 HP 3- Dump Truck 3.0 Ton	1- Wheel Loader 1.2 m^3
iii) Fill in Swamp	1- Swamp Bulldozer 90 HP 1- Water Tank Truck 4,000 Ltr	1- Vibratory Roller 4.0 Ton (D&T)
iv) Excavation to Spoil	1- Bulldozer 90 HP 1- Wheel Loader 1.2 m^3	4- Dump Truck 3.0 Ton
3. Subgrade Preparation	1- Motor Grader 75 HP 1- Vibratory Roller 4.0 Ton (D&T)	1- Water Tank Truck 4,000 Ltr
4. Subbase Course	1- Motor Grader 75 HP 1- Vibratory Roller 4.0 Ton (D&T)	1- Water Tank Truck 4,000 Ltr
5. Base Course	1- Motor Grader 75 HP 1- Vibratory Roller 4.0 Ton 1- Portable Crusher/Screens 30-40 Ton/H	1- Water Tank Truck 4,000 Ltr
6. Cement Stabilizing	1- Motor Grader 70 HP 1- Bulldozer 90 HP 1- Wheel Loader 1.2 m^3 1- Flat Bed Truck 3.0 Ton	1- Vibratory Roller 4.0 Ton (D&T) 1- Road Stabilizer 1- Water Tank Truck 4,000 Ltr
7. Surface Course	1- Asphalt Sprayer 850 Ltr 1- Tyre Roller 8-15 Ton 1- Portable Crusher/Screens 30-40 Ton/H	1- Flat Bed Truck 3.0 Ton
8. Concrete	1- Concrete Mixer 0.5 m^3 1- Water Pump 200 Ltr/Min 1- Concrete Vibrator 3.3 HP	1- Flat Bed Truck 3.0 Ton 1- Hand-Guided Vibratory Roller 1000 Kg

Table 3-4-3 EQUIPMENT OF ONE WORK GANG FOR MAINTENANCE

TYPE OF WORK	EQUIPMENT REQUIRED
Road	1- Motor Grader
	1- Tyre Roller 8-15 Ton
	1- Hand-Guided Vibratory Roller 1000 Kg
	1- Flat Bed Truck 3.0 Ton
	1- Dump Truck 3.0 Ton
Bridge and Other Structure	1- Flat Bed Truck With Crane 3.0 Ton

3.5 Workshop and Laboratory

3.5.1 Policy of the Kabupaten Workshop

A workshop will be provided for each Kabupaten. The function of the workshop is to cope with requests from the construction site. The main service will be routine maintenance while the secondary service will be light repairs which can be carried out by changing parts. Dismantling and assembling of units which need setting or adjustment using special equipment or facilities will not be carried out in the Kabupaten workshop. Such repairs are planned to be carried out by the provincial workshop or the regional Workshop of Bina Marga.

Accordingly the main tasks of the Kabupaten workshop are as follows:

1) Administration for and storage of equipment
2) Routine maintenance and light repair of equipment
3) Storage and supply of spare parts
4) Operation of equipment including crushing plant.

3.5.2 Workshop Equipment and Tools

Equipment and tools for the workshop are recommended as shown in Table 3-5-1.

Table 3-5-1 WORKSHOP EQUIPMENT AND TOOLS

DESCRIPTION	QUANTITY
Upright Drilling Machine	1 Set
Electric Hand Drill	1
Electric Portable Grinder	1
Disc Grinder	1
Bench Electric Grinder	1
Engineer's Vice	1
DC Electric Welder with Engine	1 Set
Portable Hydraulic Jack, Screw Head	1
Hydraulic Jack	1
Grease Gun	2
Suction Pump for Oil Recovery	2
High Pressure Grease Pump	1

continued

DESCRIPTION	QUANTITY
Drum Opening Spanner	1
Silicon Normal Charger	1
Tyre Changer Air Operated	1
Tyre Service Tool Set	1
Tyre Pressure Gauge	1
Automatic Tyre Inflator	1
Plug Cleaner and Tester	1
Mechanics Tool Set, Heavy Equipment	1
Mechanics Tool Set, Large Vehicle	1
Portable Air Compressor	1
Electric Cord Reel, 15 A, 50 m	1
Oil Measure, Polyethylene	1
Funnel 200 mm, Steel	3
Hand Truck (Cart), 4-Wheel	1
Nylon Sling, 10 ton	2
Chain Block, 1 ton	2
Wire Rope (for sling), 1.8 ton	2
Wire Rope (for sling) 3.2 ton	2
Generator	1

3.5.3 Laboratory

For quality control of construction in the Project it is recommended that a laboratory is provided for each Kabupaten. For each laboratory, provision of laboratory test equipment for the following tests is recommended:

- Physical characteristic, compaction and strength tests for the road bed and pavement materials.
- Slump and strength tests for the bridge concrete.

In the laboratory a fixed water tank should be provided for CBR tests and curing of concrete specimens.

The proposed laboratory equipment is listed in Table 3-5-2.

Table 3-5-2 LABORATORY TEST EQUIPMENT

DESCRIPTION	QUANTITY
Soil Moisture Test Set (JIS A1203)	1
Liquid Limit Set (JIS A1205)	1
Plastic Limit Set (JIS A1206)	1
Compaction Set (JIS A1210)	1
CBR Laboratory Set, Mechanical (JIS A1211)	1
Sand Density Apparatus (JIS A1214)	1
Aggregate Test Sieve Set	1
Portable Cone Penetrometer	1
Compression & Bending Test Machine	1
Cylinder Mould (JIS A1132, 1108)	9
Slump Test Apparatus (JIS A1101)	2

To conduct the surveys necessary for road and structure construction such as centering, profile leveling, cross section leveling etc., the surveying equipment listed in Table 3-5-3 recommended.

Table 3-5-3 SURVEYING EQUIPMENT

DESCRIPTION	QUANTITY
Transit	1
Level	1
Staff	3

Chapter 4 CONSTRUCTION AND MAINTENANCE COST ESTIMATIONS

4.1 Unit Price

With regard to the unit prices of materials and labor, the data were collected from each Kabupaten through Bina Marga. The collected data were compared with those of Jakarta using BAHAN BANGUNAN DKI-JAKARTA MAY & JUNE 1985 compiled by PUSAT INFORMASI TEHNIK PEMBANGUNAN, and then finalized.

4.1.1 Unit Labour Price

The unit labour prices of Kabupaten Kapuas and other Kabupatens in Kalimantan Tengah Province are shown in Table 4-1-1.

Table 4-1-1 UNIT LABOUR PRICE

(Rp)

KABUPATEN	MAN	SKL LAB	CAP	MAS	LAB	DRIV	OPE
Kotawaringin Timur	2,500	2,000	2,500	2,500	1,500	3,000	7,500
Kapuas	2,200	2,000	2,500	2,500	1,650	2,200	2,750
Barito Selatan	4,000	3,250	2,500	3,000	2,750	3,000	3,500
Barito Utara	3,000	3,600	3,000	3,000	2,250	3,300	3,300
Average	2,925	2,713	2,625	2,750	2,038	2,875	4,263

Notes :

MAN : Mandur
SKL LAB : Skilled Labour
CAP : Carpenter
MAS : Mason
LAB : Labourer
DRIV : Driver
OPE : Operater

4.1.2 Unit Price of Materials

Table 4-1-2 shows the unit price of materials for Kabupaten Kapuas together with for other Kabupatens in Kalimantan Tengah Province.

The unit price of river stone in the Kabupaten which has direct effects upon construction costs is significantly high.
Stone and sand are not produced in the Kabupaten. Therefore unit prices of these materials include the shipping cost from the producing Kabupaten.

Table 4-1-2 UNIT PRICE OF MATERIALS

(Rp)

MATERIAL	UNIT	KOTAWARI-NGIN TIMUR	KAPUAS	BARITO SELATAN	BARITO UTARA	AVERAGE
Bitumen	L	500	500	1,000	400	600
Asphalt oil	L	800	800	800	800	800
Gasoline	L	250	250	250	250	250
Sand	M^3	7,500	7,000	7,500	10,000	8,000
Cement	bag	5,000	5,000	5,000	5,000	5,000
River Stone	M^3	15,000	20,000	30,000	10,000	18,750
Steel moulds	Set	8,500	8,500	8,500	8,500	8,500
Timber	M^3	75,000	70,000	75,000	75,000	73,750
Paint	L	2,000	3,000	3,000	3,000	2,750
Reinforcing Steel	Kg	1,000	1,000	1,000	1,000	1,000
Tying Wire	Kg	1,500	1,500	1,500	1,500	1,500

4.1.3 Hourly Equipment Cost

The hourly equipment cost for Kabupaten is shown in Table 4-1-3.

Table 4-1-3

HOURLY EQUIPMENT COST

PROVINCE : KALIMANTAN TENGAH
KABUPATEN : KAPUAS

(UNIT : Rp) (6'85)

CODE NO	EQUIPMENT NAME	CLASS	LOCAL COST OWNERSHIP	LOCAL COST OPERATION	LOCAL COST SUB-TOTAL	FOREIGN COST OWNERSHIP	FOREIGN COST OPERATION	FOREIGN COST SUB-TOTAL	TOTAL COST
	Bulldozer	120 HP	272	12,867	13,139	7,769	1,029	8,798	21,937
	Bulldozer/Ripper	120 HP	298	13,882	14,180	8,499	1,583	10,082	24,262
	Swamp Bulldozer	120 HP	311	14,126	14,437	8,879	1,654	10,533	24,970
	Bulldozer	90 HP	173	8,688	8,861	4,914	650	5,564	14,425
	Bulldozer/Ripper	90 HP	186	9,280	9,466	5,299	987	6,286	15,752
	Bulldozer	65 HP	123	6,310	6,433	3,499	463	3,962	10,395
	Bulldozer/Ripper	65 HP	134	6,762	6,896	3,819	711	4,530	11,426
	Swamp Bulldozer	90 HP	185	9,270	9,455	5,284	984	6,268	15,723
	Swamp Bulldozer	65 HP	142	6,677	6,819	4,049	754	4,803	11,622
	Motor Grader	110 HP	243	11,119	11,362	6,919	1,289	8,208	19,570
	Motor Grader	75 HP	168	7,621	7,789	4,779	890	5,669	13,458
	Motor Grader	65 HP	151	6,705	6,856	4,299	801	5,100	11,956
	Road Stabilizer	W=1850 mm	301	3,398	3,699	8,594	426	9,020	12,719
	Vibratory Roller	4 ton	102	3,331	3,433	2,899	384	3,283	6,716
	Hand-guide Vib. Roller	1000 Kg	77	600	677	849	29	878	1,555
	Tire Roller	8-15 ton	109	7,384	7,493	3,106	102	3,208	10,701
	Vibratory Roller (D&T)	4 ton	102	3,331	3,433	2,899	384	3,283	6,716
	Hand-guide Vib. Roller	600 Kg	54	409	463	600	20	620	1,083
	Rough Terrain Crane	10 ton	352	12,964	13,316	10,039	748	10,787	24,103
	Hydraulic Excavator; Wheel	0.3 m3	144	7,812	7,956	4,109	544	4,653	12,609
	Wheel Loader	1.2 m3	246	8,442	8,688	7,019	929	7,948	16,636
	Wheel Loader	0.3 m3	80	2,946	3,026	2,269	300	2,569	5,595
	Water Tank Truck	4000 ltr.	79	2,838	2,917	868	120	988	3,905
	Fuel Tank Truck	4000 ltr.	80	2,844	2,924	882	122	1,004	3,928
	Dump Truck	3.0 ton	133	3,554	3,687	1,469	204	1,673	5,360
	Flat Bed Truck with Crane	3.0 ton	61	3,084	3,145	1,716	127	1,843	4,988
	Dump Loader Truck	12 ton	135	18,954	19,089	3,837	127	3,964	23,053
	Dump Truck	5.0 ton	198	5,871	6,069	2,189	305	2,494	8,563
	Flat Bed Truck	3.0 ton	20	2,656	2,676	563	41	604	3,280
	Portable Crusher/Screening	30-40 t/h	658	21,726	22,384	18,800	2,490	21,290	43,674
	Concrete Mixer	0.5 m3	486	2,418	2,904	5,400	423	5,823	8,727
	Water Pump	200 l/min	18	264	282	188	6	194	476
	Concrete Vibrator	3.3 HP	7	228	235	73	2	75	310
	Asphalt Sprayer	850 ltr.	92	768	860	1,019	142	1,161	2,021

4.2 Unit Construction Cost by Work Type

4.2.1 All Works Except Bridges

The unit construction costs by work type, excluding bridge construction costs, have been estimated using the combination of equipment described in Clause 3.4 and the unit prices already listed. The results are summarized in Table 4-2-1.

Table 4-2-1 UNIT COST BY WORK TYPE EXCEPT BRIDGE WORK

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(Rp)

ITEM	UNIT	LOCAL	FOREIGN	TOTAL
Site Clearance in Light Bush	m2	157	91	248
Subgrade Preparation	m2	20	11	31
Normal Fill	m3	1,611	863	2,474
Fill in Swamp	m3	7,553	267	7,820
Normal Excavation to Spoil	m3	946	523	1,469
Cement Stabilizing	m3	11,617	12,368	23,985
Cement Stabilizing	m3	11,617	12,368	23,985
Shoulder	m2	281	146	427
Asphalt Patching	m2	7,855	1,308	9,163
Surface Dressing (Single)	m2	1,145	896	2,041
Surface Dressing (Double)	m2	1,635	1,410	3,045
Earth Drain	m	797	119	916
Earth Drain in Swamp (by machine)	m3	1,127	474	1,601
Pipe Culvert D80cm	m	56,475	49,971	106,446
Masonry Culvert (80x80cm)	m	88,375	39,061	127,436
Retaining Wall and Wing Wall (Timber)	m2	8,608	246	8,854
Retaining Wall and Wing Wall (Masonry)	m3	63,107	10,457	73,564
Gabion Protection	m3	25,687	120	25,807
Manual routine maintenance of road	Km	127,812	7,248	135,060
Routine maintenance of earth road	Km	89,432	37,924	127,356
Routine maintenance of gravel road	Km	775,611	42,664	818,275
Routine maintenance of asphalt road	Km	785,500	130,800	916,300

4.2.2 Bridges

The unit construction costs by bridge type including the cost of demolition of existing bridges are shown in Table 4-2-2.

Table 4-2-2 BRIDGE COST

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(Rp)

ITEM	UNIT	LOCAL	FOREIGN	TOTAL
Superstructure (Timber;Span 3m;10T)	m2	32,449	4,083	36,532
Superstructure (Timber;Span 5m;10T)	m2	35,942	4,508	40,450
Superstructure (Timber;Span 8m;10T)	m2	47,605	5,920	53,525
Superstructure (Timber;Span 3m;BM50)	m2	40,235	5,048	45,283
Superstructure (Timber;Span 5m;BM50)	m2	43,924	5,469	49,393
Superstructure (Timber;Span 8m;BM50)	m2	55,707	6,922	62,629
Superstructure (Concrete;Span 3m;BM50)	m2	55,420	106,749	162,169
Superstructure (Concrete;Span 5m;BM50)	m2	58,109	119,370	177,479
Superstructure (Concrete;Span 8m;BM50)	m2	60,768	130,068	190,836
Superstructure (Concrete;Span10m;BM50)	m2	66,923	147,794	214,717
Superstructure (Concrete;Span15m;BM50)	m2	73,982	174,184	248,166
Substructure (Pier;for Timber;10T)	NO	282,709	37,984	320,693
Substructure (Abut;for Timber;10T)	NO	975,083	147,329	1,122,412
Substructure (Pier;for Timber;BM50)	NO	415,790	56,225	472,015
Substructure (Abut;for Timber;BM50)	NO	1,075,606	167,422	1,243,028
Substructure (Pier;for Concrete;BM50)	NO	2,240,801	477,264	2,718,065
Substructure (Abut;for Concrete;BM50)	NO	4,911,589	920,351	5,831,940
Demolition of Bridge (Timber->Timber)	m2	10,098	1,417	11,515
Demolition of Bridge (Timber->Concrete)	m2	10,098	1,417	11,515
Demolition of Bridge (Concrete)	m2	106,545	79,667	186,212
Maintenance of Timber Bridge (New)	m2	6,117	1,232	7,349
Maintenance of Concrete Bridge (New)	m2	2,557	3,061	5,618
Maintenance of Timber Bridge (Exist)	m2	6,643	2,459	9,102
Maintenance of Concrete Bridge (Exist)	m2	4,096	2,455	6,551

Chapter 5 RESULTS OF ECONOMIC FEASIBILITY EVALUATION

5.1 Preliminary Screening

The road links to be improved should be effective for development of the Project Area. The road links where improvements were assumed to be inefficient for development of the Project Area were generally screened out using the following cut-off criteria.

(1) Very short roads, less than 2 Km long, which have no connection with the trunk road network.

(2) Roads not connected to the network at any point

(3) Unpreferred roads, due to poor suitability for transportation compared to other existing alternative roads serving the same purpose.

(4) Road in good condition according to the Bina Marga road inventory which lists improvement projects carried out in the last two or three years

(5) Roads with asphalt surface in good condition

(6) Urban roads, except those forming part of a longer route

(7) Roads serving single large organizations rather than the general public

(8) Roads with no inventory data

(9) Kabupaten roads also assigned as provincial roads

The road links to be screened out in Kabupaten Kapuas are shown in Table 5-1-1.

Table 5-1-1 ROAD LINKS TO BE SCREENED OUT

KABUPATEN : KAPUAS

CRITERIA NO	ROAD LINK NO
(9)	07

5.2 Evaluation

5.2.1 Primary Analysis

The Kabupaten roads were classified by using the future traffic volume on the road links in 1998. The primary analysis of the IRR was carried out using the construction and maintenance costs. Road links where IRRs were more than 10% were defined as feasible links.

Results of primary analysis are shown in Table 5-2-1.

5.2.2 Secondary Analysis

From the infeasible road links evaluated by the primary analysis, road links where the IRRs were between 1% and 10%, i.e. road links which could become feasible if down graded by one rank, in classification were down graded and the costs re-estimated. Using these costs, a secondary analysis of IRR was carried out. Road links where these IRRs were then more than 10% were also defined as feasible links. This reflected that even though the road classification was rather low the road link should be improved.

Results of secondary analysis are shown in Table 5-2-2.

5.2.3 Ranking of Feasible Road Links

From the results of the primary and secondary analysis, road links where the IRRs were more than 10% were selected and their NPVs and B/Cs were estimated. The ranking of feasible road links from the economic evaluation are decided in the order of the NPVs, i.e. the larger the NPV the higher the road link priority as shown in Table 5-2-3.

Table 5-2-1 RESULTS OF PRIMARY ANALYSIS

PROVINCE : KALIMANTAN TENBAH KABUPATEN : KAPUAS

LINK NO	LENGTH	CLASS	IRR(%)	REMARK
1	25 Km	IIIA	21.399	Surplus
3	50 Km	IIIB-1	11.444	Surplus
4	50 Km	IIIB-1	9.979	Surplus
2	14 Km	IIIB-2	0.078	Surplus
5	15 Km	IIIB-2	0.078	Surplus
6	31 Km	IIIB-2	0.078	Surplus
8	26 Km	IIIC	0.078	Surplus
9	9 Km	IIIC	0.078	Surplus
10	21 Km	IIIC	0.078	Surplus
11	13 Km	IIIC	0.078	Surplus
12	28 Km	IIIC	0.078	Surplus
13	50 Km	IIIC	0.078	Surplus
14	16 Km	IIIC	0.078	Surplus

Table 5-2-2 RESULTS OF SECONDARY ANALYSIS

PRUVINCE : KALIMANTAN TENGAH KABUPATEN : KAPUAS

LINK NO	LENGTH	CLASS	IRR(%)	REMARK
4	50 Km	IIIB-2	12.172	Surplus

Table 5-2-3 RANKING OF FEASIBILITY ROAD LINKS

PROVINCE : KALIMANTAN TENGAH KABUPATEN : KAPUAS

LINK NO	LENGTH	CLASS	NPV (1000Rp)	B/C	IRR (%)	REMARK
1	25 Km	IIIA	865712	1.524	21.399	Surplus
3	50 Km	IIIB-1	152754	1.060	11.444	Surplus
4	50 Km	IIIB-2	144648	1.088	12.172	Surplus
SUM	125 Km		1163114			

Chapter 6 IMPLEMENTATION PROGRAMME

6.1 Implementation Schedule

6.1.1 Project Cost

The total Project Cost for the Kabupaten is composed of the cost of construction and maintenance, supplementation as described later, and workshop, laboratory and survey equipment. The total Project Cost for the Kabupaten is summarized in Table 6-1-1.

Table 6-1-1 TOTAL PROJECT COST (1)

KABUPATEN: Kapuas

(Rpx10^6)

COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CONSTRUCTION	1,962	2,600	4,562
MAINTENANCE	77	296	373
SUPPLEMENTATION	311	-	311
WORKSHOP EQUIPMENT & TOOLS	28	-	28
LABORATORY EQUIPMENT	12	-	12
SURVEY EQUIPMENT	5	-	5
TOTAL	2,395	2,896	5,291

The total Project Cost can be divided into costs as shown in Table 6-1-2.

Table 6-1-2 TOTAL PROJECT COST (2)

(Rpx10^6)

COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CIVIL WORK	1,570	2,880	4,450
CONSTRUCTION & MAINTENANCE EQUIPMENT	718	-	718
SPARE PARTS	62	16	78
WORKSHOP/LABORATORY/SURVEY EQUIPMENT	45	-	45
TOTAL	2,395	2,896	5,291

The cost for civil work is composed of the cost of labour and materials, operation cost excluding spare parts, indirect cost and transportation cost of equipment, and ownership cost for existing equipment.

6.1.2 Proposed Road Links

(1) Road Link to be Improved

The road links to be improved were generally selected taking into consideration the following criteria:

(1) Feasible road links
- Feasible road links from the primary evaluation
- Feasible road links from the secondary evaluation

(2) Road links selected from the engineering points of view

(3) Road links selected because of basic human needs.

The road links final proposed to be improved in the Kabupaten are the 6 links with the total length of 62 km which is 47% of the 132 km total length of Kabupaten roads studied. The proposed road links are shown in Table 6-1-3.

Table 6-1-3 ROAD LINKS TO BE IMPROVED

KABUPATEN : KAPUAS

REASON FOR SELECTION	ROAD LINK NO
Feasible	
- Primary	1,3,
- Secondary	4,
Engineering Point of View	-
Basic Human Needs	-

As the table shows all feasible road links are proposed to be improved.

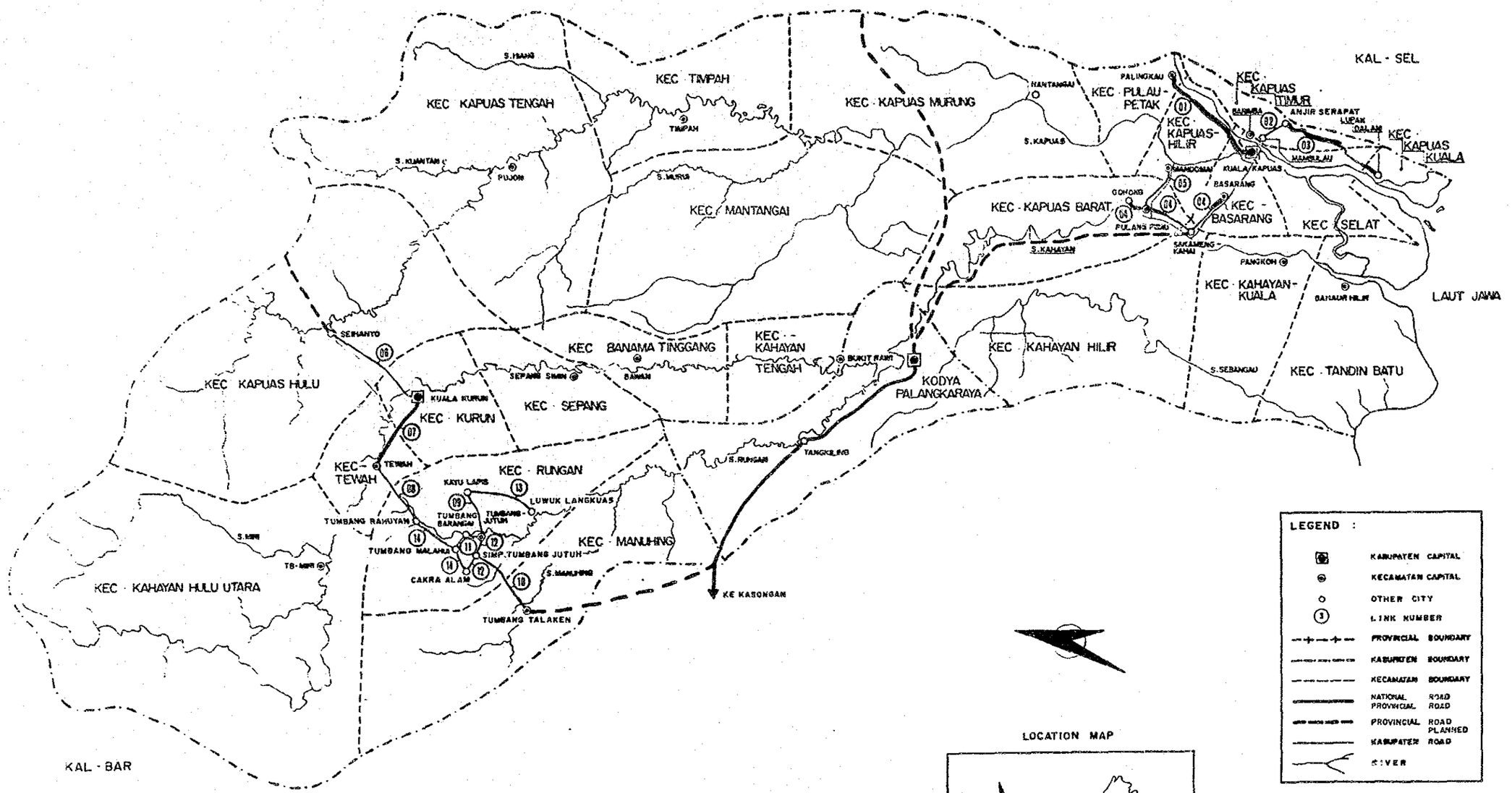
The order of proceeding with the improvement of the proposed road links are decided as shown in Table 6-1-4.

Table 6-1-4 ROAD LINKS TO BE IMPROVED BY YEAR

PROV : KALIMANTAN TENGAH KAB : KAPUAS

YEAR	LINK NO ( ) : rate
1988	1 (35%)
1989	1 (35%), 3 (25%)
1990	1 (30%), 3 (20%), 4 (20%)
1991	3 (30%), 4 (45%)
1992	3 (25%), 4 (35%)

KAB · KAPUAS



SCALE :

0 10 20 30 Km

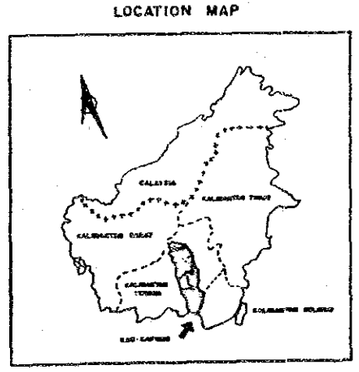
LEGEND :

- KABUPATEN CAPITAL
- KECAMATAN CAPITAL
- OTHER CITY
- (3) LINK NUMBER
- PROVINCIAL BOUNDARY
- KABUPATEN BOUNDARY
- KECAMATAN BOUNDARY
- NATIONAL ROAD / PROVINCIAL ROAD
- PROVINCIAL ROAD PLANNED / KABUPATEN ROAD
- RIVER

CONSTRUCTION PROGRAMME

ROAD LINK NUMBER	FISCAL YEAR 1989/89	1989/90	1990/91	1991/92	1992/93
01	422				
01,05		542			
01,03,04			1,088		
03,06				1,197	
03,06					986
TOTAL COST (10^6 Rp)	422	962	1,088	1,197	986

LOCATION MAP



THE FEASIBILITY STUDY OF THE LOCAL ROAD DEVELOPMENT IN THE REPUBLIC OF INDONESIA

TITLE : CONSTRUCTION PROGRAMME

SOURCE:	SCALE:	PROVINCE : KALIMANTAN TENGAH
DIREKTORAT JENDERAL AGRARIA	AS SHOWN	KABUPATEN : KAPUAS

10-62

(2) Road Links to Be Maintained

It is desirable that all Kabupaten roads are maintained. However, because of the limited budget it is inevitable that some road links in the Kabupatens will be left without maintenance for the time being. The budget should be used for those which are effective in producing more useful development of the Kabupaten through the road development project. The road links to be maintained are finally proposed as shown in Table 6-1-5.

Table 6-1-5 ROAD LINKS TO BE MAINTAINED

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1000Rp)

LINK NO	LENGTH (Km)	BA (%)	SD (%)	RU (%)	RB (%)	ASPHAL (Km)	GRAVEL (Km)	EARTH (Km)	TH NO	AREA (m2)	RC NO	AREA (m2)	BRIDGE COST	LOCAL COST	FOREIGN COST	TOTAL COST
9	9	85.6	0.0	14.4	0.0	0	0	9	0	0.00	0	0.00	0	1,955	407	2,362
10	21	77.1	6.7	16.2	0.0	0	0	21	9	849.00	0	0.00	7,728	10,202	3,036	13,238
11	13	80.0	0.0	20.0	0.0	0	0	13	8	420.00	0	0.00	3,823	5,614	1,620	7,234
12	28	59.6	0.0	40.4	0.0	0	0	28	0	0.00	0	0.00	0	6,083	1,265	7,348
13	50	50.0	0.0	50.0	0.0	0	1	49	9	1096.00	0	0.00	9,976	18,829	4,958	23,787
14	16	88.8	11.3	0.0	0.0	0	0	16	3	450.00	0	0.00	4,096	6,465	1,829	8,294
SUM	137					0	1	136	29	2815.00	0	0.00	25,622	49,148	13,115	62,263

6.1.3 Annual Construction and Maintenance Cost

The annual allocation of the total construction and maintenance cost in the five years programme for Kabupaten Kapuas is finally recommended as shown in Tables 6-1-6 (1), (2) and (3) for the construction, maintenance and total respectively.

The proposed construction cost is Rp 4,562 x 10^6 and maintenance cost is Rp 373 x 10^6 which is approximately 8% of the total expenditure.

Table 6-1-6 (1) CONSTRUCTION AND MAINTENANCE COST
(CONSTRUCTION)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(UNIT : 1000Rp)

ITEM	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)	
LOCAL CURRENCY :	236,088	533,429	570,491	649,881	525,281	2,515,170	(55.1%)
Ownership Cost	2,143	4,299	4,913	5,630	4,525	21,510	(0.9%)
Operation Cost	74,932	149,466	167,580	187,827	151,056	730,861	(29.1%)
Material Cost	109,549	264,633	275,704	316,003	256,115	1,222,004	(48.6%)
Labour Cost	18,670	45,453	47,882	55,654	45,070	212,729	(8.5%)
Contingency	30,794	69,578	74,412	84,767	68,515	328,066	(13.0%)
FOREIGN CURRENCY :	186,309	409,614	462,680	547,736	440,897	2,047,236	(44.9%)
Ownership Cost	42,928	86,034	98,367	112,671	90,505	430,505	(21.0%)
Operation Cost	5,728	11,263	12,968	14,815	11,889	56,663	(2.8%)
Material Cost	113,352	258,889	290,995	348,806	280,995	1,293,037	(63.2%)
Labour Cost	0	0	0	0	0	0	(0.0%)
Contingency	24,301	53,428	60,350	71,444	57,508	267,031	(13.0%)
TOTAL COST :	422,397	943,043	1,033,170	1,197,617	966,178	4,562,405	
Ownership Cost	45,071	90,333	103,280	118,301	95,030	452,015	(9.9%)
Operation Cost	80,660	160,729	180,548	202,642	162,945	787,524	(17.3%)
Material Cost	222,901	523,522	566,699	664,809	537,110	2,515,041	(55.1%)
Labour Cost	18,670	45,453	47,882	55,654	45,070	212,729	(4.7%)
Contingency	55,095	123,006	134,761	156,211	126,023	595,096	(13.0%)

(Contingency : 15%)

Table 6-1-6 (2) CONSTRUCTION AND MAINTENANCE COST

(MAINTENANCE)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(UNIT : 1000Rp)

ITEM	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)	
LOCAL CURRENCY :	24,562	49,141	49,141	86,401	86,642	295,887	(79.4%)
Ownership Cost	197	394	394	684	685	2,354	(0.8%)
Operation Cost	12,030	24,064	24,064	35,596	35,633	131,387	(44.4%)
Material Cost	1,869	3,748	3,748	19,164	19,248	47,777	(16.1%)
Labour Cost	10,466	20,935	20,935	30,957	31,076	114,369	(38.7%)
FOREIGN CURRENCY :	6,556	13,113	13,113	22,020	22,069	76,871	(20.6%)
Ownership Cost	5,564	11,128	11,128	17,084	17,104	62,008	(80.7%)
Operation Cost	523	1,046	1,046	1,545	1,547	5,707	(7.4%)
Material Cost	469	939	939	3,391	3,418	9,156	(11.9%)
Labour Cost	0	0	0	0	0	0	(0.0%)
TOTAL COST :	31,118	62,254	62,254	108,421	108,711	372,758	
Ownership Cost	5,761	11,522	11,522	17,768	17,789	64,362	(17.3%)
Operation Cost	12,553	25,110	25,110	37,141	37,180	137,094	(36.8%)
Material Cost	2,338	4,687	4,687	22,555	22,666	56,933	(15.3%)
Labour Cost	10,466	20,935	20,935	30,957	31,076	114,369	(30.7%)

Table 6-1-6 (3) CONSTRUCTION AND MAINTENANCE COST

(TOTAL)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(UNIT : 1000Rp)

ITEM	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)	
LOCAL CURRENCY :	260,650	582,570	619,632	736,282	611,923	2,811,057	(57.0%)
Ownership Cost	2,340	4,693	5,307	6,314	5,210	23,864	(0.8%)
Operation Cost	86,962	173,530	191,644	223,423	186,689	862,248	(30.7%)
Material Cost	111,418	268,381	279,452	335,167	275,363	1,269,781	(45.2%)
Labour Cost	29,136	66,388	68,817	86,611	76,146	327,098	(11.6%)
Contingency	30,794	69,578	74,412	84,767	68,515	328,066	(11.7%)
FOREIGN CURRENCY :	192,865	422,727	475,793	569,756	462,966	2,124,107	(43.0%)
Ownership Cost	48,492	97,162	109,495	129,755	107,609	492,513	(23.2%)
Operation Cost	6,251	12,309	14,014	16,360	13,436	62,370	(2.9%)
Material Cost	113,821	259,828	291,934	352,197	284,413	1,302,193	(61.3%)
Labour Cost	0	0	0	0	0	0	(0.0%)
Contingency	24,301	53,428	60,350	71,444	57,508	267,031	(12.6%)
TOTAL COST :	453,515	1,005,297	1,095,424	1,306,038	1,074,889	4,935,163	
Ownership Cost	50,832	101,855	114,802	136,069	112,819	516,377	(10.5%)
Operation Cost	93,213	185,839	205,658	239,783	200,125	924,618	(18.7%)
Material Cost	225,239	528,209	571,386	687,364	559,776	2,571,974	(52.1%)
Labour Cost	29,136	66,388	68,817	86,611	76,146	327,098	(6.6%)
Contingency	55,095	123,006	134,761	156,211	126,023	595,096	(12.1%)

(Contingency : 15%)

6.1.4 Construction and Maintenance Equipment Cost

(1) Required Number of Equipment

The required numbers of construction equipment for Kabupaten Kapuas are estimated from the annual proposed construction quantities as shown in Table 6-1-7.

The proposed numbers of equipment to be purchased are finally decided considering the following number of existing equipment in the Kabupaten which are available for the Project.

- 1-Motor Grader
- 1-Tire Roller
- 1-Dump Truck
- 2-Steel Roller

The proposed numbers of maintenance equipment have been decided as shown below from the proposed annual maintenance volume taking into account the capacity of the proposed maintenance gangs.

a. Equipment for Road Maintenance

- 1-Motor Grader 75 HP
- 1-Tire Roller 8-15 Ton
- 1-Dump Truck 3 Ton
- 1-Hand Guided Vibratory Roller 1000 Kg
- 1-Flat Bed Truck 3 Ton

b. Equipment for Bridge Maintenance

- 1-Flat Bed Truck with Grane 3 Ton

(2) Equipment Cost

The proposed construction and maintenance equipment and their purchase costs are shown in Table 6-1-8. In the Project the supplementation cost or equipment cost supplemented is the difference between the purchase cost for newly supplied equipment and the depreciated value.

This comes about because full depreciation of the supplied equipment would not be completed within the Project Period of 5 years.

Table 6-1-7 REQUIRED NUMBER OF EQUIPMENT

PROV : KALIMANTAN TENGAH KAB : KAPUAS

EQUIPMENT NAME	WORKABLE	EXISTING	(1988)	(1989)	(1990)	(1991)	(1992)
Bulldozer	240	0	0.29	0.66	0.82	1.07	0.86
Bulldozer/Ripper	240	0	0.28	0.39	0.48	0.48	0.38
Swamp Bulldozer	240	0	0.04	0.13	0.11	0.11	0.09
Motor Grader	250	1	0.72	1.40	1.80	2.25	1.80
Road Stabilizer	240	0	0.29	0.66	0.82	1.07	0.86
Hand-guide Vib. Roller	250	0	0.02	0.12	0.11	0.15	0.13
Tire Roller	240	1	0.23	0.52	0.43	0.35	0.29
Vibratory Roller (D&T)	250	0	0.67	1.37	1.71	2.14	1.72
Hydraulic Excavator; Wheel	240	0	1.16	2.21	1.84	1.27	1.06
Wheel Loader	250	0	0.68	1.31	1.64	1.99	1.59
Water Tank Truck	250	0	0.49	1.11	1.36	1.74	1.40
Dump Truck	250	1	4.77	9.41	10.81	12.34	9.91
Flat Bed Truck with Crane	250	0	0.01	0.10	0.12	0.19	0.15
Flat Bed Truck	250	0	0.68	1.57	1.70	1.98	1.60
Concrete Mixer	240	0	0.00	0.01	0.01	0.01	0.01
Water Pump	240	0	0.00	0.01	0.01	0.01	0.01
Concrete Vibrator	240	0	0.00	0.01	0.01	0.01	0.01
Asphalt Sprayer	240	0	0.23	0.52	0.43	0.35	0.29

NOTE WORKABLE : workable days in a year
EXISTING : number of existing equipment

Table 6-1-8 EQUIPMENT PURCHASE COST

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1000 Rp)

EQUIPMENT NAME	CLASS	CIF (JAKARTA)	PURCHASE NO.	PURCHASE COST
Bulldozer	90 HP	49,150	1	49,150
Bulldozer/Ripper	90 HP	53,000	-	-
Swamp Bulldozer	90 HP	52,850	1	52,850
Swamp Bulldozer	65 HP	40,500	-	-
Motor Grader	75 HP	47,800	1	47,800
Road Stabilizer	W=1850 mm	85,950	1	85,950
Hand-guide Vib. Roller	1000 Kg	8,500	1	8,500
Tire Roller	8-15 ton	31,070	1	31,070
Vibratory Roller (D&T)	4 ton	29,000	-	-
Vibratory Roller	4 ton	29,000	-	-
Rough Terrain Crane	10 ton	100,400	-	-
Hydraulic Excavator; Wheel	0.3 m3	41,100	1	41,100
Wheel Loader	1.2 m3	70,200	2	140,400
Water Tank Truck	4000 ltr.	12,750	1	12,750
Dump Truck	3.0 ton	14,700	10	147,000
Dump Loader Truck	12 ton	56,300	-	-
Flat Bed Truck with Crane	3.0 ton	25,190	1	25,190
Flat Bed Truck	3.0 ton	11,275	3	33,825
Portable Crusher/Screening	30-40 t/h	188,000	-	-
Concrete Mixer	0.5 m3	18,000	-	-
Water Pump	200 l/min	630	-	-
Concrete Vibrator	3.3 HP	740	-	-
Asphalt Sprayer	850 ltr.	10,200	1	10,200
Service Car	3 ton	11,600	1	11,600
4 Wheel Drive Vehicle	70 HP	17,500	1	17,500
Motorcycle	100 cc	1,100	3	3,300

PURCHASE COST TOTAL	718,185
OWNERSHIP COST (FOREIGN)	407,717
EQUIPMENT COST SUPPLEMENTED	310,468

NOTE : OWNERSHIP COST (FOREIGN) for Existing Equipment

Motor Grader	34,384
Tire Roller	7,877
Vibratory Roller (D&T)	32,973
Dump Truck	9,562
TOTAL	84,796

6.1.5 Other Costs

Cost other items includes the costs of workshop equipment and tools, laboratory test equipment and survey equipment which are recommended in Sub-Clause 3.5. These total costs are summarized in Table 6-1-1.

6.1.6 Quantities by Work Type

The annual construction and maintenance quantities for all proposed road links are shown in Table 6-1-9.

Table 6-1-9 CONSTRUCTION QUANTITIES FOR ALL PROPOSED LINKS

PROV : KALIMANTAN TENGAH KAB : KAPUAS

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
Site Clearance in Light Bush	m2	0.00	0.00	0.00	0.00	0.00	0.00
Subgrade Preparation	m2	105000.00	180000.00	240000.00	292500.00	232500.00	1050000.00
Normal Fill	m3	0.00	0.00	0.00	0.00	0.00	0.00
Fill in Swamp	m3	1707.96	5441.57	4450.85	4480.32	3733.60	19814.30
Normal Excavation to Spoil	m3	4716.95	6934.95	6334.10	3823.95	3122.05	24932.00
Cement Stabilizing	m3	5512.50	12512.50	15925.00	21000.00	16800.00	71750.00
Cement Stabilizing	m3	2756.25	6256.25	7562.50	9600.00	7700.00	33875.00
Shoulder	m2	65625.00	90625.00	126250.00	142500.00	112500.00	537500.00
Asphalt Patching	m2	0.00	0.00	0.00	0.00	0.00	0.00
Surface Dressing (Single)	m2	39375.00	89375.00	73750.00	60000.00	50000.00	312500.00
Surface Dressing (Double)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Earth Drain	m	0.00	7260.00	5808.00	8712.00	7260.00	29040.00
Earth Drain in Swamp (by machine)	m3	22102.50	42352.50	35145.00	24300.00	20250.00	144150.00
Pipe Culvert D80cm	m	0.00	20.50	16.40	24.60	20.50	82.00
Masonry Culvert (80x80cm)	m	0.00	0.00	0.00	0.00	0.00	0.00
Retaining Wall and Wing Wall (Timber)	m2	0.00	249.75	199.80	299.70	249.75	999.00
Retaining Wall and Wing Wall (Masonry)	m3	0.00	8.00	6.40	9.60	8.00	32.00
Gabion Protection	m3	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber;Span 3m;10T)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber;Span 5m;10T)	m2	14.00	98.00	88.16	120.96	99.68	420.80
Superstructure (Timber;Span 8m;10T)	m2	0.00	0.00	48.00	108.00	84.00	240.00
Superstructure (Timber;Span 3m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber;Span 5m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber;Span 8m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete;Span 3m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete;Span 5m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete;Span 8m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete;Span10m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete;Span15m;BM50)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Pier;for Timber;10T)	NO	0.35	2.35	3.70	6.45	5.15	18.00
Substructure (Abut;for Timber;10T)	NO	0.70	5.20	5.00	7.20	5.90	24.00
Substructure (Pier;for Timber;BM50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Abut;for Timber;BM50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Pier;for Concrete;BM50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Abut;for Concrete;BM50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of Bridge (Timber->Timber)	m2	0.00	4.00	10.82	21.94	17.33	54.08
Demolition of Bridge (Timber->Concrete)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of Bridge (Concrete)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Manual routine maintenance of road	Km	68.50	137.00	137.00	162.00	162.00	666.50
Routine maintenance of earth road	Km	68.00	136.00	136.00	136.00	136.00	612.00
Routine maintenance of gravel road	Km	0.50	1.00	1.00	1.00	1.00	4.50
Routine maintenance of asphalt road	Km	0.00	0.00	0.00	25.00	25.00	50.00
Maintenance of Timber Bridge (New)	m2	0.00	0.00	0.00	0.00	40.00	40.00
Maintenance of Concrete Bridge (New)	m2	0.00	0.00	0.00	0.00	0.00	0.00
Maintenance of Timber Bridge (Exist)	m2	1407.50	2815.00	2815.00	4915.00	4915.00	16867.50
Maintenance of Concrete Bridge (Exist)	m2	0.00	0.00	0.00	119.00	119.00	238.00

6.2 Organization and Construction System

6.2.1 Organization

The Bupati as head of the Kabupaten has been authorized by Law No. 13, 1980 as an official responsible for the Local Road Development Project implementation. This means that the DPUK is considered as a responsible agency for the actual execution of the Project.

According to instruction letter dated June 24, 1982 Ref. No. 620/975-/BANGDA, the Project Manager appointed by the Bupati will be responsible for the operation and maintenance of the equipment. Accordingly the Equipment Coordinator appointed from the staff of the Regional Public Works (Kantor Wilayah) by Bina Marga as a coordinator between the Governor and the Bupati will be responsible for delivery, effectual utilization and maintenance of the equipment.

The standard organization of DPUK consists of a minimum of four sections, i.e. Road Section, Housing and City Planning Section, Irrigation Section and Administration Section. For execution of the Project it is strongly recommended that the structural organization of DPUK is established. It will be necessary not only to organize new sections but also to reorganize the current structure through a review of the roles and responsibilities of each inter-related section.

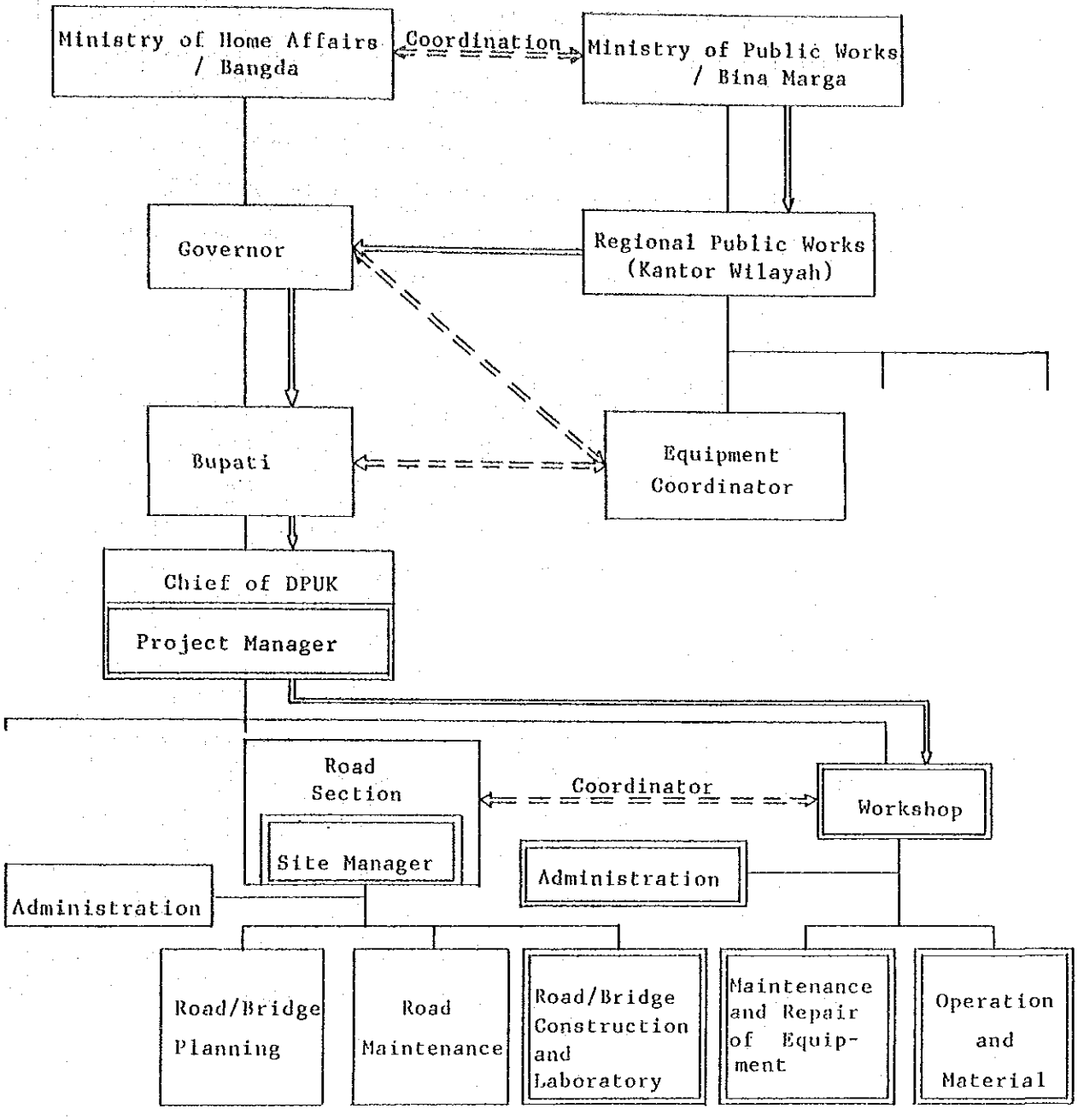
It is recommended that the workshop is newly organized to consist of three sub-sections, i.e. maintenance and repair of equipment, operation and materials, and administration to execute the main tasks described in Clause 3.5.

The sub-section of laboratory would be under the relevant Road Section. The proposed organization is shown in Fig. 6-2-1.

6.2.2 Construction System

For the construction of Kabupaten roads with a ten year effective design life, it has been recommended in Clause 3.4 that the equipment intensive method should be adopted for earth work and pavement work with the exception of surface dressing.

Fig. 6-2-1 PROPOSED ORGANIZATION



⇓ : Equipment delivery flow

▭ : New position/subsection

Current road construction in the Kabupatens is obliged to rely upon the traditional labour intensive method. It is therefore assumed that both the DPUK and the local contractors in the Kabupatens do not have sufficient experience and technique for the equipment intensive method of road construction.

For realization of the Local Road Development Project the GOI has ensured availability of the required human resources of DPUK and intends to conduct training programmes for those human resources as described in Clause 8.3 of the Main Report. This means that the GOI intends the Kabupatens to have the ability to execute the Project by force account (Swakelola).

It should be recognized from the experiences in the first local road project, which was assisted by OECF, ADB and IBRD, that because of their poor construction management and traditional labour intensive methods most of the road construction by local contractors could not be completed within the contract periods. Therefore execution of the road improvement by force account is desirable as recommended from their experience by the consultants for the first local road project.

It is strongly recommended that except for labourers the staff of the force account team should not be hired by the day as it would then not be able to consolidate the foundations for development of self reliability.

However, it will be very difficult to execute all the Projects by force account because of the need for many Kabupaten staff. The GOI has emphasized the need to promote the employment of local weak contractors in order to up-grade their capability in the road project schemes within the Fourth Five-Year Plan (REPELITA)

Taking into consideration the conditions mentioned above it is strongly recommended that the DPUK is obliged to lend some equipment with skilled operators to the local contractors in the Kabupatens for the execution of a part of the road improvement works.

The types of work executed only by force account are recommended as follows:

- Routine maintenance work for the Kabupaten roads
- Laboratory tests
- Production of crushed stone
- Technical service for the equipment

APPENDIX

Appendix 1

INPUT DATA

FOR ESTIMATION OF THE PRODUCER'S SURPLUS BENEFIT

PRV. : KALIMANTAN TENGAH KAB. : KAPUAS SURVEY YEAR : 1983

Code No.	KECAMATAN NAME	CULTIVATED AREA : (PA)	YIELD RATE : (Y)	FARMER'S POPULATION : (AP)	CIRCULATED COMMODITY : (PG)
01	SELAT	9,252	1.75	43,820	0
02	KAPUAS HILIR	6,019	2.06	17,710	0
03	KAPUAS TIMUR	7,119	2.16	10,360	0
04	KAPUAS KUALA	10,302	2.06	13,980	0
05	KAPUAS BARAT	6,309	1.75	16,400	0
06	PULAU PETAK	9,050	1.65	23,420	0
07	KAPUAS MURUNG	9,821	2.06	12,490	0
08	BASARANG	9,183	1.71	13,070	0
09	MANTANGAI	2,095	1.78	12,840	0
10	TIMPAH	2,324	2.06	9,100	0
11	KAPUAS TENGAH	12,180	2.16	9,210	0
12	KAHAYAN HILIR	1,792	1.75	55,520	0
13	PANDIH BATU	1,472	1.03	18,330	0
14	KAHAYAN KUALA	609	1.03	11,370	0
15	KAHAYAN TENGAH	1,354	0.93	9,130	0
16	BANAMA TINGANG	2,142	0.93	5,290	0
17	MANUHING	1,342	1.11	7,790	0
18	RUNGAN	1,402	1.01	5,460	0
19	SEPANG	1,492	1.01	10,200	0
20	KURUN	1,539	0.93	7,750	0
21	TEWAH	1,837	0.97	8,190	0
22	KAPUAS HULU	1,233	0.93	11,470	0
23	KAHAYAN HULU UTARA	509	0.93	5,070	0

	r_1	r_2	r_3	r_4
ANNUAL % AVERAGE GROWTH RATE	2.0	3.0	8.0	6.3

FARMER'S CONSUMPTION : (Cp)	NON-AGRO REQUIRMENT : (NG)
0.13 Ton/head/year	0.15 Ton/ton

	SEDAN	BUS	TRUCK	MOTOR CYCLE
RATE OF EACH VEHICLE TYPE %	5.93	5.93	22.88	65.26

AVERAGE FREIGHT TONAGE	0.7 Ton/Truck

Appendix A-2 Engineering Data

ROAD LINK DATA

PROVINCE : KALIMANTAN TENAGAH

KABUPATEN: KAPUAS

LINK NO.	BEGINNING POINT (DESA NAME)	END POINT (DESA NAME)	LENGTH (KM)	THROUGH THE KEC. NAME & LENGTH		REMARKS
				KEC. NAME	LENGTH (KM)	
01	Kuala Kapuas	Palingkau	25	Basarang Kapuas Hilir Pulau Petak	2 21 2	
02	Mambulau	Anjir Serapat	14	Kapuas Timur	14	
03	Anjir Serapat	Lupak Dalam	50	Kapuas Timur Selat Kapuas Kuala	30 20	
04	Basarang	Gohong	50	Basarang Kahayan Hilir Kapuas Barat	20 5 25	
05	Pulang Pisau	Mandomai	15	Kapuas Hilir Kapuas Barat	3 12	
06	Kuala Kurun	Sei Hanyo	31	Kurun Kapuas Hulu	12 19	
07	Kuala Kurun	Tewah		Kurun Tewah		Jln. Prop.
08	Tumbang Rahuyan	Tewah	26	Tewah Rungan	10 16	
09	Tumbang Jutuh	Kayu Lapis	9	Rungan	9	
10	Simp. Tumbang Jutuh	Tumbang Talaken	21	Rungan Manuhing	10.5 10.5	
11	Tumbang Jutuh	Tumbang Malahui	13	Rungan	13	
12	Tumbang Jutuh	Cakra Alam	28	Rungan	28	
13	Luwuk Langkuas	Kayu lapis	50	Rungan	50	
14	Tumbang Rahuyan	Cakra Alam	16	Rungan	16	

Please note the priority No. in the Remarks of this list for each links No. according to the each Kabupaten's development plan.

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

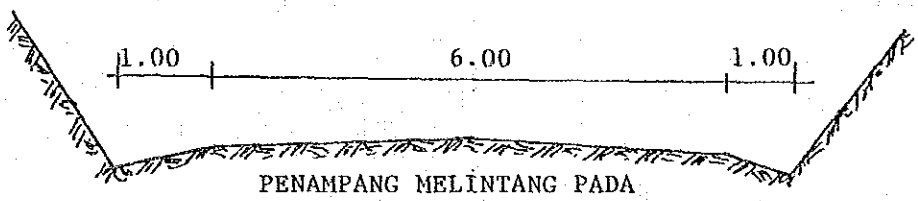
What Kind of Design Criteria has being applied for the new road construction and the improvement for the Kabupaten Road ?
Kriteria Perencanaan yang dipakai pada program penanganan jalan Kabupaten, baik untuk jalan lama maupun pembangunan baru.

Please draw the Typical Cross Section of the Kabupaten Road.
Buat gambar dan penjelasan dari: Typical cross section yang dipakai pada program penanganan jalan selama ini (baik untuk jalan lama, maupun pembangunan baru)

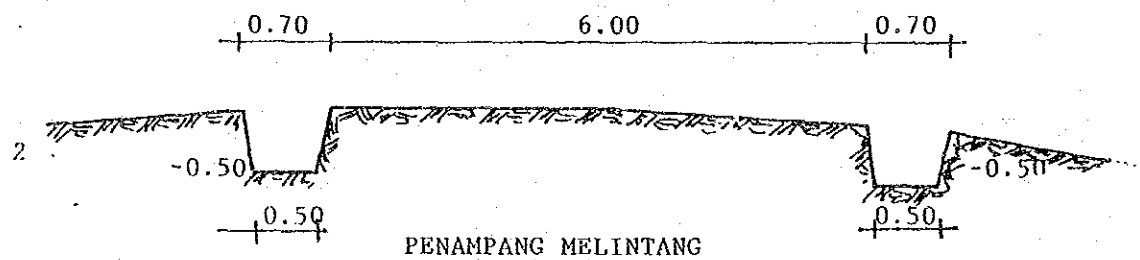
TYPICAL CROSS SECTION.

JALAN TANAH

1



PENAMPANG MELINTANG PADA DAERAH BUKIT



PENAMPANG MELINTANG PADA DAERAH DATAR

PROPINSI: KALIMANTAN TENGAH

E-03-(1)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1980/1981

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1980/1981

LINK NO : Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1981/1982

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1981/1982

LINK NO : Nomor Ruas	L O C A T I O N From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
04	Basarang-Pulang Pisau-Gohong	4 m	Awcas	47	264	
	Mambulau-Unit Tatas	4 m	Awcas	9	61	
07	Tewah-Kuala Kurun	4 m	Awcas	16	104	
02	Anjir Serapat - Mambulau	4 m 120 m	Awcas Kayu	14	94 17	
03	Anjir Serapat-Catur Karya Lupak	4 m	Awcas	50	350	
-	Tumb.Jalembo-Tumb.Kamau	4 m	Awcas	16	112.729	

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

E-03-(3)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1982/1983

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1982/1983

LINK NO. : Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
	INPRES PENUNJANGAN JALAN KABUPATEN DT II					
10	Tumbang Jutuh - Tumbang Talaken	4		6	463.1	
	Tewah - Kuala Kurun	4 m	Awcas	18	199.9	
	Tumbang Ruhuyan-Jl.Kayu Lapis - Tewah	4 m	Awcas 50 m	28	208.8 45	
	Tumbang Jutuh-Jl.Kayu Lapis Km 18	4 m	Awcas	8.5	55.5	
	Tumbang Jutuh-Tumbang Talaken - Tangkiling	4 m	Awcas 110 m	60	364.8 106	
	Kuala Kapuas-Sei Tatas - Palingkau		340 m		366.6	
	Tumbang Baringei-Tumbang Mulahoi	4 m	Awcas	6	55.4	
	Cakra Alam - Tehang	4 m	Awcas		48	

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH E-03-(3)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1982/1983

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1982/1983

LINK NO.: Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
.	INPRES PENUNJANGAN JALAN KABUPATEN DT II					
10	Tumbang Jutuh-Tumbang-Talaken	4		6	463,100	

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

E-03-(4)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1983/1984

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1983/1984

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
07	Kurun-Tewah	4		20	129.850	Inpres DT I Kal.Teng
06	Kurun-Sei Hanyo	4		32	295.252	Inpres DT I
10	Tumbang Jutuh-Tumbang Talaken			26		Inpres DT II
05	Mandumai-Pulang Pisau	4 m 4 m	Gorong2 228 m Kayu 112 m		56.14 88.26	
04	Basarang-Pulang Pisau-Gohong	4 m	Gorong2 456 m Kayu 115 m		89.83 90.62	
02	Mambulan-Anjir Searapat Km 14		Gorong2 192 m Kayu 81 m		37.82 63.83	
	Tb.Jutuh-Tb.Talaken-Tangkiling	4 m	Awcas Kayu 60 m	26	184.61 44.48	
03	Anjir Serapat-Catur Karya - Lupak		Gorong2 248 m Kayu 395 m		48.86 311.26	

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

E-03-(4)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1983/1984

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1983/1984

LINK NO Nomor Ruas	L O C A T I O N From - To (dari - ke)	Lebar perkerasan(m) Lebar Jembatan	Type perkerasan Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
07	Kurun - Tewah	4		20	129,850	Inpres DT I Kal.Teng
06	Kurun-Sei Hanyo	4		32	295,252	InpresDTI
10	Tumbang jutuh-tumbang Talaken			26		Inpres DT II

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

E-03-(5)

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1984/1985

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1984/1985

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar jembatan	Type perkerasan / Type jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
08	Tewah - Tb.Rahuyan	4	Kayu bulat	13	6.637	Inpres Dati II
01	Kapuas-Sei.Tatas-Palingkau	4 m	Awcas	25	265.375	
02	Mambulau-Anjir Serapat	4 m	Awcas	16.5	238.837	
	Kuala Kurun-Tumpang-Tumpang Anjir-Tb.Riu		Gorong2 16m Kayu 223m		4 146.058	
05	Mandomai-Pulang Pisau	4 m	Awcas	5	21.230	

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI: KALIMANTAN TENGAH

E-03-(5)

KABUPATEN: KAPUAS

LOCATION AND COSTS OF THE KABUPATEN ROADS CONSTRUCTED OR INPROVED IN 1984/1985

Biaya konstruksi penanganan jalan dan jembatan Kabupaten thn. 1984/1985

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar perkerasan(m) / Lebar Jembatan	Type perkerasan / Type Jembatan	LENGTH Panjang (KM)	COSTS Harga (Rp 10^6)	REMARKS Keterangan
08	Tewah-TB.Rahuyan	4	Kayu bulat	13	6,637	Inpres DT II

* PAVEMENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam
2. : Asphalt seal / pelaburan aspal
3. : Gravel / kerikil
4. : Gravel /AWCAS / kerikil / japat

PROPINSI : KALIMANTAN TENGAH

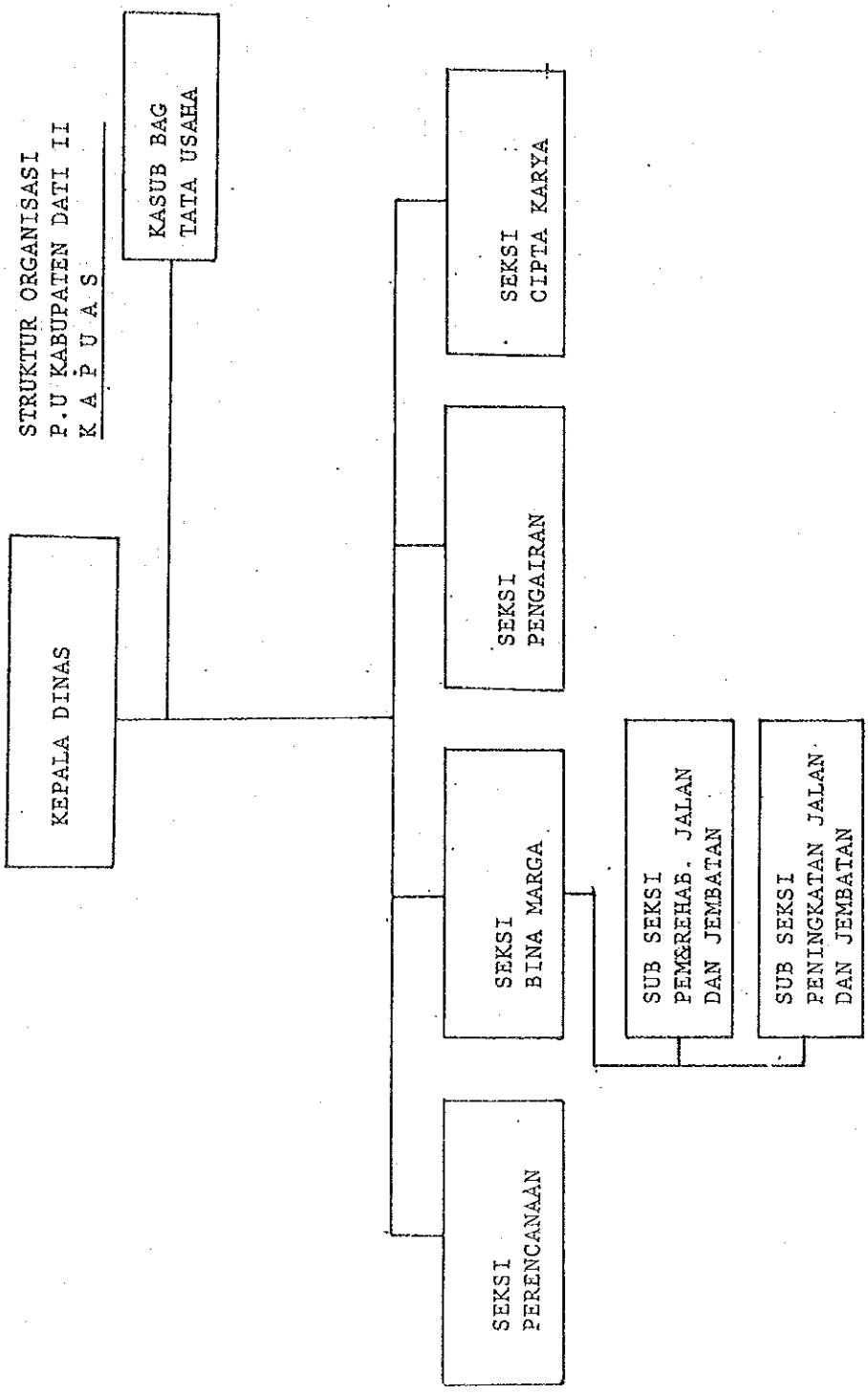
KABUPATEN: KAPUAS

E-04

EXISTING ORGANIZATION IN KABUPATEN

Structur Organisasi yang ada dari P.U Kabupaten

Please draw the Cart of the Existing Organization in the Kabupaten.
Harap digambar bagan organisasi dari DPUK.



EXISTING STAFF RESOURCES OF BINA MARGA OF PU KABUPATEN

Tenaga Dinas PUK yang ada

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

DESCRIPTION /Uraian	NUMBER / Jumlah	REMARKS Keterangan
CONTROLING STAFF Staff teknis PUK	———	———
DPUK ENGINEED Sarjana Teknik		
ASSISTANT ENGINEER Sarjana Muda Teknik	3	
TECHNICIAN STAFF Staff Teknik (STM)	9	
ADMINISTRATION Tenaga Administrasi	6	
SUPERVISOR Tenaga Pengawas	2.	
WORKING FORCE Tenaga Pelaksana Lapangan	———	———
OPERATORS Operators	3	
DRIVERS Supir		
MECHANICS Mechanic		
TRADESMAN Tukang		
L A B O U R Buruh / Pekerja		
OTHERS Lain-lain		
TOTAL / JUMLAH	23	

Catatan ; Untuk kolom keterangan harap diisi berapa orang yang telah mendapat Training.

LOCATION AND AREA OF DPUK WORKSHOP E-06

Lokasi Workshop DPUK

PROPINSI : KALIMANTAN TENGAH

KABUPATEN: KAPUAS

LOCATION Lokasi	AREA (m2) Luas	NUMBER Jumlah	REMARKS Keterangan
KUALA KURUN TANJUNG RIU	40,000	1	Rencana

PROPINSI: KALIMANTAN TENGAH

E-07

KABUPATEN: KAPUAS

LAND ACQUISITION COST

Daftar harga pembebasan tanah

DESCRIPTION Uraian	UNIT Satuan	RATE (RP) Harga	REMARKS Keterangan
CITY/kota	M2		
VILLAGE / desa	M2		
RICE FIELD/sawah	M2		
DRY FIELD/ladang	M2		
MIX CROPS/panen	M2		
FOREST/hutan	M2		
SWAMP / rawa	M2		
OTHERS / lain-lain	M2		

PROPINSI: KALIMANTAN TENGAH E-08

KABUPATEN: KAPUAS

Classification of local contractors at Kabupaten level.

Klasifikasi kontraktor di Kabupaten

COMPANY NAME Nama Kontraktor	CLASS Kelas	CAPITAL Modal (Rp)	NUMBER OF EMPLOYEE Jumlah pegawai	REMARKS Keterangan
143	C2	0-20 juta	16	

NOTE: DATI II

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

E-09

LIST OF EXISTING EQUIPMENT OF LOCAL CONTRACTOR

Name of contractor

NAME OF EQUIPMENT Jenis peralatan	EXISTING CONDITION/ Kondisi Peralatan						REQUIRE - MENT / Kebutuhan peralatan baru
	TYPE/ Tipe	P.Y	NUMBER / Jumlah			REASON OF BAD CONDITION/Sebab Kerusakan	
			GOOD Baik	BAD Rusak	TOTAL Jumlah		
Bulldozer							
Motor Grader							
Tyre Roller							
Steel Whell Roller							
Vibration Roller							
Wheel Loader							
Front End Loader and Backhoe							
Mobile Crane							
Concrete Mixer							
Stone Crusher							
Portable Compressor							
Hydraulic Excavator							
Asphalt Paving Machine							
Asphalt Sprayer							
Asphalt Mixing Machine							
Mobile Workshop							
Mechanic Rammer							
Plate Tamper							
Pile Driver							
Leg Drill							
Hand Hammer							
Farm Tractor							
Dump Truck							
Water Tank Truck							
Fuel Tank Truck							
Pick Up							
Jeep							
Motorcycle							
Generator							
Water Pump							
Others							

PROPINSI: KALIMANTAN TENGAH

KABUPATEN: KAPUAS

LIST OF EXISTING EQUIPMENT OF P.U KABUPATEN

NAME OF EQUIPMENT Jenis peralatan	EXISTING CONDITION/ Kondisi Peralatan						REQUIRE - MENT / Ke-butuhan peralatan baru
	TYPE/ Tipe	P.Y	NUMBER / Jumlah			REASON OF BAD CONDI TION/Sebab Kerusakan	
			GOOD Baik	BAD Rusak	TOTAL Jumlah		
Bulldozer							1
Motor Grader	100NP	1980	1		1		5
Tyre Roller	TS-7409	1980	1		1		9
Steel Whell Roller	Bharata	1983	5	3	8	Sparepart	24
Vibration Roller							10
Wheel Loader							15
Front End Loader and Backhoe							11
Mobile Crane							
Concrete Mixer							16
Stone Crusher	DDU-I	1980	1		1		
Portable Compressor							17
Hydraulic Excavator							2
Asphalt Paving Machine							12
Asphalt Sprayer							
Asphalt Mixing Machine							8
Mobile Workshop							19
Mechanic Rammer							
Plate Tamper							
Pile Driver							
Leg Drill							
Hand Hammer							25
Farm Tractor							18
Dump Truck	3,5t/ 80PS	1980	1	2	3	Sparepart	7
Water Tank Truck							23
Fuel Tank Truck							22
Pick Up	T-120	1980		1	1	Sparepart	6
Jeep							13
Motorcycle							14
Generator							20
Water Pump							21
Others	Bharata 3,5 PK	1982	4		4		4
							3

Appendix A-3 CONSTRUCTION AND MAINTENANCE COST FOR PROPOSED ROAD LINKS

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO : 4 (IIIB-2) LENGTH : 50 Km

UPGRADE : 9.0m road bed, 4.0m road with surface Base Cource

(Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>> LOCAL	FOREIGN	<<<<<< COST LOCAL	FOREIGN	>>>>>> TOTAL
Site Clearance in Light Bush	m2	0.0	157	91	0	0	0
Subgrade Preparation	m2	450000.0	20	11	9,000,000	4,950,000	13,950,000
Normal Fill	m3	0.0	1,611	863	0	0	0
Fill in Swamp	m3	0.0	7,553	267	0	0	0
Normal Excavation to Spoil	m3	2583.0	946	523	2,443,518	1,350,909	3,794,427
Cement Stabilizing	m3	28000.0	11,617	12,368	325,276,000	346,304,000	671,580,000
Cement Stabilizing	m3	12000.0	11,617	12,368	139,404,000	148,416,000	287,820,000
Shoulder	m2	250000.0	281	146	70,250,000	36,500,000	106,750,000
Asphalt Patching	m2	0.0	7,855	1,308	0	0	0
Surface Dressing (Single)	m2	0.0	1,145	896	0	0	0
Surface Dressing (Double)	m2	0.0	1,635	1,410	0	0	0
Earth Drain	m	0.0	797	119	0	0	0
Earth Drain in Swamp (by machine)	m3	0.0	1,127	474	0	0	0
Pipe Culvert D80cm	m	0.0	56,475	49,971	0	0	0
Masonry Culvert (80x80cm)	m	0.0	88,375	39,061	0	0	0
Retaining Wall and Wing Wall (Timber)	m2	0.0	8,608	246	0	0	0
Retaining Wall and Wing Wall (Masonry)	m3	0.0	63,107	10,457	0	0	0
Gabion Protection	m3	0.0	25,607	120	0	0	0
New Bridge (Timber)	SET	1.0	--	--	19,864,645	2,607,889	22,472,534
New Bridge (Concrete)	SET	1.0	--	--	0	0	0
			Sub Total		566,238,163	540,128,798	1,106,366,961
Overhead (15%)					84,935,724	81,019,319	165,955,043
			TOTAL COST		651,173,887	621,148,117	1,272,322,004
Manual routine maintenance of road	Km	50.0	127,812	7,248	6,390,600	362,400	6,753,000
Routine maintenance of gravel road	Km	50.0	775,611	42,664	38,780,550	2,133,200	40,913,750
			Sub Total		45,171,150	2,495,600	47,666,750
Maintenance of Timber Bridge (New)	m2	284.8	6,117	1,232	1,742,121	350,873	2,092,994
Maintenance of Concrete Bridge (New)	m2	0.0	2,557	3,061	0	0	0
Maintenance of Timber Bridge (Exist)	m2	1290.6	6,643	2,459	8,573,455	3,173,585	11,747,040
Maintenance of Concrete Bridge (Exist)	m2	0.0	4,096	2,455	0	0	0

Earthwork & Pavement	Unit Cost	(Rp/Km)	:	24,929,572
Timber	Bridge	Unit Cost	(Rp/m2)	:	90,742
Concrete	Bridge	Unit Cost	(Rp/m2)	:	
Survived	Value		(Rp)	:	335,790,000
Maintenance Rate without Bridge			(%)	:	3.82
New Bridge	Cost Rate		(%)	:	2.03

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO : 1 (IIIB-1) LENGTH : 25 Km

UPGRADE : 12.0m road bed, 4.5m road with surface Dressing (1)

(Rp)

ITEM	UNIT	QUANTITY	UNIT COST LOCAL	UNIT COST FOREIGN	COST LOCAL	COST FOREIGN	COST TOTAL
Site Clearance in Light Bush	m2	0.0	157	91	0	0	0
Subgrade Preparation	m2	300000.0	20	11	6,000,000	3,300,000	9,300,000
Normal Fill	m3	0.0	1,611	863	0	0	0
Fill in Swamp	m3	4879.9	7,553	267	36,857,884	1,302,933	38,160,817
Normal Excavation to Spoil	m3	13477.0	946	523	12,749,242	7,048,471	19,797,713
Cement Stabilizing	m3	15750.0	11,617	12,368	182,967,750	194,796,000	377,763,750
Cement Stabilizing	m3	7875.0	11,617	12,368	91,483,875	97,398,000	188,881,875
Shoulder	m2	187500.0	281	146	52,687,500	27,375,000	80,062,500
Asphalt Patching	m2	0.0	7,855	1,308	0	0	0
Surface Dressing (Single)	m2	112500.0	1,145	896	128,812,500	100,800,000	229,612,500
Surface Dressing (Double)	m2	0.0	1,635	1,410	0	0	0
Earth Drain	m	0.0	797	119	0	0	0
Earth Drain in Swamp (by machine)	m3	63150.0	1,127	474	71,170,050	29,933,100	101,103,150
Pipe Culvert D80cm	m	0.0	56,475	49,971	0	0	0
Masonry Culvert (80x80cm)	m	0.0	88,375	39,061	0	0	0
Retaining Wall and Wing Wall (Timber)	m2	0.0	8,609	246	0	0	0
Retaining Wall and Wing Wall (Masonry)	m3	0.0	63,107	10,457	0	0	0
Gabion Protection	m3	0.0	25,687	120	0	0	0
New Bridge (Timber)	SET	1.0	--	--	3,670,555	512,962	4,183,517
New Bridge (Concrete)	SET	1.0	--	--	0	0	0
			Sub Total		586,399,356	462,466,466	1,048,865,822
Overhead (15%)					87,959,903	69,369,969	157,329,872
			TOTAL COST		674,359,259	531,836,435	1,206,195,694
Manual routine maintenance of road	Km	25.0	127,812	7,248	3,195,300	181,200	3,376,500
Routine maintenance of asphalt road	Km	25.0	785,500	130,800	19,637,500	3,270,000	22,907,500
			Sub Total		22,832,800	3,451,200	26,284,000
Maintenance of Timber Bridge (New)	m2	40.0	6,117	1,232	244,680	49,280	293,960
Maintenance of Concrete Bridge (New)	m2	0.0	2,557	3,061	0	0	0
Maintenance of Timber Bridge (Exist)	m2	2100.0	6,643	2,459	13,950,300	5,163,900	19,114,200
Maintenance of Concrete Bridge (Exist)	m2	119.0	4,096	2,455	487,424	292,145	779,569

Earthwork & Pavement	Unit Cost	(Rp/Km)	:	48,055,386
Timber Bridge	Unit Cost	(Rp/m2)	:	120,276
Concrete Bridge	Unit Cost	(Rp/m2)	:	
Survived Value		(Rp)	:	302,211,000
Maintenance Rate without Bridge		(%)	:	2.19
New Bridge Cost Rate		(%)	:	0.40

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO : 3 (IIIB-1) LENGTH : 50 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Dressing (1)

(Rp)

ITEM	UNIT	QUANTITY	UNIT COST LOCAL	UNIT COST FOREIGN	COST LOCAL	COST FOREIGN	COST TOTAL
Site Clearance in Light Bush	m2	0.0	157	91	0	0	0
Subgrade Preparation	m2	300000.0	20	11	6,000,000	3,300,000	9,300,000
Normal Fill	m3	0.0	1,611	863	0	0	0
Fill in Swamp	m3	14934.4	7,553	267	112,799,523	3,987,484	116,787,007
Normal Excavation to Spoil	m3	8872.0	946	523	8,392,912	4,640,056	13,032,968
Cement Stabilizing	m3	28000.0	11,617	12,368	325,276,000	346,304,000	671,580,000
Cement Stabilizing	m3	14000.0	11,617	12,368	162,638,000	173,152,000	335,790,000
Shoulder	m2	100000.0	281	146	28,100,000	14,600,000	42,700,000
Asphalt Patching	m2	0.0	7,855	1,308	0	0	0
Surface Dressing (Single)	m2	200000.0	1,145	896	229,000,000	179,200,000	408,200,000
Surface Dressing (Double)	m2	0.0	1,635	1,410	0	0	0
Earth Drain	m	29040.0	797	119	23,144,880	3,455,760	26,600,640
Earth Drain in Swamp (by machine)	m3	81000.0	1,127	474	91,287,000	38,394,000	129,681,000
Pipe Culvert D80cm	m	82.0	56,475	49,971	4,630,950	4,097,622	8,728,572
Masonry Culvert (80x80cm)	m	0.0	88,375	39,061	0	0	0
Retaining Wall and Wing Wall (Timber)	m2	999.0	8,608	246	8,599,392	245,754	8,845,146
Retaining Wall and Wing Wall (Masonry)	m3	32.0	63,107	10,457	2,019,424	334,624	2,354,048
Gabion Protection	m3	0.0	25,687	120	0	0	0
New Bridge (Timber)	SET	1.0	--	--	32,051,246	4,493,154	36,544,400
New Bridge (Concrete)	SET	1.0	--	--	0	0	0
			Sub Total		1,033,939,327	776,204,454	1,810,143,781
Overhead (15%)					155,090,899	116,430,668	271,521,567
			TOTAL COST		1,189,030,226	892,635,122	2,081,665,348
Manual routine maintenance of road	Km	50.0	127,812	7,248	6,390,600	362,400	6,753,000
Routine maintenance of asphalt road	Km	50.0	785,500	130,800	39,275,000	6,540,000	45,815,000
			Sub Total		45,665,600	6,902,400	52,568,000
Maintenance of Timber Bridge (New)	m2	336.0	6,117	1,232	2,055,312	413,952	2,469,264
Maintenance of Concrete Bridge (New)	m2	0.0	2,557	3,061	0	0	0
Maintenance of Timber Bridge (Exist)	m2	2209.0	6,643	2,459	14,674,387	5,431,931	20,106,318
Maintenance of Concrete Bridge (Exist)	m2	56.0	4,096	2,455	229,376	137,480	366,856

Earthwork & Pavement	Unit Cost	(Rp/Km)	:	40,792,786
Timber Bridge	Unit Cost	(Rp/m2)	:	125,076
Concrete Bridge	Unit Cost	(Rp/m2)	:	
Survived Value		(Rp)	:	537,264,000
Maintenance Rate without Bridge		(%)	:	2.58
New Bridge Cost Rate		(%)	:	2.02

Appendix A-4 CONSTRUCTION AND MAINTENANCE QUANTITIES
FOR ALL PROPOSED ROAD LINKS
(CONSTRUCTION)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :							
Bulldozer	hr	413.4	938.4	1174.3	1530.0	1225.0	5281.1
Bulldozer/Ripper	hr	391.3	550.9	684.3	689.2	546.7	2862.4
Swamp Bulldozer	hr	56.9	181.3	148.3	149.3	124.4	660.2
Motor Grader	hr	1079.4	2085.7	2692.6	3373.1	2690.6	11921.4
Road Stabilizer	hr	413.4	938.4	1174.3	1530.0	1225.0	5281.1
Hand-guide Vib. Roller	hr	16.4	165.8	153.2	223.6	184.0	743.0
Tire Roller	hr	328.1	744.7	614.5	499.9	416.6	2603.8
Vibratory Roller (D&T)	hr	993.6	2049.5	2558.7	3207.5	2565.1	11374.4
Hydraulic Excavator; Wheel	hr	1657.6	3176.4	2635.8	1822.5	1518.7	10811.0
Wheel Loader	hr	1011.4	1958.5	2445.7	2984.2	2384.2	10784.0
Water Tank Truck	hr	732.9	1651.4	2030.4	2603.9	2086.4	9105.0
Dump Truck	hr	7143.8	14110.8	16206.9	18507.8	14859.3	70828.6
Flat Bed Truck with Crane	hr	14.4	148.8	170.9	276.1	223.8	834.0
Flat Bed Truck	hr	1019.2	2351.5	2545.9	2963.5	2393.8	11273.9
Concrete Mixer	hr	0.0	8.3	6.6	9.9	8.3	33.1
Water Pump	hr	0.0	6.7	5.3	8.0	6.7	26.7
Concrete Vibrator	hr	0.0	3.5	2.8	4.2	3.5	14.0
Asphalt Sprayer	hr	328.1	744.7	614.5	499.9	416.6	2603.8
LABOUR :							
Handur	man day	737.0	1716.8	1790.6	2018.9	1635.5	7898.8
Skilled Labourer	man day	326.7	1600.9	1751.4	2546.1	2065.0	8290.1
Carpenter	man day	69.8	616.9	742.3	1207.2	975.5	3611.7
Mason	man day	0.0	8.0	6.4	9.6	8.0	32.0
Labourer	man day	5837.5	14290.8	14274.2	15786.1	12841.5	63030.1
Driver	man day	1545.5	3225.4	3634.6	4189.0	3370.0	15964.5
Operator	man day	1160.4	2269.3	2553.8	2842.7	2284.7	11110.9
MATERIAL :							
Bitumen	l	67265.6	152682.2	125989.5	102499.9	85416.6	533853.8
Asphalt Oil	l	13453.1	30536.4	25197.9	20500.0	17083.3	106770.7
Kerosene	l	16078.1	36494.7	30114.5	24499.9	20416.6	127603.8
Sand	m3	10195.3	24873.4	28507.7	35672.9	28724.2	127973.5
Cement	bag	15917.2	36183.9	45256.8	58970.1	47216.7	203544.7
River Stone	m3	0.0	8.0	6.4	9.6	8.0	32.0
Steel Moulds	set	0.0	20.5	16.4	24.6	20.5	82.0
Timber	m3	6.2	61.3	71.6	115.9	93.8	348.8
Paint	l	44.8	325.6	398.2	641.2	517.3	1927.1
Reinforcing Steel	kg	0.0	653.9	523.1	784.7	653.9	2615.6
Tying Wire	kg	0.0	5.9	4.7	7.1	5.9	23.6
BaseCourse Material	m3	0.0	0.0	0.0	0.0	0.0	0.0
Crushed Stone	m3	656.2	1495.3	1233.7	1007.0	839.1	5231.3

CONSTRUCTION AND MAINTENANCE QUANTITIES
FOR ALL PROPOSED ROAD LINKS
(MAINTENANCE)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :							
Bulldozer	hr	0.0	0.0	0.0	0.0	0.0	0.0
Bulldozer/Ripper	hr	0.0	0.0	0.0	0.0	0.0	0.0
Swamp Bulldozer	hr	0.0	0.0	0.0	0.0	0.0	0.0
Motor Grader	hr	274.2	548.5	548.5	548.5	548.5	2468.2
Road Stabilizer	hr	0.0	0.0	0.0	0.0	0.0	0.0
Hand-guide Vib. Roller	hr	0.0	0.0	0.0	375.0	375.0	750.0
Tire Roller	hr	274.2	548.5	548.5	548.5	548.5	2468.2
Vibratory Roller (D&T)	hr	0.0	0.0	0.0	0.0	0.0	0.0
Hydraulic Excavator; Wheel	hr	0.0	0.0	0.0	0.0	0.0	0.0
Wheel Loader	hr	0.0	0.0	0.0	0.0	0.0	0.0
Water Tank Truck	hr	0.0	0.0	0.0	0.0	0.0	0.0
Dump Truck	hr	0.0	0.0	0.0	750.0	750.0	1500.0
Flat Bed Truck with Crane	hr	1623.0	3246.0	3246.0	5789.5	5801.7	19706.2
Flat Bed Truck	hr	1096.2	2192.5	2192.5	2492.6	2492.6	10466.4
Concrete Mixer	hr	0.0	0.0	0.0	0.4	0.4	0.8
Water Pump	hr	0.0	0.0	0.0	0.4	0.4	0.8
Concrete Vibrator	hr	0.0	0.0	0.0	0.4	0.4	0.8
Asphalt Sprayer	hr	0.0	0.0	0.0	0.0	0.0	0.0
LABOUR :							
Mandor	man day	381.1	762.4	762.4	1079.8	1083.3	4069.0
Skilled Labourer	man day	450.5	901.1	901.1	1825.9	1851.5	5930.1
Carpenter	man day	241.9	483.8	483.8	845.8	859.5	2914.8
Mason	man day	0.0	0.0	0.0	0.0	0.0	0.0
Labourer	man day	4064.5	8129.1	8129.1	11153.7	11164.0	42640.4
Driver	man day	530.0	1060.2	1060.2	1778.4	1782.1	6210.9
Operator	man day	91.3	182.8	182.8	182.8	182.8	822.5
MATERIAL :							
Bitumen	l	0.0	0.0	0.0	3375.0	3375.0	6750.0
Asphalt Oil	l	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	l	0.0	0.0	0.0	375.0	375.0	750.0
Sand	m3	0.0	0.0	0.0	62.9	62.9	125.8
Cement	bag	0.0	0.0	0.0	6.3	6.3	12.6
River Stone	m3	0.0	0.0	0.0	0.0	0.0	0.0
Steel Moulds	set	0.0	0.0	0.0	0.0	0.0	0.0
Timber	m3	21.9	43.9	43.9	76.7	77.9	264.3
Paint	l	156.6	313.3	313.3	547.1	556.0	1886.3
Reinforcing Steel	kg	0.0	0.0	0.0	32.8	32.8	65.6
Tying Wire	kg	0.0	0.0	0.0	0.2	0.2	0.4
BaseCourse Material	m3	11.2	22.5	22.5	397.5	397.5	851.2
Crushed Stone	m3	0.0	0.0	0.0	38.2	38.2	76.4

CONSTRUCTION AND MAINTENANCE QUANTITIES
FOR ALL PROPOSED ROAD LINKS
(TOTAL)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :							
Bulldozer	hr	413.4	938.4	1174.3	1530.0	1225.0	5281.1
Bulldozer/Ripper	hr	391.3	550.9	684.3	689.2	546.7	2862.4
Swamp Bulldozer	hr	56.9	181.3	148.3	149.3	124.4	660.2
Motor Grader	hr	1353.6	2634.2	3241.1	3921.6	3239.1	14389.6
Road Stabilizer	hr	413.4	938.4	1174.3	1530.0	1225.0	5281.1
Hand-guide Vib. Roller	hr	16.4	165.8	153.2	598.6	559.0	1493.0
Tire Roller	hr	602.3	1293.2	1163.0	1048.4	965.1	5072.0
Vibratory Roller (D&T)	hr	993.6	2049.5	2558.7	3207.5	2565.1	11374.4
Hydraulic Excavator; Wheel	hr	1657.6	3176.4	2635.8	1822.5	1518.7	10811.0
Wheel Loader	hr	1011.4	1958.5	2445.7	2984.2	2384.2	10784.0
Water Tank Truck	hr	732.9	1651.4	2030.4	2603.9	2086.4	9105.0
Dump Truck	hr	7143.8	14110.8	16206.9	19257.8	15609.3	72328.6
Flat Bed Truck with Crane	hr	1637.4	3394.8	3416.9	6065.6	6025.5	20540.2
Flat Bed Truck	hr	2115.4	4544.0	4738.4	5456.1	4886.4	21740.3
Concrete Mixer	hr	0.0	8.3	6.6	10.3	8.7	33.9
Water Pump	hr	0.0	6.7	5.3	8.4	7.1	27.5
Concrete Vibrator	hr	0.0	3.5	2.8	4.6	3.9	14.8
Asphalt Sprayer	hr	328.1	744.7	614.5	499.9	416.6	2603.8
LABOUR :							
Handur	man day	1118.1	2479.2	2553.0	3098.7	2718.8	11967.8
Skilled Labourer	man day	777.2	2502.0	2652.5	4372.0	3916.5	14220.2
Carpenter	man day	311.7	1100.7	1226.1	2053.0	1835.0	6526.5
Mason	man day	0.0	8.0	6.4	9.6	8.0	32.0
Labourer	man day	9902.0	22419.9	22403.3	26939.8	24005.5	105670.5
Driver	man day	2075.5	4285.6	4694.8	5967.4	5152.1	22175.4
Operator	man day	1251.7	2452.1	2736.6	3025.5	2467.5	11933.4
MATERIAL :							
Bitumen	l	67265.6	152682.2	125989.5	105874.9	88791.6	540603.8
Asphalt Oil	l	13453.1	30536.4	25197.9	20500.0	17083.3	106770.7
Kerosene	l	16078.1	36494.7	30114.5	24874.9	20791.6	128353.8
Sand	m3	10195.3	24873.4	28507.7	35735.8	28787.1	128099.3
Cement	bag	15917.2	36183.9	45256.8	58976.4	47223.0	203557.3
River Stone	m3	0.0	8.0	6.4	9.6	8.0	32.0
Steel Moulds	set	0.0	20.5	16.4	24.6	20.5	82.0
Timber	m3	28.1	105.2	115.5	192.6	171.7	613.1
Paint	l	201.4	638.9	711.5	1188.3	1073.3	3813.4
Reinforcing Steel	kg	0.0	653.9	523.1	817.5	686.7	2681.2
Tying Wire	kg	0.0	5.9	4.7	7.3	6.1	24.0
BaseCourse Material	m3	11.2	22.5	22.5	397.5	397.5	851.2
Crushed Stone	m3	656.2	1495.3	1233.7	1045.2	877.3	5307.7

Appendix A-5

CONSTRUCTION AND MAINTENANCE COSTS FOR ALL PROPOSED ROAD LINKS (CONSTRUCTION)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1000 Rp)

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :		125,731	251,062	283,828	320,943	257,975	1,239,539
Bulldozer	14425	5,963	13,536	16,939	22,070	17,670	76,178
Bulldozer/Ripper	15752	6,163	8,677	10,779	10,856	8,611	45,086
Swamp Bulldozer	11622	661	2,107	1,723	1,735	1,445	7,671
Motor Grader	13458	14,526	28,069	36,237	45,395	36,210	160,437
Road Stabilizer	12719	5,258	11,935	14,935	19,460	15,500	67,168
Hand-guide Vib. Roller	1555	25	257	238	347	286	1,153
Tire Roller	10701	3,510	7,969	6,575	5,349	4,458	27,861
Vibratory Roller (D&T)	6716	6,673	13,764	17,184	21,541	17,227	76,389
Hydraulic Excavator; Wheel	12609	20,900	40,051	33,234	22,979	19,149	136,313
Wheel Loader	16636	16,825	32,581	40,686	49,645	39,663	179,400
Water Tank Truck	3905	2,861	6,448	7,928	10,168	8,147	35,552
Dump Truck	5360	38,290	75,633	86,868	99,201	79,645	379,637
Flat Bed Truck with Crane	4988	71	742	852	1,377	1,116	4,158
Flat Bed Truck	3280	3,342	7,712	8,350	9,720	7,851	36,975
Concrete Mixer	8727	0	72	57	86	72	287
Water Pump	476	0	3	2	3	3	11
Concrete Vibrator	310	0	1	0	1	1	3
Asphalt Sprayer	2021	663	1,505	1,241	1,010	841	5,260
LABOUR :		18,670	45,453	47,882	55,654	45,070	212,729
Handur	2200	1,621	3,776	3,939	4,441	3,598	17,375
Skilled Labourer	2000	653	3,201	3,502	5,092	4,130	16,578
Carpenter	2500	174	1,542	1,855	3,018	2,438	9,027
Mason	2500	0	20	16	24	20	80
Labourer	1650	7,631	23,579	23,552	26,047	21,188	103,997
Driver	2200	3,400	7,095	7,996	9,215	7,414	35,120
Operator	2750	3,191	6,240	7,022	7,817	6,282	30,552
MATERIAL :		222,901	523,522	566,699	664,809	537,110	2,515,041
Bitumen	500	33,632	76,341	62,994	51,249	42,708	266,924
Asphalt Oil	800	10,762	24,429	20,158	16,400	13,666	85,415
Kerosene	250	4,019	9,123	7,528	6,124	5,104	31,898
Sand	7000	71,367	174,113	199,553	249,710	201,069	895,812
Cement	5000	79,586	180,919	226,284	294,850	236,083	1,017,722
River Stone	20000	0	160	128	192	160	640
Steel Moulds	8500	0	174	139	209	174	696
Timber	70000	434	4,291	5,012	8,113	6,566	24,416
Paint	3000	134	976	1,194	1,923	1,551	5,778
Reinforcing Steel	1000	0	653	523	784	653	2,613
Tying Wire	1500	0	8	7	10	8	33
BaseCourse Material	30000	0	0	0	0	0	0
Crushed Stone	35000	22,967	52,335	43,179	35,245	29,368	183,094

CONSTRUCTION AND MAINTENANCE COSTS
FOR ALL PROPOSED ROAD LINKS
(MAINTENANCE)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1000 Rp)

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :		18,314	36,632	36,632	54,909	54,969	201,456
Bulldozer	14425	0	0	0	0	0	0
Bulldozer/Ripper	15752	0	0	0	0	0	0
Swamp Bulldozer	11622	0	0	0	0	0	0
Motor Grader	13458	3,690	7,381	7,381	7,381	7,381	33,214
Road Stabilizer	12719	0	0	0	0	0	0
Hand-guide Vib. Roller	1555	0	0	0	583	583	1,166
Tire Roller	10701	2,934	5,869	5,869	5,869	5,869	26,410
Vibratory Roller (D&T)	6716	0	0	0	0	0	0
Hydraulic Excavator; Wheel	12609	0	0	0	0	0	0
Wheel Loader	16636	0	0	0	0	0	0
Water Tank Truck	3905	0	0	0	0	0	0
Dump Truck	5360	0	0	0	4,020	4,020	8,040
Flat Bed Truck with Crane	4988	8,095	16,191	16,191	28,878	28,938	98,293
Flat Bed Truck	3280	3,595	7,191	7,191	8,175	8,175	34,327
Concrete Mixer	8727	0	0	0	3	3	6
Water Pump	476	0	0	0	0	0	0
Concrete Vibrator	310	0	0	0	0	0	0
Asphalt Sprayer	2021	0	0	0	0	0	0
LABOUR :		10,466	20,935	20,935	30,957	31,076	114,369
Mandur	2200	838	1,677	1,677	2,375	2,383	8,950
Skilled Labourer	2000	901	1,802	1,802	3,651	3,703	11,859
Carpenter	2500	604	1,209	1,209	2,114	2,148	7,284
Mason	2500	0	0	0	0	0	0
Labourer	1650	6,706	13,413	13,413	18,403	18,420	70,355
Driver	2200	1,166	2,332	2,332	3,912	3,920	13,662
Operator	2750	251	502	502	502	502	2,259
MATERIAL :		2,338	4,687	4,687	22,555	22,666	56,933
Bitumen	500	0	0	0	1,687	1,687	3,374
Asphalt Oil	800	0	0	0	0	0	0
Kerosene	250	0	0	0	93	93	186
Sand	7000	0	0	0	440	440	880
Cement	5000	0	0	0	31	31	62
River Stone	20000	0	0	0	0	0	0
Steel Moulds	8500	0	0	0	0	0	0
Timber	70000	1,533	3,073	3,073	5,369	5,453	18,501
Paint	3000	469	939	939	1,641	1,668	5,656
Reinforcing Steel	1000	0	0	0	32	32	64
Tying Wire	1500	0	0	0	0	0	0
BaseCourse Material	30000	336	675	675	11,925	11,925	25,536
Crushed Stone	35000	0	0	0	1,337	1,337	2,674

CONSTRUCTION AND MAINTENANCE COSTS
FOR ALL PROPOSED ROAD LINKS
(TOTAL)

PROV : KALIMANTAN TENGAH KAB : KAPUAS

(1000 Rp)

ITEM	UNIT	(1988)	(1989)	(1990)	(1991)	(1992)	(TOTAL)
EQUIPMENT :		144,045	287,694	320,460	375,852	312,944	1,440,995
Bulldozer	14425	5,963	13,536	16,939	22,070	17,670	76,178
Bulldozer/Ripper	15752	6,163	8,677	10,779	10,856	8,611	45,086
Swamp Bulldozer	11622	661	2,107	1,723	1,735	1,445	7,671
Motor Grader	13458	18,216	35,450	43,618	52,776	43,591	193,651
Road Stabilizer	12719	5,258	11,935	14,935	19,460	15,580	67,168
Hand-guide Vib. Roller	1555	25	257	238	930	869	2,319
Tire Roller	10701	6,444	13,838	12,444	11,218	10,327	54,271
Vibratory Roller (D&T)	6716	6,673	13,764	17,184	21,541	17,227	76,389
Hydraulic Excavator; Wheel	12609	20,900	40,051	33,234	22,979	19,149	136,313
Wheel Loader	16636	16,825	32,581	40,686	49,645	39,663	179,400
Water Tank Truck	3905	2,861	6,448	7,928	10,168	8,147	35,552
Dump Truck	5360	38,290	75,633	86,868	103,221	83,665	387,677
Flat Bed Truck with Crane	4988	8,166	16,933	17,043	30,255	30,054	102,451
Flat Bed Truck	3280	6,937	14,903	15,541	17,895	16,026	71,302
Concrete Mixer	8727	0	72	57	89	75	293
Water Pump	476	0	3	2	3	3	11
Concrete Vibrator	310	0	1	0	1	1	3
Asphalt Sprayer	2021	663	1,505	1,241	1,010	841	5,260
LABOUR :		29,136	66,388	68,817	86,611	76,141	327,098
Mandur	2200	2,459	5,453	5,616	6,816	5,981	26,325
Skilled Labourer	2000	1,554	5,003	5,304	8,743	7,833	28,437
Carpenter	2500	778	2,751	3,064	5,132	4,586	16,311
Mason	2500	0	20	16	24	20	80
Labourer	1650	16,337	36,992	36,965	44,450	39,608	174,352
Driver	2200	4,566	9,427	10,328	13,127	11,334	48,782
Operator	2750	3,442	6,742	7,524	8,319	6,784	32,811
MATERIAL :		225,239	528,209	571,386	687,364	559,776	2,571,974
Bitumen	500	33,632	76,341	62,994	52,936	44,395	270,298
Asphalt Oil	800	10,762	24,429	20,158	16,400	13,666	85,415
Kerosene	250	4,019	9,123	7,528	6,217	5,197	32,084
Sand	7000	71,367	174,113	199,553	250,150	201,509	896,692
Cement	5000	79,586	180,919	226,284	294,881	236,114	1,017,784
River Stone	20000	0	160	128	192	160	640
Steel Moulds	8500	0	174	139	209	174	696
Timber	70000	1,967	7,364	8,085	13,482	12,019	42,917
Paint	3000	603	1,915	2,133	3,564	3,219	11,434
Reinforcing Steel	1000	0	653	523	816	685	2,677
Tying Wire	1500	0	8	7	10	8	33
BaseCourse Material	30000	336	675	675	11,925	11,925	25,536
Crushed Stone	35000	22,967	52,335	43,179	36,582	30,705	185,768

Appendix A-6 QUANTITIES OF BRIDGE ON PROPOSED ROAD LINKS

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO	BRIDGE NAME	Km	From	<< TYPE >> (EXIST)	(NEW)	DESIGN LOAD	SPAN CLASS	LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA (EXIST) (m2)	AREA (NEW) (m2)	PIER (no)	ABUT (no)	ROAD CLASS
4	PULANGPISAN	40	BSRG	KK				16.30	4	4.08	3.00	48.90		3	2	III B-2
	PULANGPISAN	41	BSRG	KK				11.00	3	3.67	4.00	44.00		2	2	
	ANJIRKELANPAN	42	BSRG	--	TN	10T	(C)	60.00	8	7.50	4.00	0.00	240.00	7	2	
	PULANGPISAN	42	BSRG	KK				18.60	6	3.10	4.00	74.40		5	2	
	PULANGPISAN	43	BSRG	KK				7.00	2	3.50	4.00	28.00		1	2	
	PULANGPISAN	44	BSRG	KK				10.60	3	3.53	4.00	42.40		2	2	
	PULANGPISAN	45	BSRG	KK				14.74	4	3.69	4.00	58.96		3	2	
	PULANGPISAN	45	BSRG	KK				6.40	2	3.20	4.00	25.60		1	2	
	PULANGPISAN	46	BSRG	KK				14.50	4	3.63	4.00	58.00		3	2	
	GOHONG	47	BSRG	KK				18.30	5	3.66	4.00	73.20		4	2	
	GOHONG	48	BSRG	KK				6.80	2	3.40	4.00	27.20		1	2	
	KLNKNN	25	++	KK				30.00	7	4.29	4.00	120.00		6	2	

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO	BRIDGE NAME	Km	From	<< TYPE >> (EXIST)	(NEW)	DESIGN LOAD	SPAN CLASS	LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA (EXIST) (m2)	AREA (NEW) (m2)	PIER (no)	ABUT (no)	ROAD CLASS
4	LUNUK RAMBA B	6	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	IIIB-2
	LUNUK RAMBA 9	6	BSRG	KK				2.00	1	2.00	3.50	7.00		0	2	
	TAMBUN RAYA	7	BSRG	KK				2.00	1	2.00	3.45	6.90		0	2	
	TAMBUN RAYA	7	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	TAMBUN RAYA	9	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	10	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	10	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	11	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	12	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	13	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	13	BSRG	KK				2.00	1	2.00	3.30	6.60		0	2	
	BASARANG	10	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	10	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	11	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	12	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	13	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	13	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	14	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	15	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	16	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	17	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	18	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	18	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	18	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	18	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	19	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	19	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	19	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	19	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	20	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	20	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	20	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	20	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	20	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	21	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	21	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	BASARANG	22	BSRG	KK				2.20	1	2.20	3.20	7.04		0	2	
	BASARANG	22	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	23	BSRG	KK				2.00	1	2.00	3.30	6.60		0	2	
	BASARANG	24	BSRG	KK				2.00	1	2.00	3.35	6.70		0	2	
	BASARANG	24	BSRG	KK				2.00	3	0.67	3.25	6.50		2	2	
	BASARANG	25	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	MENTAREN	26	BSRG	KK				14.00	3	4.67	3.45	48.30		2	2	
	MENTAREN	26	BSRG	KK				13.30	3	4.43	3.50	46.55		2	2	
	MENTAREN	27	BSRG	KK				6.60	2	3.30	4.00	26.40		1	2	
	PULANGPISAN	39	BSRG	KK				4.00	1	4.00	3.50	14.00		0	2	
	PULANGPISAN	39	BSRG	KK				3.80	1	3.80	3.60	13.68		0	2	
	PULANGPISAN	39	BSRG	KK	TH	10T	(B)	11.20	3	3.73	4.00	38.08	44.80	2	2	
	NYAHUK	40	BSRG	KK				11.60	3	3.87	3.40	39.44		2	2	
	PULANGPISAN	40	BSRG	KK				15.00	3	5.00	3.40	51.00		2	2	
	PULANGPISAN	40	BSRG	KK				10.50	3	3.50	3.00	31.50		2	2	

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO	BRIDGE NAME	Km	From	<< TYPE >> (EXIST)	(NEW)	DESIGN LOAD	SPAN CLASS	LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA (EXIST) (m2)	AREA (NEW) (m2)	PIER (no)	ABUT (no)	ROAD CLASS
3	N.1	38	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	IIIB-1
	N.1	38	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	39	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	40	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	41	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	41	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	41	MBLU	KK				14.00	4	3.50	3.50	49.00		3	2	
	N.1	41	MBLU	KK				20.00	5	4.00	3.50	70.00		4	2	
	N.1	41	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	41	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	REY II	42	MBLU	KK				12.00	4	3.00	3.50	42.00		3	2	
	N.1	42	MBLU	KK				4.00	1	4.00	3.50	14.00		0	2	
	N.1	42	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				14.00	4	3.50	3.50	49.00		3	2	
	N.1	42	MBLU	KK				20.00	5	4.00	3.50	70.00		4	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.1	42	MBLU	KK				3.00	1	3.00	4.00	12.00		0	2	
	REY I	42	MBLU	KK				12.00	4	3.00	3.50	42.00		3	2	
	SEI.BAKUT	43	MBLU	KK				20.00	5	4.00	4.00	80.00		4	2	
	N.1	44	MBLU	KK				4.00	1	4.00	3.00	12.00		0	2	
	N.1	44	MBLU	KK				4.00	1	4.00	3.00	12.00		0	2	
	SEI.BARIS	44	MBLU	KK				20.00	6	3.33	3.50	70.00		5	2	
	N.1	45	MBLU	KK				6.00	2	3.00	3.00	18.00		1	2	
	SEI KURAU	46	MBLU	KK				20.00	1	20.00	3.50	70.00		0	2	
	N.1	46	MBLU	KK				12.00	4	3.00	3.50	42.00		3	2	
	SEI.LUPAK	46	MBLU	KK				30.00	7	4.29	3.50	105.00		6	2	
	N.1	46	MBLU	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.1	46	MBLU	RB				4.00	1	4.00	4.00	16.00		0	2	
	N.1	46	MBLU	KK				4.00	1	4.00	4.00	16.00		0	2	
	MDL GANDUNG	46	MBLU	KK				6.00	2	3.00	4.00	24.00		1	2	
	N.1	46	MBLU	KK				4.00	1	4.00	4.00	16.00		0	2	
	MDL.SETUJU	46	MBLU	KK				8.00	3	2.67	4.00	32.00		2	2	
	MDL.PERWIRA	46	MBLU	GG				10.00	3	3.33	4.00	40.00		2	2	
	N.1	46	MBLU	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.1	46	MBLU	KK				6.00	2	3.00	4.00	24.00		1	2	
	N.1	46	MBLU	KK				12.00	4	3.00	4.00	48.00		3	2	
4	MALUVEN	1	++	KK				2.50	1	2.50	3.30	8.25		0	2	IIIB-2
	MALUVEN 2	1	BSRG	KK				2.15	1	2.15	3.10	6.67		0	2	
	MALUVEN 3	2	BSRG	KK				2.40	1	2.40	3.60	8.64		0	2	
	LUNUK RAMBA	4	BSRG	KK				12.30	2	6.15	3.20	39.36		1	2	
	LUNUK RAMBA 2	4	BSRG	KK				2.15	1	2.15	3.06	6.58		0	2	
	LUNUK RAMBA 3	5	BSRG	KK				2.00	1	2.00	3.40	6.80		0	2	
	LUNUK RAMBA 4	5	BSRG	KK				2.00	1	2.00	3.50	7.00		0	2	
	LUNUK RAMBA 5	5	BSRG	KK				2.00	3	0.67	3.20	6.40		2	2	
	LUNUK RAMBA 6	6	BSRG	KK				12.30	3	4.10	3.20	39.36		2	2	
	LUNUK RAMBA 7	6	BSRG	KK				2.15	1	2.15	3.06	6.58		0	2	

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO	BRIDGE NAME	Km	From	<< TYPE >> (EXIST)	(NEW)	DESIGN LOAD	SPAN CLASS	LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA (EXIST) (m2)	AREA (NEW) (m2)	PIER (no)	ABUT (no)	ROAD CLASS
3	SILK KBR	1	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	IIIB-1
	S.BRTS	2	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	S.RGN	2	MBLN	KK				10.00	3	3.33	4.00	40.00		2	2	
	MDLDT	2	MBLN	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	MDLLTN	6	++	KK				3.00	1	3.00	4.00	12.00		0	2	
	MDL MURNI	7	MBLN	LL				4.00	1	4.00	4.00	16.00		0	2	
	MDLS WARGA	8	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	MDL NAGASAKI	9	MBLN	KK				6.00	1	6.00	4.00	24.00		0	2	
	MDL SEDERHANA	10	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	MDL PERWIRA	11	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	N.I	13	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	13	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	KLM TENGAH	25	MBLN	KK				26.00	7	3.71	4.00	104.00		6	2	
	N.I	16	++	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	PHRKLN KIRI	19	MBLN	KK				12.00	4	3.00	4.00	48.00		3	2	
	N.I	20	++	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	20	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	21	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	21	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	22	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	23	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	23	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	SIBRANGAS	23	MBLN	KK				6.00	2	3.00	4.00	24.00		1	2	
	N.I	24	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	SI.BLGR	24	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	24	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	N.I	26	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	26	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	28	++	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	29	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	29	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	29	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	30	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	31	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	MDL LUTOI	4	MBLN	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.I	0	**	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	AJR TOMBAN	34	MBLN	KK				30.00	7	4.29	4.00	120.00		6	2	
	N.I	34	MBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	34	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	34	MBLN	KK				6.00	2	3.00	4.00	24.00		1	2	
	N.I	35	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	35	MBLN	KK				6.00	2	3.00	4.00	24.00		1	2	
	N.I	36	MBLN	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	37	MBLN	KK	TM	10T	(B)	4.00	1	4.00	4.00	16.00	16.00	0	2	

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO	BRIDGE NAME	Km	From	<< TYPE >> (EXIST)	(NEW)	DESIGN LOAD	SPAN CLASS	LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA (EXIST) (m2)	AREA (NEW) (m2)	PIER (no)	ABUT (no)	ROAD CLASS
1	SEI.SELAT	1	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	IIID-1
	ULES	4	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	USANG	5	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	BERKAT NAKMUR	6	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	SEIBERE	7	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	KABULI	7	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	TABALIEN	8	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	PALINGET	9	KPAS	KB				17.00	4	4.25	7.00	119.00		3	2	
	JAJANGKIT	10	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	PALUNDU	10	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	PALUNDUNATI	11	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	GABEN	11	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	SAKAMANGKAHAI	12	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	BARASAKECIL	12	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	USAHANURNI	13	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	BARASAK BESAR	14	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	RADEN	14	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	HANDELTABALIEN	15	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	BUNGAKAWAR	15	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	JAMJAMAN	16	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	MELATI HULU	16	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	SEITATAS HILIR	16	KPAS	KK				10.00	3	3.33	4.00	40.00		2	2	
	SAKALANGGAR	17	KPAS	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.I	17	KPAS	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.I	18	KPAS	KK				10.00	3	3.33	4.00	40.00		2	2	
	MELATIMUARI	18	KPAS	KK				21.00	6	3.50	4.00	84.00		5	2	
	SEI TATAS HULU	18	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	MARATA	19	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	TATAS SAGAKIRI	20	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	N.I	20	KPAS	KK				3.00	1	3.00	7.00	21.00		0	2	
	TATASJAGAKANAN	20	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	HANDELSIMIN	21	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	SIMPANG BUNGAI	21	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	ITIK	22	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	PALAMBANG	22	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	BARI	23	KPAS	KK				20.00	6	3.33	7.00	140.00		5	2	
	SEILASAR	24	KPAS	KK				6.00	2	3.00	7.00	42.00		1	2	
	PAPUYU	25	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	SIMPANG DALAM	25	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	SEIPAN LINGKAU	25	KPAS	KK				10.00	3	3.33	7.00	70.00		2	2	
	SEITELUK KUBUR	25	KPAS	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.1	0	--	--	TM	10T	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	HOLIDAGTS	5	KBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	N.I	19	++	KK				3.00	1	3.00	4.00	12.00		0	2	
	N.I	27	++	KK				6.00	2	3.00	4.00	24.00		1	2	
3	SKBL	1	++	KK				14.00	5	2.80	4.00	56.00		4	2	IIIB-1
	N.I	1	KBLN	KK				4.00	1	4.00	4.00	16.00		0	2	
	SAGN KECIL	1	KBLN	KK				10.00	3	3.33	4.00	40.00		2	2	
	SKBL KECIL	1	KBLN	KK				10.00	3	3.33	4.00	40.00		2	2	
	N.I	1	KBLN	KK				3.00	1	3.00	4.00	12.00		0	2	

Appendix A-7 CONSTRUCTION AND MAINTENANCE COST OF BRIDGES ON PROPOSAL ROAD LINKS

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO : 1 (IIIB-1) LENGTH : 25 Km

(Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>> LOCAL	FOREIGN	<<<<<< COST LOCAL	FOREIGN	>>>>>> TOTAL
Superstructure (Timber;Span 3m;10T)	m2	0.00	32,449	4,083	0	0	0
Superstructure (Timber;Span 5m;10T)	m2	40.00	35,942	4,508	1,437,680	180,320	1,618,000
Superstructure (Timber;Span 8m;10T)	m2	0.00	47,605	5,920	0	0	0
Superstructure (Timber;Span 3m;BM50)	m2	0.00	40,235	5,048	0	0	0
Superstructure (Timber;Span 5m;BM50)	m2	0.00	43,924	5,469	0	0	0
Superstructure (Timber;Span 8m;BM50)	m2	0.00	55,707	6,922	0	0	0
Superstructure (Concrete;Span 3m;BM50)	m2	0.00	55,420	106,749	0	0	0
Superstructure (Concrete;Span 5m;BM50)	m2	0.00	58,109	119,370	0	0	0
Superstructure (Concrete;Span 8m;BM50)	m2	0.00	60,768	130,068	0	0	0
Superstructure (Concrete;Span10m;BM50)	m2	0.00	66,923	147,794	0	0	0
Superstructure (Concrete;Span15m;BM50)	m2	0.00	73,982	174,184	0	0	0
Substructure (Pier;for Timber;10T)	NO	1.00	282,709	37,984	282,709	37,984	320,693
Substructure (Abut;for Timber;10T)	NO	2.00	975,083	147,329	1,950,166	294,658	2,244,824
Substructure (Pier;for Timber;BM50)	NO	0.00	415,790	56,225	0	0	0
Substructure (Abut;for Timber;BM50)	NO	0.00	1,075,606	167,422	0	0	0
Substructure (Pier;for Concrete;BM50)	NO	0.00	2,240,801	477,264	0	0	0
Substructure (Abut;for Concrete;BM50)	NO	0.00	4,911,589	920,351	0	0	0
Demolition of Bridge (Timber->Timber)	m2	0.00	10,098	1,417	0	0	0
Demolition of Bridge (Timber->Concrete)	m2	0.00	10,098	1,417	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	106,545	79,667	0	0	0
Maintenance of Timber Bridge (New)	m2	40.00	6,117	1,232	244,680	49,280	293,960
Maintenance of Concrete Bridge (New)	m2	0.00	2,557	3,061	0	0	0
Maintenance of Timber Bridge (Exist)	m2	2100.00	6,643	2,459	13,950,300	5,163,900	19,114,200
Maintenance of Concrete Bridge (Exist)	m2	119.00	4,096	2,455	487,424	292,145	779,569
(Without Overhead)	TOTAL COST (Timber Bridge)				3,670,555	512,962	4,183,517
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				3,670,555	512,962	4,183,517
(Overhead : 15%)	TOTAL COST (Timber Bridge)				4,221,138	589,906	4,811,045
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				4,221,138	589,906	4,811,045

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINK NO : 3 (IIIB-1) LENGTH : 50 Km

(Rp)

ITEM	UNIT	QUANTITY	UNIT COST LOCAL	UNIT COST FOREIGN	COST LOCAL	COST FOREIGN	TOTAL
Superstructure (Timber;Span 3m;10T)	m2	0.00	32,449	4,083	0	0	0
Superstructure (Timber;Span 5m;10T)	m2	336.00	35,942	4,508	12,076,512	1,514,688	13,591,200
Superstructure (Timber;Span 8m;10T)	m2	0.00	47,605	5,920	0	0	0
Superstructure (Timber;Span 3m;BM50)	m2	0.00	40,235	5,048	0	0	0
Superstructure (Timber;Span 5m;BM50)	m2	0.00	43,924	5,469	0	0	0
Superstructure (Timber;Span 8m;BM50)	m2	0.00	55,707	6,922	0	0	0
Superstructure (Concrete;Span 3m;BM50)	m2	0.00	55,420	106,749	0	0	0
Superstructure (Concrete;Span 5m;BM50)	m2	0.00	58,109	119,370	0	0	0
Superstructure (Concrete;Span 8m;BM50)	m2	0.00	60,768	130,068	0	0	0
Superstructure (Concrete;Span10m;BM50)	m2	0.00	66,923	147,794	0	0	0
Superstructure (Concrete;Span15m;BM50)	m2	0.00	73,982	174,184	0	0	0
Substructure (Pier;for Timber;10T)	NO	8.00	282,709	37,984	2,261,672	303,872	2,565,544
Substructure (Abut;for Timber;10T)	NO	18.00	975,083	147,329	17,551,494	2,651,922	20,203,416
Substructure (Pier;for Timber;BM50)	NO	0.00	415,790	56,225	0	0	0
Substructure (Abut;for Timber;BM50)	NO	0.00	1,075,606	167,422	0	0	0
Substructure (Pier;for Concrete;BM50)	NO	0.00	2,240,801	477,264	0	0	0
Substructure (Abut;for Concrete;BM50)	NO	0.00	4,911,589	920,351	0	0	0
Demolition of Bridge (Timber->Timber)	m2	16.00	10,098	1,417	161,568	22,672	184,240
Demolition of Bridge (Timber->Concrete)	m2	0.00	10,098	1,417	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	106,545	79,667	0	0	0
Maintenance of Timber Bridge (New)	m2	336.00	6,117	1,232	2,055,312	413,952	2,469,264
Maintenance of Concrete Bridge (New)	m2	0.00	2,557	3,061	0	0	0
Maintenance of Timber Bridge (Exist)	m2	2209.00	6,643	2,459	14,674,387	5,431,931	20,106,318
Maintenance of Concrete Bridge (Exist)	m2	56.00	4,096	2,455	229,376	137,480	366,856
(Without Overhead)	TOTAL COST (Timber Bridge)				32,051,246	4,493,154	36,544,400
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				32,051,246	4,493,154	36,544,400
(Overhead : 15%)	TOTAL COST (Timber Bridge)				36,858,933	5,167,127	42,026,060
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				36,858,933	5,167,127	42,026,060

PROV : KALIMANTAN TENGAH KAB : KAPUAS

LINE NO : 4 (IIIB-2) LENGTH : 50 Km

(Rp)

ITEM	UNIT	QUANTITY	UNIT COST LOCAL	UNIT COST FOREIGN	COST LOCAL	COST FOREIGN	TOTAL
Superstructure (Timber;Span 3m;10T)	m2	0.00	32,449	4,083	0	0	0
Superstructure (Timber;Span 5m;10T)	m2	44.80	35,942	4,508	1,610,201	201,958	1,812,159
Superstructure (Timber;Span 8m;10T)	m2	240.00	47,605	5,920	11,425,200	1,420,800	12,846,000
Superstructure (Timber;Span 3m;BM50)	m2	0.00	40,235	5,048	0	0	0
Superstructure (Timber;Span 5m;BM50)	m2	0.00	43,924	5,469	0	0	0
Superstructure (Timber;Span 8m;BM50)	m2	0.00	55,707	6,922	0	0	0
Superstructure (Concrete;Span 3m;BM50)	m2	0.00	55,420	106,749	0	0	0
Superstructure (Concrete;Span 5m;BM50)	m2	0.00	58,109	119,370	0	0	0
Superstructure (Concrete;Span 8m;BM50)	m2	0.00	60,768	130,068	0	0	0
Superstructure (Concrete;Span10m;BM50)	m2	0.00	66,923	147,794	0	0	0
Superstructure (Concrete;Span15m;BM50)	m2	0.00	73,982	174,184	0	0	0
Substructure (Pier;for Timber;10T)	NO	9.00	282,709	37,984	2,544,381	341,856	2,886,237
Substructure (Abut;for Timber;10T)	NO	4.00	975,083	147,329	3,900,332	589,316	4,489,648
Substructure (Pier;for Timber;BM50)	NO	0.00	415,790	56,225	0	0	0
Substructure (Abut;for Timber;BM50)	NO	0.00	1,075,606	167,422	0	0	0
Substructure (Pier;for Concrete;BM50)	NO	0.00	2,240,801	477,264	0	0	0
Substructure (Abut;for Concrete;BM50)	NO	0.00	4,911,589	920,351	0	0	0
Demolition of Bridge (Timber->Timber)	m2	38.08	10,098	1,417	384,531	53,959	438,490
Demolition of Bridge (Timber->Concrete)	m2	0.00	10,098	1,417	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	106,545	79,667	0	0	0
Maintenance of Timber Bridge (New)	m2	284.80	6,117	1,232	1,742,121	350,873	2,092,994
Maintenance of Concrete Bridge (New)	m2	0.00	2,557	3,064	0	0	0
Maintenance of Timber Bridge (Exist)	m2	1290.60	6,643	2,459	8,573,455	3,173,585	11,747,040
Maintenance of Concrete Bridge (Exist)	m2	0.00	4,096	2,455	0	0	0
(Without Overhead)	TOTAL COST (Timber Bridge)				19,864,645	2,607,889	22,472,534
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				19,864,645	2,607,889	22,472,534
(Overhead : 15%)	TOTAL COST (Timber Bridge)				22,844,342	2,999,072	25,843,414
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				22,844,342	2,999,072	25,843,414