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MINISTRY OF PUBLIC WORKS
DIRECTORATE GENERAL OF HIGHWAYS**

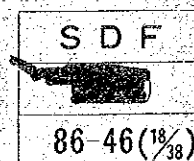
**THE FEASIBILITY STUDY
OF
THE LOCAL ROAD DEVELOPMENT
IN THE REPUBLIC OF INDONESIA**

KABUPATEN REPORT 18

KABUPATEN KOTA BARU

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY



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国際協力事業団

受入 月日	'87.5.21	108
登録 No.	16441	61.4 SDF

PREFACE

This is the Kabupaten Report of the Feasibility Study of the Local Road Development in the Republic of Indonesia for Kabupaten Kota Baru in Kalimantan Selatan 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.

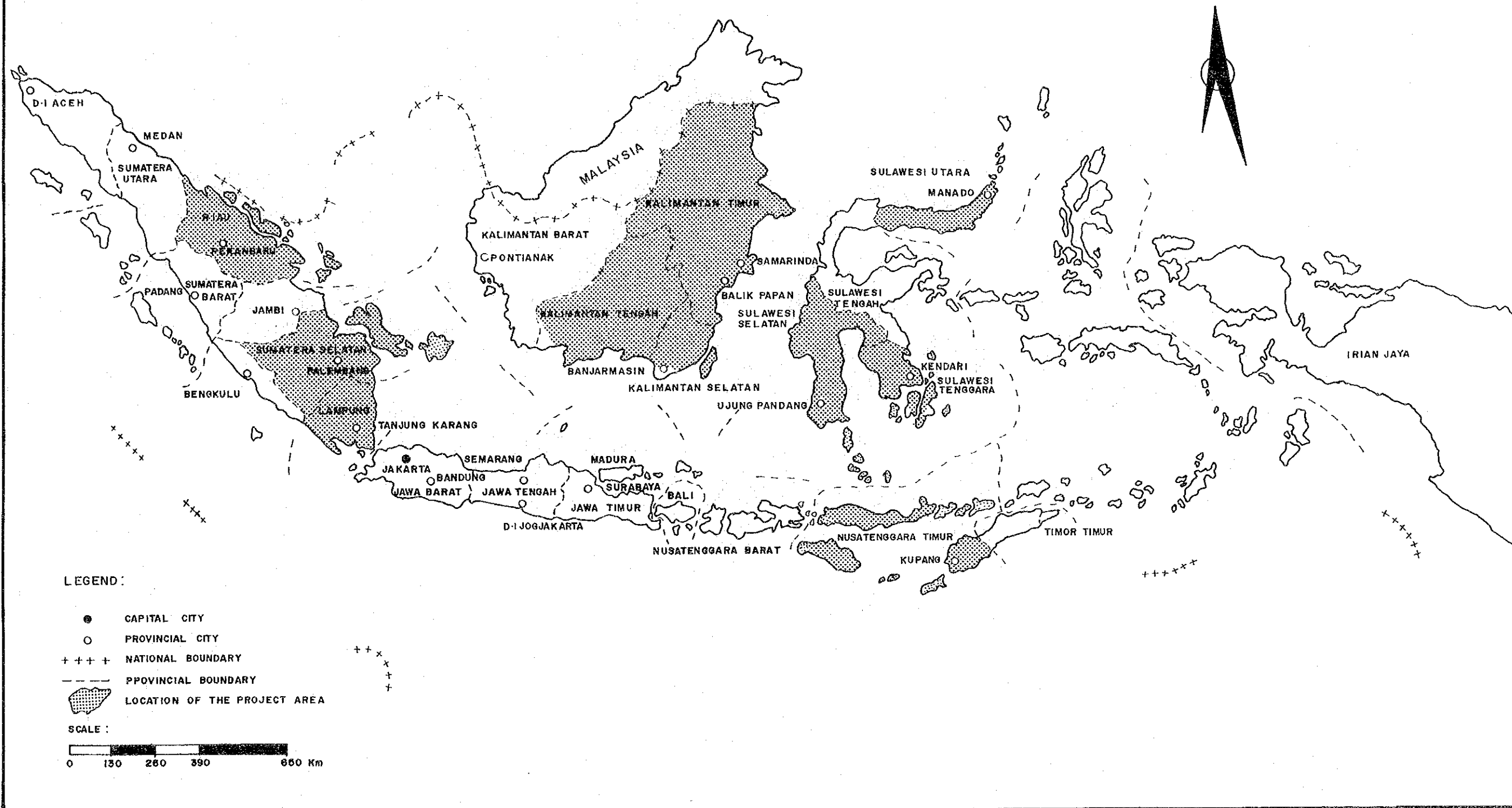
Since the study period was limited without cooperation of Bina Marga, Bangda and local governments of both province and Kabupaten in collecting the data, the study would not have been completed within the period.

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

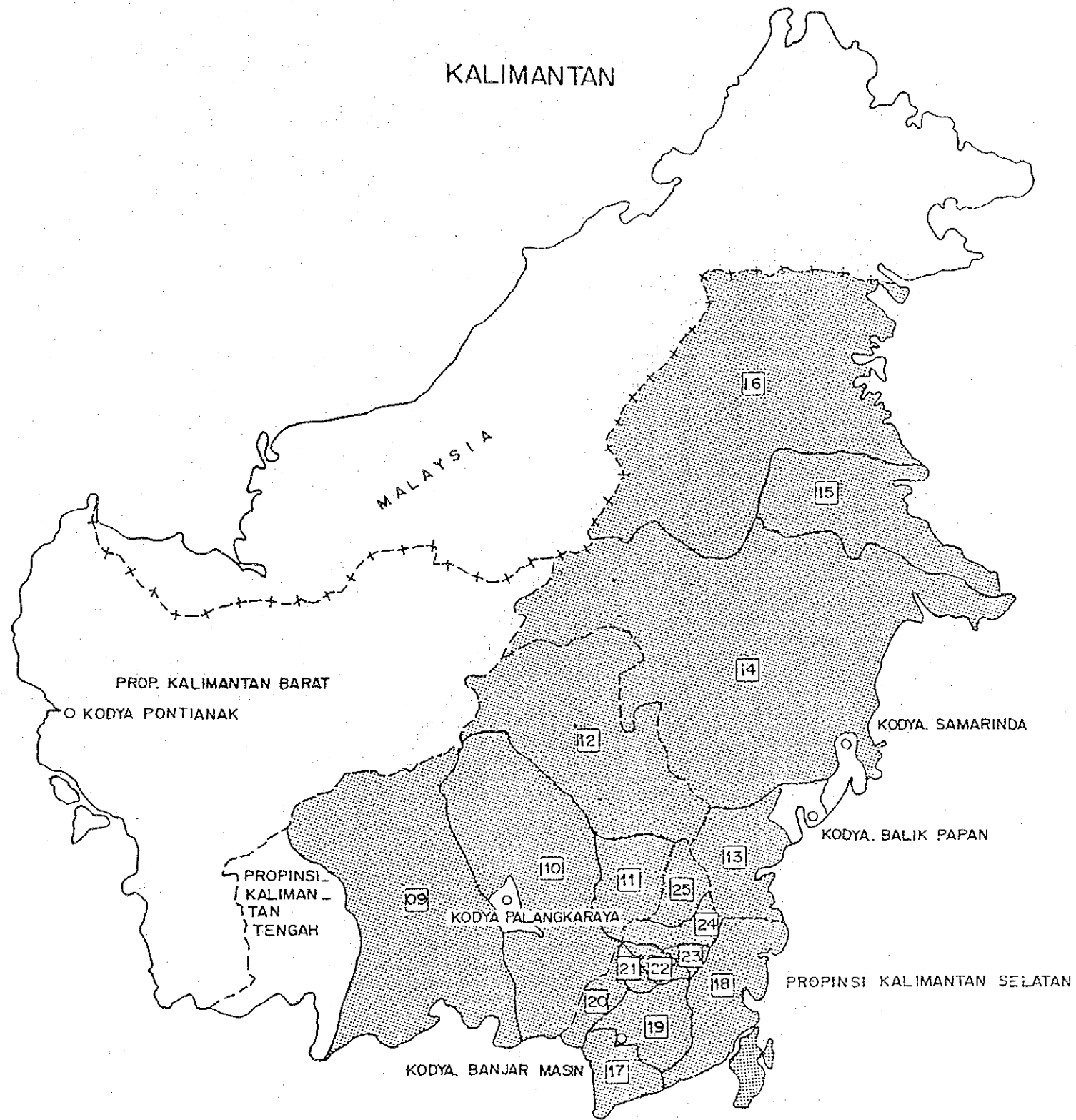
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- 12 · KAB · BARITO UTARA

V · PROPINSI KALIMANTAN TIMUR

- 13 · KAB · PASIR
- 14 · KAB · KUTAI
- 15 · KAB · BERAU
- 16 · KAB · BULUNGAN

VI · PROPINSI KALIMANTAN SELATAN

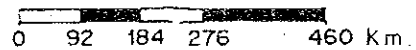
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- 19 · KAB · BANJAR
- 20 · KAB · BARITO KUALA
- 21 · KAB · TAPIN
- 22 · KAB · HULU SUNGAI SELATAN
- 23 · KAB · HULU SUNGAI TENGAH
- 24 · KAB · HULU SUNGAI UTARA
- 25 · KAB · TABALONG

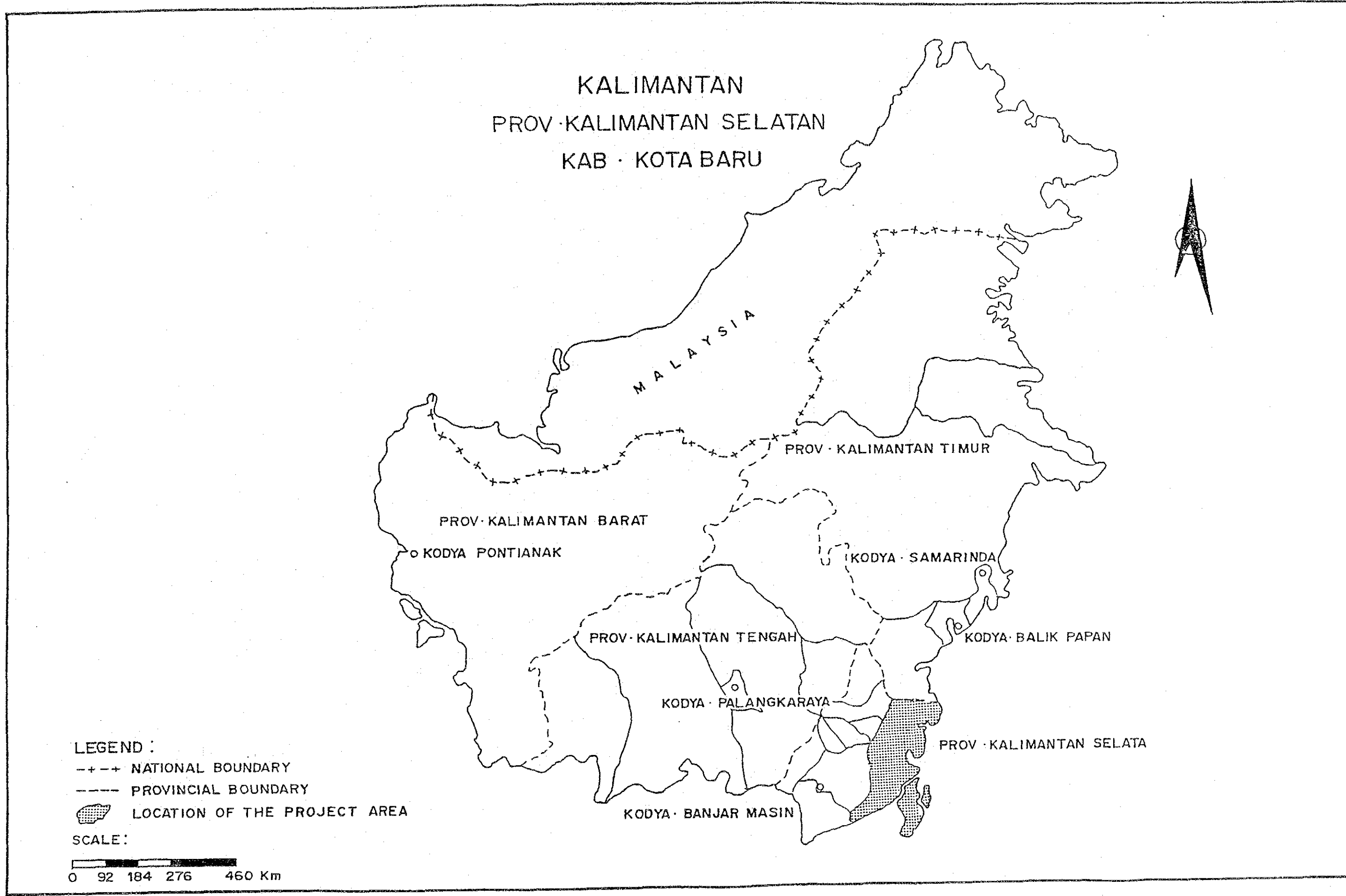


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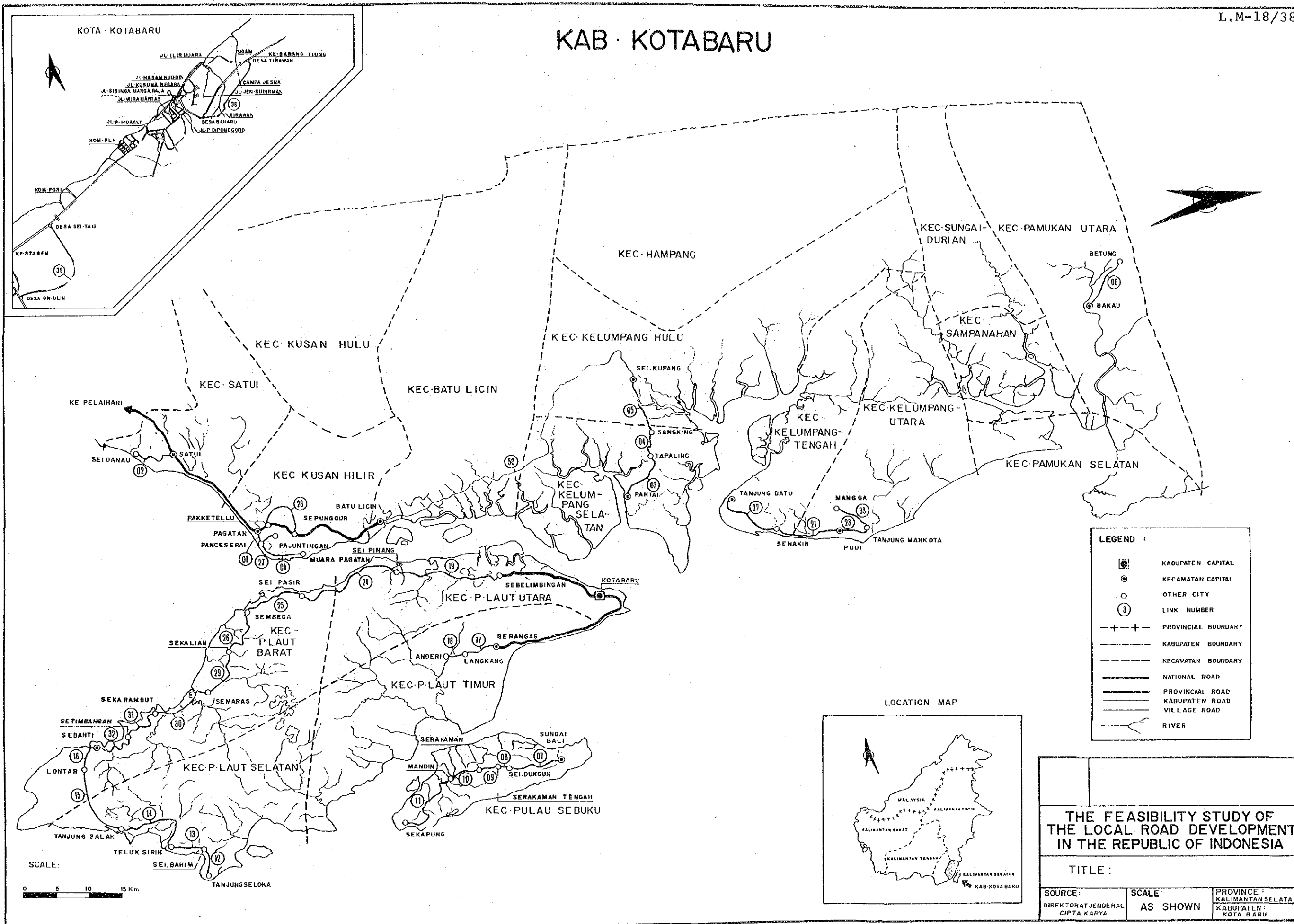
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KAB · KOTABARU



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

TITLE :

SOURCE : DIREKTORAT JENDERAL CIPTA KARYA

SCALE : AS SHOWN

PROVINCE : KALIMANTAN SELATAN
KABUPATEN : KOTA BARU

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Chapter 1 BACKGROUND OF THE KABUPATEN

1.1 Topographic and Meteorological Conditions

1.1.1 Location and Topography

Kabupaten Kota Baru occupies a stretch of the east part of Kalimantan Selatan Province. The south-east of the Kabupaten is an entirely coastal area facing both the Makassar Strait and the Jawa Sea. The Kabupaten also includes Laut Island in the offing and Sebuku Island further to the east. On the north the Kabupaten is bordered by Kalimantan Timur Province and on the west, from the north, by Kabupatens Hulu Sungai Utara, Hulu Sungai Tengah, Hulu Sungai Selatan, Banjar and Tanah Laut.

On the west boundary, except the Riamkanan dan area, the Meratus mountains, 1000 to 1900 meter high, run from the north to the south. From the foot of the mountains undulating hills spread southeastward down to the coast. Rising from the mountains on the boundary, a number of rivers flow into the sea and form some flat areas along the limited extent of the basins close to the coast. Laut Island where the capital of the Kabupaten, Kota Baru, is located and the neighboring island, Sebuku, are both wholly covered by hills which form tablelands with coastal cliffs, except at some areas where small flatlands approach the coast.

The area of the Kabupaten is about 14,260 square kilometers and is the largest in Kalimantan Selatan Province. It consists administratively of 19 Kecamatan.

1.1.2 Meteorological Conditions

Since there are no meteorological data obtained from the Kabupaten Kota Baru the data of Kabupaten Tanah Laut shown in Table 1-1-1 are adopted for the Study.

The number of working days 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.

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

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 Selatan
KABUPATEN : Tanah Laut

STATION : Pelsihari

MONTH	1 9 8 0		1 9 8 1		1 9 8 2		1 9 8 3		1 9 8 4	
	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)	RAINY DAYS	RAINFALL (mm)
January	22	480	15	490	18	770	14	407	21	454
February	14	389	10	292	13	320	14	320	22	261
March	14	232	6	138	19	308	12	269	19	655
April	18	440	9	350	13	310	11	258	22	402
May	9	61	11	270	3	135	14	88	20	241
June	10	205	3	121	4	188	8	93	11	133
July	3	140	9	140	1	7	14	192	10	213
August	5	34	-	-	-	-	4	54	3	33
September	1	5	7	241	2	6	6	23	9	227
October	6	68	8	135	3	23	11	180	5	133
November	17	450	17	962	7	68	18	880	15	170
December	21	477	18	612	18	341	14	656	21	694
Total	140	2,981	113	3,751	101	2,476	140	3,420	178	3,616

1.2 Socio-Economic Conditions

1.2.1 Population

The population of Kabupaten Kota Baru in 1984 was 253,400 which was approximately 11.3% of the 2,241,600 total population of Kalimantan Selatan Province as shown in Table 1-2-1.

The Population density was 0.18 persons per ha which was lower than the provincial density of 0.58. This may be because of many swampy areas and poor accers particularly near the Kabupaten boundary.

The recent annual average growth rate of population of the Kabupaten is 5.6% which is higher than both the provincial rate of 2.1% and the national rate of 2.2%. This may be a result of the on-going transmigration programme in the Kabupaten and the inflow of population from other Kabupatens in the province as the provincial and national growth rates are almost the same.

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:					
TANAH LAUT	148,708	3.5	347,682	0.43	1984
KOTA BARU	253,400	5.6	1,426,432	0.18	1984
BANJAR	355,078	3.0	503,980	0.70	1982
BARITO KUALA	198,282	4.0	299,696	0.66	1984
TAPIN	115,752	3.0	270,062	0.42	1983
HULU SUNGAI SELATAN	187,161	3.5	189,261	0.99	1984
HULU SUNGAI TENGAH	205,266	0.5	147,200	1.39	1983
HULU SUNGAI UTARA	248,860	1.5	359,178	0.69	1984
TABALONG	130,218	2.0	394,600	0.33	1984
PROVINCE:					
KALIMANTAN SELATAN	2,155,700		3,766,000		1982
	2,198,400	2.1	3,766,000	0.58	1983
	2,241,600		3,766,000		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 : 1984

PROVINCE : KALIMANTAN SELATAN

KABUPATEN : KOTA BARU

KECAMATAN	POPULATION	PROPORTION (%)
P. SEMBILAN	6,603	2.6
P. LAUT BARAT	10,297	4.1
P. LAUT SELATAN	13,233	5.2
P. LAUT TIMUR	5,286	2.1
P. SEBUKU	3,424	1.4
P. LAUT UTARA	52,380	20.6
KUSAN HILIR	46,265	18.3
SATUI	22,824	9.0
KUSAN HULU	7,397	2.9
BATU LICIN	35,763	14.1
KELUMPANG SELATAN	6,828	2.7
KELUMPANG HULU	5,711	2.3
KELUMPANG TENGAH	7,530	3.0
KELUMPANG UTARA	4,941	1.9
PAMUKAN SELATAN	5,205	2.1
SAMPANAHAN	4,803	1.9
PAMUKAN UTARA	6,199	2.4
HAMPANG	4,392	1.7
SUNGAI DURIAN	4,319	1.7
TOTAL	253,400	100

1.2.2 Land-Use

In Kabupaten Kota Baru, 259,256 ha of the current available land use area, which is approximately 18.2% of the 1,426,432 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 152,622 ha of agricultural harvest area, 14,184 ha of residential area and 92,450 ha of usable open space which are 58.9%, 5.5% and 35.6% of the current available land use area respectively.

The agricultural harvest area consists of 52,328 ha of paddy field, 27,050 ha of plantation area and 73,244 ha of other cultivated area which are 34.3%, 17.7% and 48.0% 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

KABUPATEN	PROVINCE : KALIMANTAN SELATAN										TOTAL AREA	SURVEY YEAR
	WET PADDY FIELD	UPLAND PADDY FIELD	OTHER TIVATED AREA	PLANTATION AREA	RESIDENTIAL AREA	USABLE SPACE	RIVER LAKE	FORESTRY AREA	OTHERS	(ha)		
TANAH LAUT	53,787 (15.5)	9,266 (2.7)	6,890 (2.0)	30,350 (8.7)	13,839 (4.0)	15,000 (4.3)	300 (0.1)	173,539 (49.9)	44,712 (12.9)	347,683 (100)	1984	
KOTA BARU	14,997 (1.1)	37,331 (2.6)	73,244 (5.1)	27,050 (1.9)	14,184 (1.0)	92,450 (6.5)	-	1,108,967 (77.7)	58,524 (4.1)	1,426,432 (100)	1984	
BANJAR	52,360 (10.4)	17,590 (3.5)	17,590 (3.5)	22,850 (4.5)	16,000 (3.2)	-	12,500 (2.5)	248,340 (49.3)	134,340 (26.6)	503,980 (100)	1982	
BARITO KUALA	76,493 (25.5)	-	-	18,274 (6.1)	6,006 (2.0)	3,678 (1.2)	1,408 (0.5)	121,494 (40.6)	72,343 (24.1)	299,696 (100)	1984	
TAPIN	33,647 (12.5)	17,385 (6.4)	49,616 (18.4)	20,694 (7.7)	6,120 (2.3)	4,525 (1.7)	16,366 (6.1)	63,819 (23.6)	57,910 (21.4)	270,082 (100)	1983	
HULU SUNGAI SELATAN	29,725 (15.7)	414 (0.2)	4,651 (2.5)	21,544 (11.4)	6,733 (0.9)	37,451 (19.8)	38,681 (20.4)	47,956 (25.3)	1,053 (0.6)	189,261 (100)	1984	
HULU SUNGAI TENGAH	23,764 (16.1)	2,100 (1.4)	-	16,425 (11.2)	1,329 (0.9)	1,930 (1.3)	11,060 (7.5)	40,846 (27.7)	49,733 (33.8)	147,168 (100)	1984	
HULU SUNGAI UTARA	99,035 (27.6)	7,828 (2.2)	48,032 (13.4)	66,068 (18.4)	11,586 (3.2)	15,000 (4.2)	69,866 (19.4)	33,482 (9.3)	10,055 (2.8)	359,178 (100)	1984	
TABALONG	13,085 (3.3)	5,720 (1.4)	7,676 (1.9)	19,980 (5.1)	7,300 (1.8)	25,000 (6.3)	12,215 (3.1)	258,867 (65.7)	44,759 (11.4)	394,600 (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 Kota Baru in 1983 were 21,457 ha and 51,151 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 17,607 ha and 37,412 ton respectively which are 81.5% and 73.1% of the total food crops. The yield rate of paddy production is 2.12 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 1983 were 6.0% and 4.3% respectively which indicate a steady but slow development of the paddy production. It is desirable that both marketability and productivity of paddy become higher and these depend upon the future development of irrigation.

The commodity crops are produced in the plantations. The area and production of plantation crops in 1983 were 9,095 ha and 703 ton respectively with current growth rates of 3.4% and 0% as shown in Table 1-2-5. Thus the plantation crop production is not satisfactory. Some changes are expected considering the international balance of supply and demand.

The population of the agricultural sector which is assumed from the employment in the Kabupaten is 63.7% of the total population as shown in Table 1-2-6. Thus this is an agricultural Kabupaten.

Table 1-2-4

AREA AND PRODUCTION OF FOOD CROPS

KABUPATEN : KOTA BARU

CULTIVATED AREA

ITEM	YEAR						(ha)	AAGR (%)
	1979	1980	1981	1982	1983	1984		
PADDY	13,708	16,601	19,072	21,968	17,607	-	6.0	
OTHERS	2,403	3,409	4,533	3,777	3,850	-	12.5	
TOTAL	16,111	20,010	3,605	25,745	21,457	-	7.4	

PRODUCTION

ITEM	YEAR						(ton)	AAGR (%)
	1979	1980	1981	1982	1983	1984		
PADDY	31,648	41,448	44,694	60,096	37,412	-	4.3	
OTHERS	8,593	20,438	15,880	9,550	13,739	-	12.4	
TOTAL	40,241	61,886	60,574	69,646	51,151	-	6.2	

YIELD RATE

ITEM	YEAR						(ton/ha)	AAGR (%)
	1979	1980	1981	1982	1983	1984		
PADDY	2.31	2.50	2.34	2.74	2.12	-	4.5	

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 SELATAN					
KABUPATEN	AREA (ha)	PRODUCTION (ton)	AREA	AAGR (%) PRODUCTION	
TANAH LAUT	9,095	1,500	6.3	18.0	
KOTA BARU	9,517	703	3.4	0	
BANJAR	-	-	-	-	
BARITO KUALA	13,021	9,013	4.0	11.0	
TAPIN	-	-	-	-	
HULU SUNGAI SELATAN	12,603	6,165	11.3	10.0	
HULU SUNGAI TENGAH	18,000	6,400	1.9	11.7	
HULU SUNGAI UTARA	19,721	7,176	3.5	0	
TABALONG	27,107	10,073	5.0	12.6	

Table 1-2-6 POPULATION OF AGRICULTURAL SECTOR

PROVINCE : KALIMANTAN SELATAN					
KABUPATEN	AGRICULTURAL SECTOR	TOTAL POPULATION	PROPORTION (%)	AAGR (%)	SURVEY YEAR
TANAH LAUT	122,000	148,708	82.3	3.5	1984
KOTA BARU	161,000	253,400	63.7	4.0	1984
BANJAR	312,000	355,078	88.0	3.0	1982
BARITO KUALA	156,000	198,282	78.6	5.0	1984
TAPIN	71,000	115,752	61.5	3.0	1983
HULU SUNGAI SELATAN	114,000	187,161	61.0	3.0	1984
HULU SUNGAI TENGAH	125,000	202,370	61.9	0.3	1984
HULU SUNGAI UTARA	192,000	248,860	77.0	1.5	1984
TABALONG	106,000	130,218	81.5	3.0	1984

Notes :

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

1.2.4 Other Economic Activities

Notable economic activities excluding agriculture in Kabupaten Kota Baru are fishery and forestry sectors.

The following table shows the current growth rate of the catch.

	<u>1980</u>	<u>1984</u>	<u>AAGR (%)</u>
Catch (ton)	1,517	2,271	10.6

Notes : 1. AAGR : Average annual growth rate

2. Source : Kabupaten data

As can be seen in the above table these catches have been overed the consumption (+ 1,300 tons/year) of the Kabupaten itself in recent years. And this Kabupaten is located in the neighbourhood of the Kotamadya Banjarmasin, therefore this sector is expected to become continuously prosperous.

Besides the fishery sector, the timber production also is expected to become prosperous as a supplier for the neighbouring Kabupaten, even though the present production volume still indicates a figure belonging to the category of small scale industry as shown in table below.

	<u>1980</u>	<u>1984</u>	<u>AAGR (%)</u>
Production (m ³)	18,813	26,833	9.3

1.3 Present Status of Kabupaten Roads

1.3.1 Outline of Road Networks

The territory of Kabupaten Kota Baru consists of a part of the mainland of Kalimantan Island and another two islands, namely Laut Island where the Kabupaten capital is located and Sebuku island.

There are two provincial roads acting as a regional trunk line in the Kabupaten. One runs from to Batu Licin to the neighbouring Kabupaten Tanah Laut along the southern coast of Laut Island with the a capital of the Kabupaten, Kota Baru at the road mid point.

Apart from the above function these provincial roads also have the role of causing development of Kabupaten roads in the less advanced areas.

The mainland Kabupaten roads in Kalimantan Island are not consolidated yet as a road network, consequently regional transportation is still obliged to rely upon the sea transportation system.

The Kabupaten roads in Laut Island are only developed along the coast beside the provincial road leading to Kotabaru, therefore they are also not consolidated yet as road network. In Sebuku Island there is only one Kabupaten road running through the center of the island.

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 Kota Baru are confirmed as 39 links and 273 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 0.19 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 in density of Kabupaten roads.

	<u>Total Length</u> (km)	<u>Area</u> (ha)	<u>Density</u> (m/ha)
Kabupaten : Kota Baru	273	1,426,432	0.19
Province : Kalimantan Selatan	3,029	3,938,091	0.77
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.

The legend used in the table is as follows:

ASP : Asphalt

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

PROV : KALIHANTAN SELATAN KAB : KOTA BARU

(Km)

NO	TO2 (7)	L.L	DTB	TNI	KRK	TOTAL
LINK 1	1	9				9
LINK 2	2		8			8
LINK 3	3	8				8
LINK 4	4	5				5
LINK 5	5	7				7
LINK 6	6	1		7		8
LINK 7	7			12		12
LINK 8	8			2		2
LINK 9	9			3		3
LINK 10	10			5		5
LINK 11	11			10		10
LINK 12	12			4		4
LINK 13	13			5		5
LINK 14	14			14		14
LINK 15	15			10		10
LINK 16	16			4		4
LINK 17	17		3	2		5
LINK 18	18				1	1
LINK 19	19		10		8	18
LINK 20	20					
LINK 21	21			10		10
LINK 22	22			10		10
LINK 23	23			4		4
LINK 24	24	10				10
LINK 25	25		1		9	10
LINK 26	26				11	11
LINK 27	27		2			2
LINK 28	28	9				9
LINK 29	29			2	9	11
LINK 30	30	8				8
LINK 31	31			10		10
LINK 32	32			10		10
LINK 33	33					
LINK 34	34					
LINK 35	35		3	3	1	7
LINK 36	36		4	1		5
LINK 37	37					
LINK 38	38			6		6
LINK 39	39	1		3		4
TOTAL		66	31	137	39	273
RATIO		24	11	50	14	(%)

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:

	<u>ASP</u>	<u>KRK</u>	<u>TNH/LL</u>
Kabupaten : Kota Baru	-	25.7	74.3
Province : Kalimantan Selatan	10.5	41.1	48.4
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 in the Kabupaten. The proportion of low grade roads such as earth roads and others is very high. This means that the road classification in the Kabupaten is very low.

(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:

	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Bad</u>
Kabupaten : Kota Baru	37.7	37.4	14.3	10.6
Province : Kalimantan Selatan	26.4	34.2	31.4	8.0
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 SELATAN

KABUPATEN : KOTA BARU

421

No	Type	L.L				BIB				TMI				KRE			
		BA	SD	RU	RD	BA	SD	RU	RD	BA	SD	RU	RD	BA	SD	RU	RD
1	LINK	76	19	4													
2	LINK					87	10	3									
3	LINK	87	8	5													
4	LINK	89	6	5													
5	LINK	82	26	12													
6	LINK	5			93					44		26	29				
7	LINK										96	4					
8	LINK										95	6					
9	LINK										94	8					
10	LINK										95	5					
11	LINK										98	2					
12	LINK										98	3					
13	LINK										96	4					
14	LINK										91	6					
15	LINK										96	6					
16	LINK										20	19	31				
17	LINK					32	30	27	12	5	20	45	30				
18	LINK													50	30	20	
19	LINK					42	25	21	13					42	29	21	9
20	LINK																
21	LINK									12	42	45	2				
22	LINK									26	25	37	11				
23	LINK									16	11	10	64				
24	LINK	69	28	3													
25	LINK					80	15	5						80	12	8	
26	LINK													80	16	3	
27	LINK					90		10									
28	LINK	97		2													
29	LINK									65	23	5	8	86	6	7	1
30	LINK	95		9													
31	LINK									60	33	7					
32	LINK									8	2	70	20				
33	LINK																
34	LINK																
35	LINK					38	35	23	3	28	27	30	15	30	25	25	20
36	LINK					45	33	23		59	30	20					
37	LINK																
38	LINK											10	10				
39	LINK		85	15							92	8					
AVERAGE		64	19	6	11	59	21	16	4	14	54	18	14	61	20	14	5
LENGTH		88 Km				31 Km				137 Km				39 Km			
(Km)		42	13	4	7	10	7	5		19	74	25	19	24	8	5	2

The surface condition level of the Kabupaten roads in the Kabupaten is similar to as that of Indonesia and of Jawa Island. The proportion in good condition is high. Therefore it seems that road maintenance is carried out diligently in the Kabupaten. However considering the fact that non of the roads is asphalt paved 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 53.0% flat, 26.0% hilly, 13.0% mountainous and 7.0% swampy.

Mountainous and swampy areas total 21% so road construction is anticipated to be difficult.

1.3.3 Bridge Inventory

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

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

The inventory shown in Table 1-3-5 indicates a total of 171 bridges with a total length of 2,208 m of which 146 or 85.4% are timber, and 25 or 14.6% are others. On the other hand, 17 bridges with a total length of 1,879 m are required to be newly constructed.

Table 1-3-3

EXISTING ROAD LENGTH BY TERRAIN CONDITION

PROV : KALIHANTAN SELATAN

KAB : KOTA BARU

(Km)

LINK	IO2 (3)	DT	RN	BK	GN	TOTAL
LINK 1	1	8	1			9
LINK 2	2	3		5		8
LINK 3	3			8		8
LINK 4	4			5		5
LINK 5	5	6		1		7
LINK 6	6			4	4	8
LINK 7	7	5			7	12
LINK 8	8	1			1	2
LINK 9	9	2			1	3
LINK 10	10	2			3	5
LINK 11	11	9			1	10
LINK 12	12	1			3	4
LINK 13	13	4			1	5
LINK 14	14	5	1	2	6	14
LINK 15	15	3	1	1	5	10
LINK 16	16	3			1	4
LINK 17	17		3	2		5
LINK 18	18			1		1
LINK 19	19	10	1	7		18
LINK 20	20					
LINK 21	21	10				10
LINK 22	22	4	5	1		10
LINK 23	23	4				4
LINK 24	24	18				18
LINK 25	25	2		8		10
LINK 26	26	6		5		11
LINK 27	27	2				2
LINK 28	28		4	5		9
LINK 29	29	11				11
LINK 30	30	5		3		8
LINK 31	31	9	1			10
LINK 32	32	8	2			10
LINK 33	33					
LINK 34	34					
LINK 35	35	2		5		7
LINK 36	36			5		5
LINK 37	37					
LINK 38	38	1	1	4		6
LINK 39	39	2			2	4
TOTAL		146	20	72	35	273
RATIO		53	7	26	13	(%)

Table 1-3-4 NUMBER AND LENGTH OF BRIDGES

PROV : KALIHANTAN SELATAN KAD : KOTA BARU

<<<< BRIDGE >>>> (UNIT: M)

		EXISTING		NOT EXIST		TOTAL	
LINK NO	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	
1	2	50.00			2	50.00	
2	6	39.00			6	39.00	
3	4	24.00			4	24.00	
4	5	32.00			5	32.00	
5	1	5.00			1	5.00	
6	4	30.00	2	14.00	6	44.00	
7	13	311.80			13	311.80	
9	3	169.00			3	169.00	
10	4	47.00			4	47.00	
11	7	95.00			7	95.00	
13	1	122.00	1	14.00	2	136.00	
14			1	64.00	1	64.00	
15	8	126.00	3	46.00	11	172.00	
16	6	35.00			6	35.00	
17	7	31.50			7	31.50	
18	2	8.00			2	8.00	
19	13	120.00	2	8.00	15	128.00	
21	8	62.00			8	62.00	
22	11	89.00			11	89.00	
23	3	42.00			3	42.00	
24	24	179.50			24	179.50	
25	9	115.00			9	115.00	
26	8	108.00			8	108.00	
28	2	7.00			2	7.00	
29	4	90.00			4	90.00	
30	5	88.00			5	88.00	
31			4	64.00	4	64.00	
32			4	1669.00	4	1669.00	
35	3	33.50			3	33.50	
36	5	40.00			5	40.00	
38	2	88.00			2	88.00	
39	1	21.00			1	21.00	
TOTAL	171	2208.30	17	1879.00	188	4087.30	

Table 1-3-5

NUMBER OF EXISTING BRIDGES BY BRIDGE TYPE

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

<<< BRIDGE >>> (No)			
LINK	KY	LL	TOTAL
LINK 1	2	1	2
LINK 2	6	1	6
LINK 3	4	1	4
LINK 4	5	1	5
LINK 5	1	1	1
LINK 6	1	4	4
LINK 7	13	1	13
LINK 9	3	1	3
LINK 10	2	2	4
LINK 11	7	1	7
LINK 13	1	1	1
LINK 14	1	1	1
LINK 15	8	1	8
LINK 16	6	1	6
LINK 17	7	1	7
LINK 18	2	1	2
LINK 19	13	1	13
LINK 21	1	8	8
LINK 22	1	11	11
LINK 23	3	1	3
LINK 24	24	1	24
LINK 25	9	1	9
LINK 26	8	1	8
LINK 28	2	1	2
LINK 29	4	1	4
LINK 30	5	1	5
LINK 31	1	1	1
LINK 32	1	1	1
LINK 35	3	1	3
LINK 36	5	1	5
LINK 38	2	1	2
LINK 39	1	1	1
TOTAL	146	25	171
RATIO	85	15	(2)

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

<u>Bridges Type</u>	<u>Span Length (m)</u>										
	<u>3</u>	<u>5</u>	<u>8</u>	<u>10</u>	<u>12</u>	<u>14</u>	<u>16</u>	<u>18</u>	<u>20</u>	<u>99</u>	<u>Total</u>
Timber	48	92	4	-	-	1	-	-	-	1	146
Concrete	-	-	-	-	-	-	-	-	-	-	-
Steel	-	-	-	-	-	-	-	-	-	-	-
Others	16	7	2	-	-	-	-	-	-	-	25
Total	64	99	6	-	-	1	-	-	-	1	171

Thus, most of the existing bridges on the Kabupaten roads are timber and the majority of spanlengths is within the range of 3 m to 5 m.

1.3.4 Traffic

Inventories of the average daily traffic (ADT) on the Kabupaten roads in Kabupaten Kota Baru 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 1985 are summarized as follows:

	<u>SEDAN</u>	<u>BUS</u>	<u>TRUCK</u>	<u>MOTOR- CYCLE</u>	<u>TOTAL</u>
Total Trips	47	0	37	361	445
Proportion (%)	10.57	0	8.31	81.12	100.00

Source : Bina Marga Inventory

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

	<u>SEDAN</u>	<u>BUS</u>	<u>TRUCK</u>	<u>MOTOR- CYCLE</u>	<u>TOTAL</u>
Proportion (%)	5.25	0	1.97	92.78	100.00

Source : Kabupaten.

Thus, the proportion of motorcycles 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:

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

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

Table 2-1-1 TRAFFIC GROWTH RATE ESTIMATION

PROV : KALIMANTAN SELATAN		KAB : KOTA BARU	
A)	Growth Rate of Population	:	5.60 (%)
B)	Growth Rate of Cultivated Area	:	7.00 (%)
C)	Growth Rate of Rice field	:	6.00 (%)
D)	Growth Rate of Rice yield rate	:	4.50 (%)
E)	Growth Rate of GDP / capita	:	6.60 (%)

a)	Geometrical Mean (A x B)	:	6.30 (%)
b)	Geometrical Mean (C x D)	:	5.25 (%)
c)	Geometrical Mean (a x b)	:	5.77 (%)
d)	Geometrical Mean (c x E)	:	6.18 (%)

TRAFFIC GROWTH RATE		:	6.18 (%)

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 :

$$T_n = T_e (1 + r)^n$$

Where :

T_n : Future traffic volume n years later

T_e : Traffic volume in 1985

r : Traffic growth rate

The results are shown in Table 2-1-2 together with the traffic volume in 1985.

Table 2-1-2 EXISTING AND FUTURE TRAFFIC VOLUME

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

< SPD : 1/2 >

LINK NO	INVENTORY (1985)					RATE	AFTER 13 YEARS (1998)					CLASS
	MBL	BUS	TRUK	SPD	TOTAL		MBL	BUS	TRUK	SPD	TOTAL	
1	0	0	0	30	15	6.2%	0	0	0	65	33	111C
2	7	0	8	25	28	6.2%	15	0	17	55	61	111B-2
3	2	0	6	15	16	6.2%	4	0	13	33	35	111C
4	2	0	6	15	16	6.2%	4	0	13	33	35	111C
5	2	0	6	15	16	6.2%	4	0	13	33	35	111C
6	0	0	0	5	3	6.2%	0	0	0	11	7	111C
7	0	0	0	6	3	6.2%	0	0	0	13	7	111C
8	0	0	0	4	2	6.2%	0	0	0	9	4	111C
9	0	0	0	5	3	6.2%	0	0	0	11	7	111C
10	0	0	0	5	3	6.2%	0	0	0	11	7	111C
11	0	0	0	7	4	6.2%	0	0	0	15	9	111C
12	0	0	0	3	2	6.2%	0	0	0	7	4	111C
13	0	0	0	3	2	6.2%	0	0	0	7	4	111C
14	0	0	0	5	3	6.2%	0	0	0	11	7	111C
15	0	0	0	7	4	6.2%	0	0	0	15	9	111C
16	0	0	0	8	4	6.2%	0	0	0	17	9	111C
17	1	0	0	6	4	6.2%	2	0	0	13	9	111C
18	2	0	0	6	5	6.2%	4	0	0	13	11	111C
19	5	0	1	7	10	6.2%	11	0	2	15	22	111C
20	0	0	0	0	0	6.2%	0	0	0	0	0	111C
21	0	0	0	6	3	6.2%	0	0	0	13	7	111C
22	0	0	0	15	8	6.2%	0	0	0	33	17	111C
23	0	0	0	2	1	6.2%	0	0	0	4	2	111C
24	5	0	1	20	16	6.2%	11	0	2	44	35	111C
25	0	0	0	15	8	6.2%	0	0	0	33	17	111C
26	0	0	0	14	7	6.2%	0	0	0	31	15	111C
27	10	0	5	35	33	6.2%	22	0	11	76	72	111B-2
28	5	0	2	35	25	6.2%	11	0	4	76	55	111B-2
29	0	0	0	10	5	6.2%	0	0	0	22	11	111C
30	0	0	0	2	1	6.2%	0	0	0	4	2	111C
31	0	0	0	0	0	6.2%	0	0	0	0	0	111C
32	0	0	0	0	0	6.2%	0	0	0	0	0	111C
33	0	0	0	0	0	6.2%	0	0	0	0	0	111C
34	0	0	0	0	0	6.2%	0	0	0	0	0	111C
35	2	0	1	10	8	6.2%	4	0	2	22	17	111C
36	4	0	1	10	10	6.2%	9	0	2	22	22	111C
37	0	0	0	0	0	6.2%	0	0	0	0	0	111C
38	0	0	0	3	2	6.2%	0	0	0	7	4	111C
39	0	0	0	7	4	6.2%	0	0	0	15	9	111C
PERCENT	10.56	0.00	8.31	81.12			10.56	0.00	8.31	81.12		

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 SELATAN KAB : KOTA BARU

< 1998 >

LINK NO	CLASS	SURFACE	MOBIL	BUS	TRUCK	SEPEDA	TOTAL
1	111A	ASP	117	0	92	895	657
2	111B-2	KRK	32	0	25	244	179
3	111C	KRK	8	0	6	61	45
4	111C	KRK	5	0	4	38	28
5	111B-2	KRK	25	0	20	193	142
6	111C	KRK	4	0	3	29	22
7	111C	KRK	1	0	1	7	6
8	111C	KRK	0	0	0	1	1
9	111C	KRK	0	0	0	2	1
10	111C	KRK	0	0	0	3	2
11	111C	KRK	1	0	1	8	6
12	111C	KRK	2	0	1	12	9
13	111C	KRK	2	0	2	15	12
14	111C	KRK	6	0	4	42	31
15	111C	KRK	3	0	3	25	19
16	111C	KRK	1	0	1	6	5
17	111B-2	KRK	28	0	22	216	158
18	111B-2	KRK	11	0	9	86	63
19	111B-2	KRK	13	0	10	96	71
21	111B-2	KRK	13	0	11	103	76
22	111B-2	KRK	21	0	17	165	121
23	111C	KRK	4	0	3	31	23
24	111B-2	KRK	17	0	13	128	94
25	111C	KRK	2	0	1	14	10
26	111C	KRK	2	0	1	14	10
27	111B-2	KRK	26	0	20	199	146
28	111A	ASP	117	0	92	895	657
29	111C	KRK	2	0	1	14	10
30	111C	KRK	2	0	1	14	10
31	111C	KRK	2	0	1	14	10
32	111C	KRK	2	0	1	14	10
35	111C	KRK	3	0	2	22	16
36	111C	KRK	2	0	2	17	13
38	111C	KRK	6	0	4	42	31

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 : KOTA BARU

(1000Rupiah)

	LINK 1	LINK 2	LINK 3	LINK 4	LINK 5	LINK 6	LINK 7	LINK 8	LINK 9	LINK 10
	9 Km	8 Km	8 Km	5 Km	7 Km	8 Km	12 Km	2 Km	3 Km	5 Km
	IIIA	IIIB-2	IIIC	IIIC	IIIB-2	IIIC	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	13200	523	169	68	1048	3375	1005	7	21	53
1990	14327	576	169	68	1165	3375	1005	7	21	53
1991	15831	617	212	81	1322	3375	1005	7	21	53
1992	17251	657	212	81	1473	3375	1005	7	21	53
1993	18802	698	254	94	1595	3375	1005	7	21	53
1994	20494	792	254	94	1707	3375	1005	7	21	53
1995	22568	831	278	97	1863	3375	1005	7	21	53
1996	24544	925	305	120	2097	3375	1005	7	21	53
1997	26806	1006	329	123	2249	3375	1005	7	21	53
1998	29304	1100	329	123	2483	3375	1005	7	21	53
SUM	203127	7725	2511	949	17002	33750	10050	70	210	530
COST	67571	-24353	-27356	-17453	-15491	-8068	-37033	-7158	-10673	-17678
/Km	7508	-3044	-3419	-3491	-2213	-1008	-3086	-3579	-3558	-3536

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:

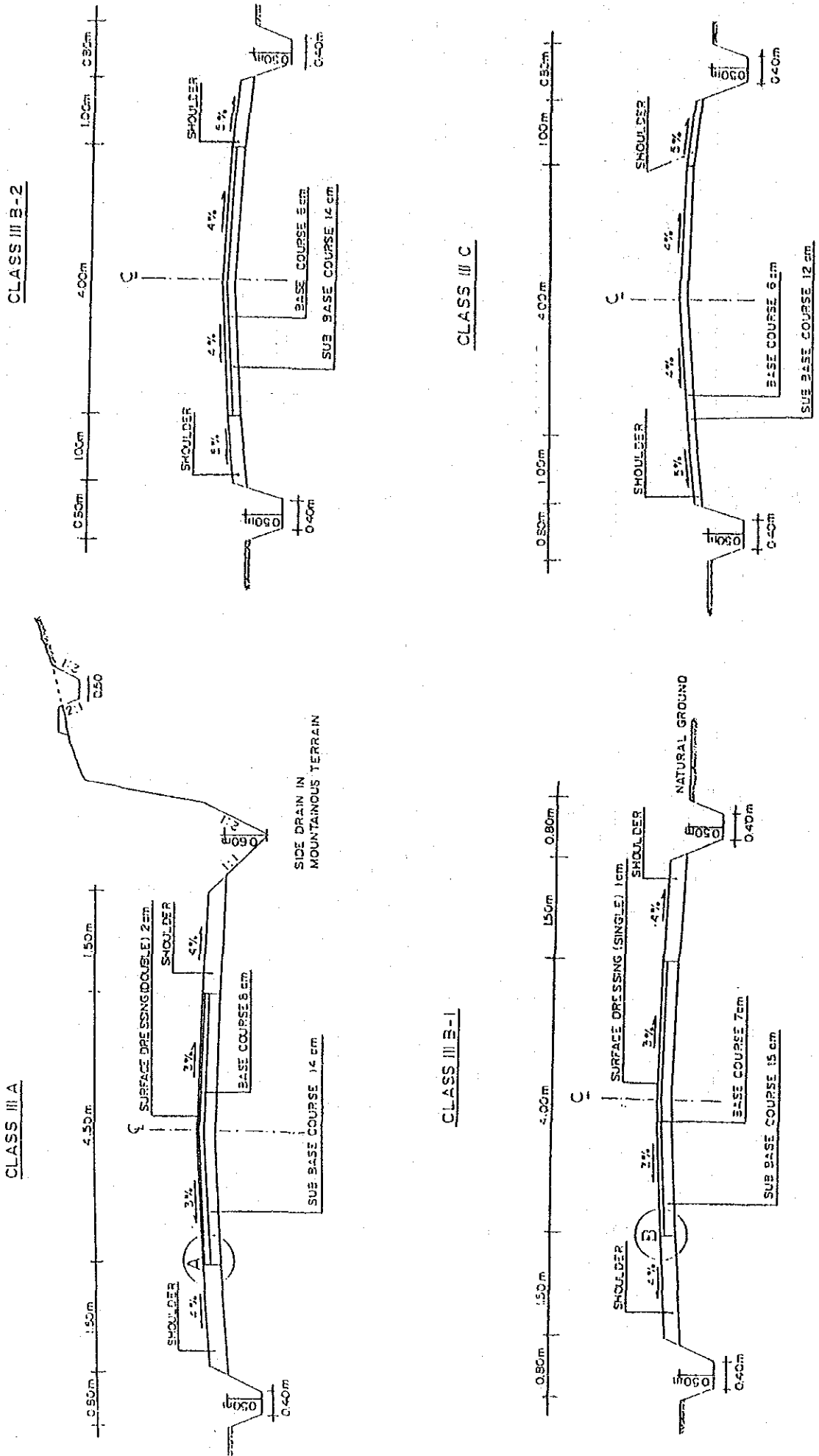
- a. 50% of Bina Marga live load (hereinafter BM 50) is applied for concrete and timber bridges on roads of III A classification.
- b. 10-ton truck load is applied for timber bridges on roads of III B-1, III B-2 and III C classification.

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	FLAT TO ROLLING	HILLY	MOUNT-AINOUS
TRAFFIC LANES		1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	1+	1	1	1
DESIGN	(Km/hr)	70	60	40	70	40	30	60	40	30	60	40	30	50	30	AS PRACTICABLE
SPEED		30	30	30	30	30	AS PRACTICABLE	30	30	AS PRACTICABLE	30	30	AS PRACTICABLE	30	AS PRACTICABLE	AS PRACTICABLE
GRADIENT	(%)	4	5	8	4	6	8	4	7	8	4	7	8	5	8	12
(LIMITING)		7	7	10	7	8	10	7	9	12	7	9	12	7	12	16
PAVEMENT	(M)	6.0	6.0	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5
WIDTH		4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0
SHOULDER	(M)	2.0	1.5	1.5	1.5	1.5	1.0	1.5	1.0	1.0	1.5	1.0	1.0	1.0	1.0	0.75
WIDTH		1.5	1.0	0.75	1.0	1.0	0.75	1.0	0.75	0.75	1.0	0.75	0.5	0.75	0.5	0.5
ROAD BED	(M)	10.0	9.0	9.0	8.0	7.5	6.5	7.5	6.5	6.5	7.5	6.5	6.5	5.5	5.5	5.0
WIDTH		6.0	6.0	6.0	5.5	5.5	5.0	5.5	5.0	5.0	5.5	5.0	4.5	4.5	4.0	4.0
RIGHT OF WAY	(M)	16	12	12	12	10	10	12	10	12	12	10	12	12	8	8
ROAD CAMBER	(%)	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4
SHOULDER		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5

Fig. 3-1-1

STANDARD ROAD CROSS SECTIONS



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:

<u>Road Classification</u>	<u>Design Traffic Volume (vpd)</u>
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.

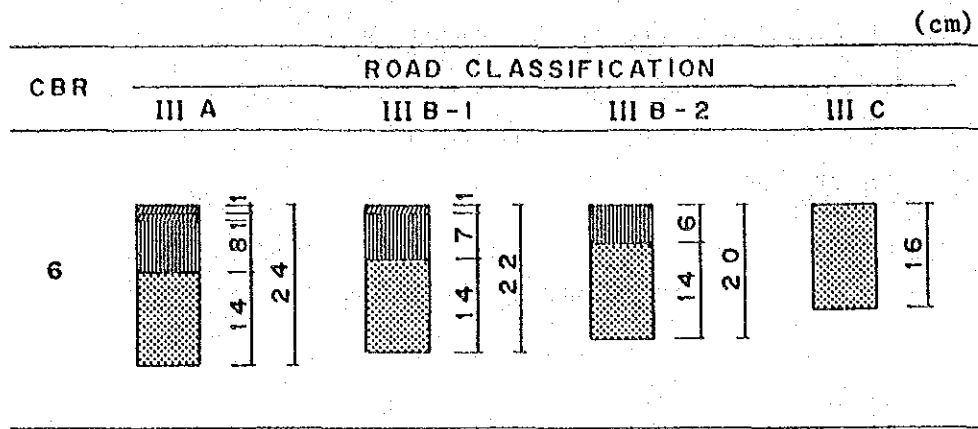
CBR of the laterite is generally in the range of CBR 4 to 10. However site CBR tests should be conducted before construction to finally decide the pavement thickness.

3.2.2 Pavement Structure

Fig. 3-2-1 shows the standard pavement structure adopted for the Kabupaten roads.

Fig. 3-2-1

PAVEMENT STRUCTURE



- = SURFACE DRESSING (ASPHALT)
- = BASE COURSE (CRUSHER-RUN)
- = SUBBASE COURSE (SANDY GRAVEL)

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 described 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 rural 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 diameter 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.

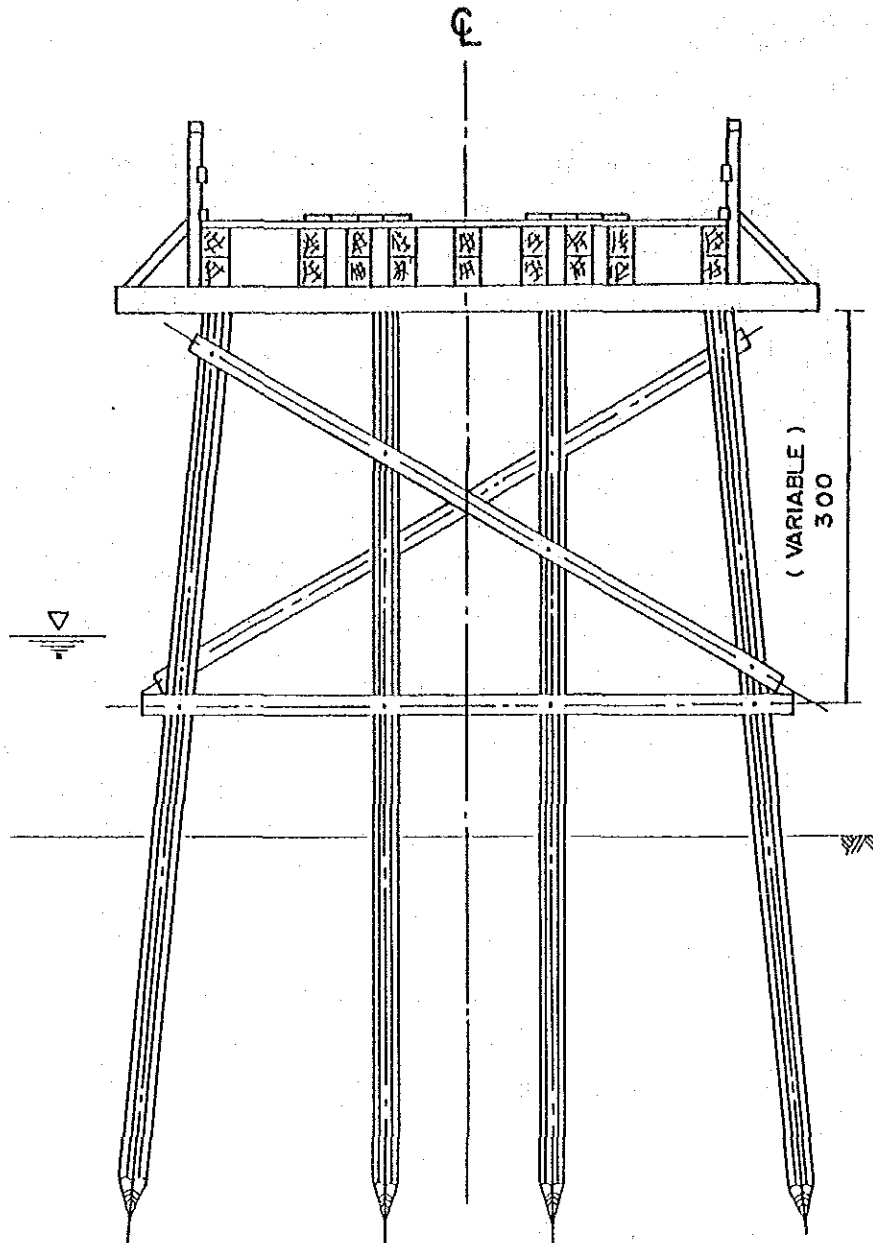
The length and number of piles should be decided in order to be adequate for the condition of the foundation materials.

(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 \emptyset 80 cm m
- b) Rubble in mortar box culvert with RC slab 80 cm X 80 cm

(2) Retaining Wall

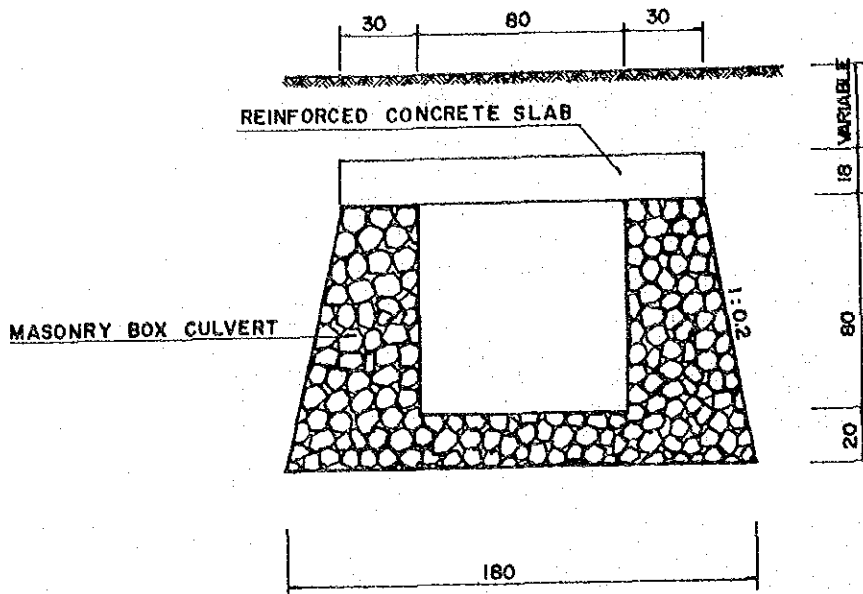
The following two types of retaining walls have been adopted because of ease of construction, economy and familiarity in Indonesia.

- 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 REINFORCED CONCRETE PIPE CULVERT

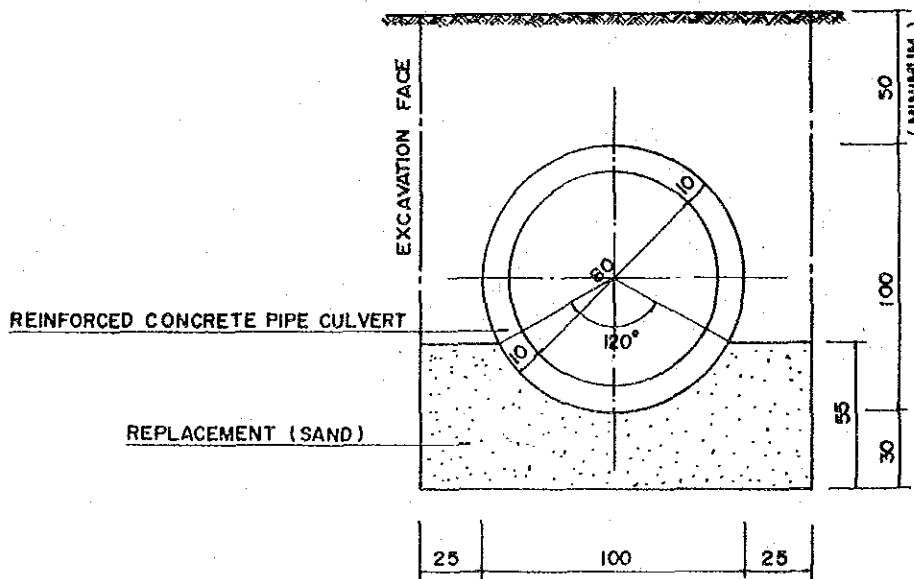
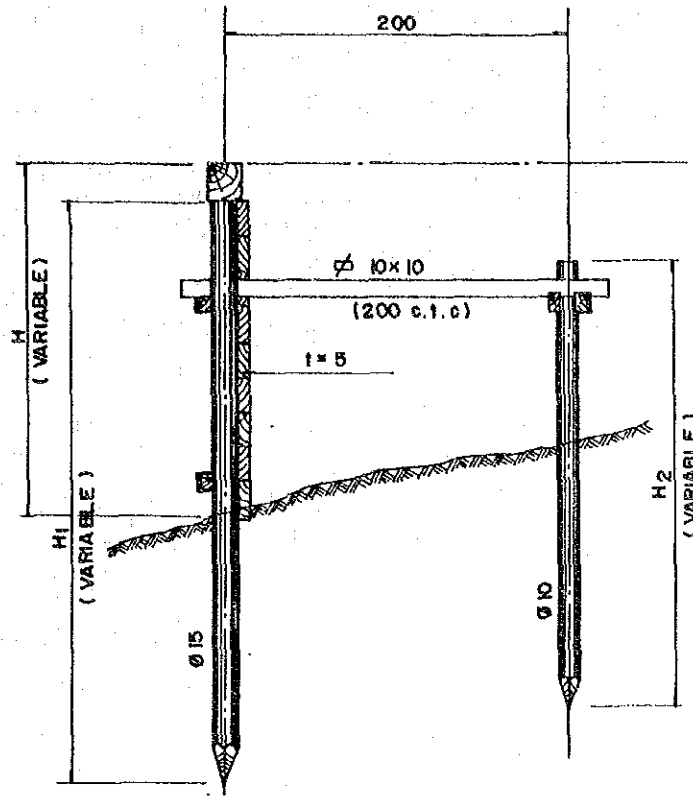


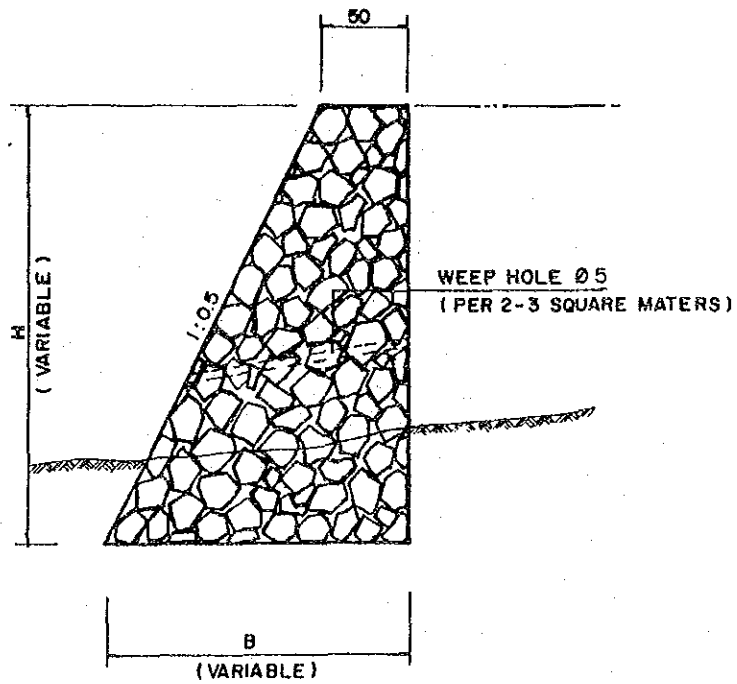
Fig. 3-3-3

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 Kota Baru and other Kabupatens in Kalimantan Selatan Province are shown in Table 4-1-1.

Table 4-1-1 UNIT LABOUR PRICE

KABUPATEN	MAN	SKL LAB	CAP	MAS	LAB	DRIV	(Rp)
							OPE
Tanah Laut	2,500	2,250	2,500	2,500	1,750	2,500	4,000
Kota Baru	2,750	2,750	3,500	3,500	2,500	2,500	4,000
Banjar	2,750	2,200	2,750	2,750	1,750	2,750	3,850
Barito Kuala	3,000	3,000	3,000	3,000	2,000	3,000	3,500
Tapin	3,000	2,500	3,250	3,250	2,000	3,000	4,000
Hulu Sungai Selatan	2,000	2,250	2,500	1,500	1,750	2,500	3,000
Hulu Sungai Tengah	2,000	1,750	2,500	1,500	1,250	2,500	3,000
Hulu Sungai Utara	3,500	2,500	3,000	3,000	2,000	3,000	2,000
Tabalong	2,500	2,500	3,000	3,000	2,000	3,000	3,500
Average	2,333	2,078	2,556	2,444	1,667	2,417	3,039

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 Kota Baru together with for other Kabupatens in Kalimantan Selatan Province.

Table 4-1-2 UNIT PRICE OF MATERIALS

MATERIAL	UNIT	(Rp)				
		TANAH LAUT	KOTA BARU	BANJAR KUALA	BARITO	TAPIN
Bitumen	L	275	375	300	300	275
Asphalt oil	L	700	750	700	750	700
Gasoline	L	250	250	250	250	250
Sand	M ³	5,000	12,500	6,000	12,500	4,500
Cement	bag	4,000	5,300	4,500	5,000	5,000
River Stone	M ³	5,000	12,500	7,000	17,500	10,000
Steel moulds	Set	8,000	8,000	8,000	8,000	8,000
Timber	M ³	60,000	150,000	80,000	200,000	80,000
Paint	L	4,000	3,500	3,000	2,000	2,500
Reinforcing Steel	Kg	750	1,000	750	1,000	1,000
Tying Wire	Kg	1,000	1,200	1,000	1,200	1,200
Equivalent Royalty	M ³	250	250	250	250	250

UNIT PRICE OF MATERIALS (CONT'D)

MATERIAL	UNIT	(Rp)				AVERAGE
		HULU SUNGAI SELATAN	HULU SUNGAI TENGAH	SUNGAI UTARA	TABALONG	
Bitumen	L	450	300	300	300	385
asphalt oil	L	800	700	700	700	925
Gasoline	L	250	250	250	250	250
Sand	M ³	5,000	5,000	5,000	6,000	5,745
Cement	bag	4,350	5,000	5,000	5,000	4,687
River Stone	M ³	7,750	7,000	9,000	7,500	11,165
Steel moulds	Set	8,000	8,000	8,000	8,000	7,865
Timber	M ³	75,000	75,000	80,000	90,000	132,758
Paint	L	2,100	2,000	2,750	2,500	2,573
Reinforcing Steel	Kg	1,000	1,000	750	1,000	940
Tying Wire	Kg	1,200	1,200	1,100	1,200	1,897
Equivalent Royalty	M ³	250	250	250	250	-

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 SELATAN
KABUPATEN : KOTA BARU

(UNIT : Rp) < 6'85 >

CODE NO	EQUIPMENT NAME	CLASS	LOCAL COST			FOREIGN COST			TOTAL COST
			OWNERSHIP	OPERATION	SUB-TOTAL	OWNERSHIP	OPERATION	SUB-TOTAL	
	Bulldozer	120 HP	234	15,949	16,183	7,769	1,024	8,793	24,976
	Bulldozer/Ripper	120 HP	255	16,960	17,215	8,500	1,575	10,075	27,290
	Swamp Bulldozer	120 HP	267	17,202	17,469	8,879	1,646	10,525	27,994
	Bulldozer	90 HP	148	10,948	11,096	4,914	647	5,561	16,657
	Bulldozer/Ripper	90 HP	159	11,538	11,697	5,300	982	6,282	17,979
	Bulldozer	65 HP	105	7,970	8,075	3,500	461	3,961	12,036
	Bulldozer/Ripper	65 HP	115	8,418	8,533	3,819	708	4,527	13,060
	Swamp Bulldozer	90 HP	159	11,528	11,687	5,284	979	6,263	17,950
	Swamp Bulldozer	65 HP	122	8,166	8,288	4,049	750	4,799	13,087
	Motor Grader	110 HP	208	13,659	13,867	6,919	1,282	8,201	22,068
	Motor Grader	75 HP	144	9,352	9,496	4,779	885	5,664	15,160
	Motor Grader	65 HP	129	8,205	8,334	4,300	797	5,097	13,431
	Road Stabilizer	W-1850 mm	258	3,381	3,639	8,594	424	9,018	12,657
	Vibratory Roller	4 ton	87	4,136	4,223	2,900	382	3,282	7,505
	Hand-guide Vib. Roller	1000 Kg	68	726	794	850	29	879	1,673
	Tire Roller	8-15 ton	94	9,706	9,800	3,106	102	3,208	13,008
	Vibratory Roller (O&T)	4 ton	87	4,136	4,223	2,900	382	3,282	7,505
	Hand-guide Vib. Roller	600 Kg	48	494	542	600	20	620	1,162
	Rough Terrain Crane	10 ton	302	15,966	16,268	10,039	744	10,783	27,051
	Hydraulic Excavator; Wheel	0.3 m ³	124	9,897	10,021	4,109	541	4,650	14,671
	Wheel Loader	1.2 m ³	211	10,123	10,334	7,019	925	7,944	18,278
	Wheel Loader	0.3 m ³	69	3,574	3,643	2,269	299	2,568	6,211
	Water Tank Truck	4000 ltr.	70	3,774	3,844	868	120	988	4,832
	Fuel Tank Truck	4000 ltr.	71	3,781	3,852	882	121	1,003	4,855
	Dump Truck	3.0 ton	118	4,572	4,690	1,469	202	1,671	6,361
	Flat Bed Truck with Crane	3.0 ton	52	4,020	4,072	1,717	127	1,844	5,916
	Dump Loader Truck	12 ton	116	25,778	25,894	3,837	126	3,963	29,857
	Dump Truck	5.0 ton	176	7,606	7,782	2,189	302	2,491	10,273
	Flat Bed Truck	3.0 ton	17	3,596	3,613	563	41	604	4,217
	Portable Crusher/Screening	30-40 t/h	564	26,732	27,296	18,800	2,478	21,278	48,574
	Concrete Mixer	0.5 m ³	432	2,513	2,945	5,400	419	5,819	8,764
	Water Pump	200 l/min	16	337	353	188	6	194	547
	Concrete Vibrator	3.3 HP	6	301	307	73	2	75	382
	Asphalt Sprayer	850 ltr.	82	879	961	1,019	140	1,159	2,120

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 SELATAN KAB : KOTA BARU

(Rp)				
ITEM	UNIT	LOCAL	FOREIGN	TOTAL
Site Clearance in Light Bush	m ²	197	91	288
Subgrade Preparation	m ²	25	11	36
Normal Fill	m ³	2,037	863	2,900
Fill in Swamp	m ³	2,974	1,052	4,026
Normal Excavation to Spoil	m ³	1,189	522	1,711
Sub Base Course	m ³	3,777	1,347	5,124
Base Course	m ³	5,214	2,294	7,513
Shoulder	m ²	356	146	502
Asphalt Patching	m ²	4,658	1,478	6,136
Surface Dressing (Single)	m ²	709	723	1,432
Surface Dressing (Double)	m ²	882	1,139	2,021
Earth Drain	m	1,124	119	1,243
Earth Drain in Swamp (by machine)	m ³	1,468	474	1,942
Pipe Culvert 80cm	m	57,196	52,136	109,332
Masonry Culvert (80x80cm)	m	79,892	42,320	122,212
Retaining Wall and Wing Wall (Timber)	m ²	15,290	246	15,536
Retaining Wall and Wing Wall (Masonry)	m ³	59,169	11,982	71,151
Gabion Protection	m ³	18,702	120	18,822
Manual routine maintenance of road	Km	184,356	7,248	191,604
Routine maintenance of earth road	Km	117,136	37,904	155,040
Routine maintenance of gravel road	Km	232,263	88,047	320,310
Routine maintenance of asphalt road	Km	465,800	147,800	613,600

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 SELATAN KAB : KOTA BARU

(Rp)				
ITEM	UNIT	LOCAL	FOREIGN	TOTAL
Superstructure (Timber; Span 3m; 10T)	m2	55,308	4,626	59,934
Superstructure (Timber; Span 5m; 10T)	m2	61,262	5,107	66,369
Superstructure (Timber; Span 8m; 10T)	m2	81,143	6,705	87,848
Superstructure (Timber; Span 3m; BH50)	m2	68,579	5,719	74,298
Superstructure (Timber; Span 5m; BH50)	m2	74,869	6,194	81,063
Superstructure (Timber; Span 8m; BH50)	m2	94,954	7,840	102,794
Superstructure (Concrete; Span 3m; BH50)	m2	62,906	109,285	172,191
Superstructure (Concrete; Span 5m; BH50)	m2	64,634	122,132	186,766
Superstructure (Concrete; Span 8m; BH50)	m2	66,602	133,035	199,637
Superstructure (Concrete; Span 10m; BH50)	m2	72,835	151,094	223,929
Superstructure (Concrete; Span 15m; BH50)	m2	78,553	177,986	256,539
Substructure (Pier; for Timber; 10T)	NO	481,773	43,119	524,892
Substructure (Abut; for Timber; 10T)	NO	1,322,891	189,522	1,512,413
Substructure (Pier; for Timber; BH50)	NO	708,545	63,837	772,382
Substructure (Abut; for Timber; BH50)	NO	1,493,946	212,542	1,706,488
Substructure (Pier; for Concrete; BH50)	NO	2,388,712	483,175	2,871,887
Substructure (Abut; for Concrete; BH50)	NO	4,851,954	1,009,571	5,861,525
Demolition of Bridge (Timber->Timber)	m2	15,368	1,729	17,097
Demolition of Bridge (Timber->Concrete)	m2	15,368	1,729	17,097
Demolition of Bridge (Concrete)	m2	109,643	82,314	191,957
Maintenance of Timber Bridge (New)	m2	10,021	1,343	11,364
Maintenance of Concrete Bridge (New)	m2	2,354	3,216	5,570
Maintenance of Timber Bridge (Exist)	m2	9,582	2,515	12,097
Maintenance of Concrete Bridge (Exist)	m2	5,042	2,487	7,529

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 Kota Baru are shown in Table 5-1-1.

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

KABUPATEN : KOTA BARU

CRITERIA NO	ROAD LINK NO
(8)	20,33,34,37,39

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 BELATAN KABUPATEN : KOTA BARU

LINK NO	LENBTH	CLASS	IRR (%)	REMARK
1	9 Km	IIIA	0.078	Surplus
2	8 Km	IIIB-2	0.078	Surplus
3	8 Km	IIIC	0.078	Surplus
4	5 Km	IIIC	0.078	Surplus
5	7 Km	IIIB-2	0.078	Surplus
6	8 Km	IIIC	0.078	Surplus
7	12 Km	IIIC	0.078	Surplus
8	2 Km	IIIC	0.078	Surplus
9	3 Km	IIIC	0.078	Surplus
10	5 Km	IIIC	0.078	Surplus
11	10 Km	IIIC	0.078	Surplus
12	4 Km	IIIC	0.078	Surplus
13	5 Km	IIIC	0.078	Surplus
14	14 Km	IIIC	0.078	Surplus
15	10 Km	IIIC	0.078	Surplus
16	4 Km	IIIC	0.078	Surplus
17	5 Km	IIIB-2	0.078	Surplus
18	1 Km	IIIB-2	0.078	Surplus
19	18 Km	IIIB-2	0.078	Surplus
21	10 Km	IIIB-2	0.078	Surplus
22	10 Km	IIIB-2	0.078	Surplus
23	4 Km	IIIC	0.078	Surplus
24	18 Km	IIIB-2	0.078	Surplus
25	10 Km	IIIC	0.078	Surplus
26	11 Km	IIIC	0.078	Surplus
27	2 Km	IIIB-2	0.078	Surplus
28	9 Km	IIIA	0.078	Surplus
29	11 Km	IIIC	0.078	Surplus
30	8 Km	IIIC	0.078	Surplus
31	10 Km	IIIC	0.078	Surplus
32	10 Km	IIIC	0.078	Surplus
35	7 Km	IIIC	0.078	Surplus
36	5 Km	IIIC	0.078	Surplus
38	6 Km	IIIC	0.078	Surplus

Table 5-2-2 RESULTS OF SECONDARY ANALYSIS

Nil

Table 5-2-3 RANKING OF FEASIBILITY ROAD LINKS

Nil

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: Kota Baru

(Rp $\times 10^6$)

COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CONSTRUCTION	357	1,124	1,481
MAINTENANCE	107	448	555
SUPPLEMENTATION	325	-	325
WORKSHOP EQUIPMENT & TOOLS	28	-	28
LABORATORY EQUIPMENT	12	-	12
SURVEY EQUIPMENT	5	-	5
TOTAL	834	1,572	2,406

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

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

(Rp $\times 10^6$)

COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CIVIL WORK	115	1,562	1,677
CONSTRUCTION & MAINTENANCE EQUIPMENT	632	-	632
SPARE PARTS	42	10	52
WORKSHOP/LABORATORY/SURVEY EQUIPMENT	45	-	45
TOTAL	834	1,572	2,406

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.

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 finally proposed to be improved in the Kabupaten are the 3 links with the total length of 75 km which is 23% of the 328 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 : KOTA BARU

<u>REASON FOR SELECTION</u>	<u>ROAD LINK NO</u>
Feasible	
- Primary	-
- Secondary	-
Engineering Point of View	-
Basic Human Needs	31,32,50*

* Link 50 New Construction Road

As the table shows there are no feasible road links from the economic evaluation. Therefore the following minimum required road links are selected regardless of any result of economic evaluation from the view point of basic human needs:

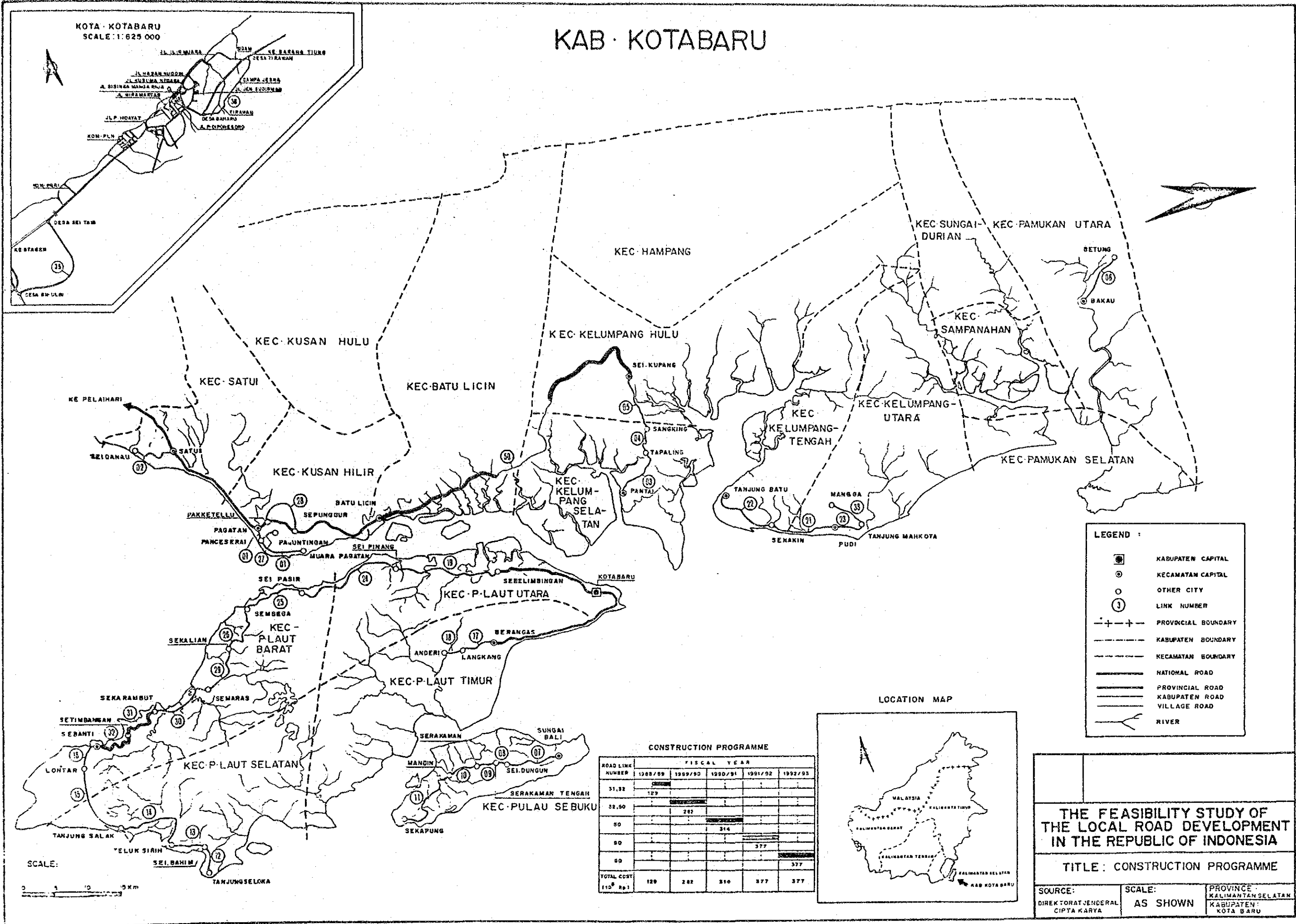
- Since Road links No 31 and No 32 are located on the strategic point to complete the trunk road which connects the Kabupaten capital with Kecamatan capital, these road links are selected.
- A new road link is proposed to be constructed. This is an existing footpath which connects the ending point of the provincial road with Sei Kupang, the kecamatan capital, and is effective in providing more effective development of the region.

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 SELATAN KAB : KOTA BARU

YEAR	LINK NO	() : rate
1988	: 31, 32	(20%)
1989	: 32	(80%), 50 (15%)
1990	: 50	(25%)
1991	: 50	(30%)
1992	: 50	(30%)



KAB · KOTABARU

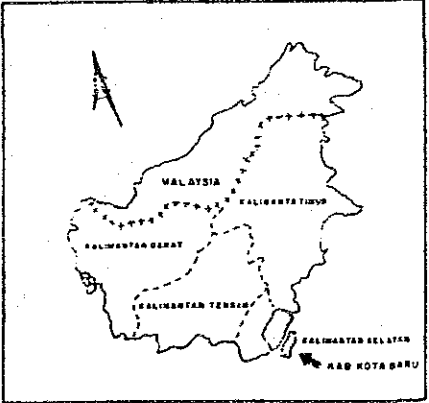
KOTA · KOTABARU
SCALE: 1:625 000

LEGEND :

- ⊙ KABUPATEN CAPITAL
- ⊙ KECAMATAN CAPITAL
- OTHER CITY
- ① LINK NUMBER
- + - + - PROVINCIAL BOUNDARY
- - - - - KABUPATEN BOUNDARY
- - - - - KECAMATAN BOUNDARY
- == NATIONAL ROAD
- — — PROVINCIAL ROAD
- — — KABUPATEN ROAD
- — — VILLAGE ROAD
- ~ RIVER

CONSTRUCTION PROGRAMME

ROAD LINK NUMBER	FISCAL YEAR				
	1988/89	1989/90	1990/91	1991/92	1992/93
31,32	129				
32,50		282			
50			314		
50				377	
50					377
TOTAL COST (10 ⁸ Rp.)	129	282	314	377	377



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

TITLE : CONSTRUCTION PROGRAMME

SOURCE: DIREK TORAT JENDERAL CIPTA KARYA	SCALE: AS SHOWN	PROVINCE: KALIMANTAN SELATAN KABUPATEN: KOTA BARU
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(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 SELATAN KAB : KOTA BARU

(1000Rp)

LINK NO	LENGTH (Km)	BA (Z)	SO (Z)	HU (Z)	RO (Z)	ASPIAL (Km)	GRAVEL (Km)	EARTH (Km)	TH NO	AREA (m2)	RC NO	AREA (m2)	BRIDGE COST	LOCAL COST	FOREIGN COST	TOTAL COST
1	9	75.7	19.3	4.4	0.6	0	9	0	2	200.00	0	0.00	2,419	5,666	1,361	7,027
2	8	87.0	10.0	3.0	0.0	0	8	0	6	195.00	0	0.00	2,359	5,201	1,253	6,454
3	8	88.9	8.4	4.8	0.0	0	8	0	4	96.00	0	0.00	1,161	4,253	1,004	5,257
4	5	89.0	6.0	5.0	0.0	0	5	0	5	128.00	0	0.00	1,548	3,310	798	4,108
5	7	62.1	26.1	11.7	0.0	0	7	0	1	70.00	0	0.00	242	3,108	717	3,825
17	5	21.0	26.0	34.0	19.0	0	3	2	7	141.75	0	0.00	1,715	3,211	733	3,944
18	1	50.0	30.0	20.0	0.0	0	1	0	2	36.00	0	0.00	435	762	186	948
19	18	41.7	26.4	20.8	11.1	0	18	0	13	540.00	0	0.00	6,532	12,673	3,073	15,746
24	18	68.9	27.7	3.4	0.0	0	17	0	24	807.75	0	0.00	9,771	15,007	3,659	18,666
25	10	80.0	12.5	7.5	0.0	0	10	0	9	517.50	0	0.00	6,260	9,125	2,254	11,379
26	11	80.5	16.4	3.2	0.0	0	11	0	8	486.00	0	0.00	5,879	9,240	2,271	11,511
27	2	90.0	0.0	10.0	0.0	0	2	0	0	0.00	0	0.00	0	833	191	1,024
28	9	97.4	0.6	2.0	0.0	0	9	0	2	31.50	0	0.00	381	4,051	937	4,988
29	11	81.8	9.2	6.7	2.3	0	9	2	4	405.00	0	0.00	4,899	8,233	1,967	10,200
30	8	94.8	0.0	5.3	0.0	0	8	0	5	396.00	0	0.00	4,790	7,127	1,758	8,885
SUM	130					0	125	4	92	4000.50	0	0.00	48,394	91,800	22,162	113,962

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 Kota Baru 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 1,481 x 10⁶ and maintenance cost is Rp 555 x 10⁶ which is approximately 27% of the total expenditure.

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

PROV : KALINANTAN SELATAN KAB : KOTA BARU

(UNIT : 1000Rp)

ITEM	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >	
LOCAL CURRENCY :	104,663	214,075	233,836	280,629	280,629	1,113,832	(75.2%)
Ownership Cost	832	2,170	2,511	3,011	3,011	11,535	(1.0%)
Operation Cost	36,958	99,715	116,122	139,359	139,359	531,513	(47.7%)
Material Cost	22,305	29,038	27,605	33,136	33,136	145,220	(13.0%)
Labour Cost	30,916	55,229	57,098	68,519	68,519	280,281	(25.2%)
Contingency	13,652	27,923	30,500	36,604	36,604	145,283	(13.0%)
FOREIGN CURRENCY :	24,682	67,749	80,610	96,739	96,739	366,519	(24.8%)
Ownership Cost	15,646	42,548	49,465	59,361	59,361	226,381	(61.0%)
Operation Cost	2,217	6,047	7,009	8,414	8,414	32,101	(8.8%)
Material Cost	3,600	10,317	13,622	16,346	16,346	60,231	(16.4%)
Labour Cost	0	0	0	0	0	0	(0.0%)
Contingency	3,219	8,837	10,514	12,618	12,618	47,806	(13.0%)
TOTAL COST :	129,345	281,824	314,447	377,368	377,368	1,480,352	
Ownership Cost	16,478	44,718	51,976	62,372	62,372	237,916	(16.1%)
Operation Cost	39,175	105,762	123,131	147,773	147,773	563,614	(38.1%)
Material Cost	25,905	39,355	41,227	49,482	49,482	205,451	(13.9%)
Labour Cost	30,916	55,229	57,098	68,519	68,519	280,281	(18.9%)
Contingency	16,871	36,760	41,015	49,222	49,222	193,090	(13.0%)

(Contingency : 15%)

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

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

(UNIT : 1000Rp)

ITEM	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >	
LOCAL CURRENCY :	45,793	95,781	102,511	101,870	102,511	448,466	(80.7%)
Ownership Cost	326	685	722	721	722	3,176	(0.7%)
Operation Cost	23,657	49,583	52,154	52,075	52,154	229,623	(51.2%)
Material Cost	5,031	10,134	11,390	11,090	11,390	49,035	(10.9%)
Labour Cost	16,779	35,379	38,245	37,984	38,245	166,632	(37.2%)
FOREIGN CURRENCY :	11,078	23,112	24,409	24,323	24,409	107,331	(19.3%)
Ownership Cost	9,341	19,534	20,517	20,484	20,517	90,393	(84.2%)
Operation Cost	958	2,020	2,134	2,131	2,134	9,377	(8.7%)
Material Cost	779	1,558	1,758	1,708	1,758	7,561	(7.0%)
Labour Cost	0	0	0	0	0	0	(0.0%)
TOTAL COST :	56,871	118,893	126,920	126,193	126,920	555,797	
Ownership Cost	9,667	20,219	21,239	21,205	21,239	93,569	(16.8%)
Operation Cost	24,615	51,603	54,288	54,206	54,288	239,000	(43.0%)
Material Cost	5,810	11,692	13,148	12,798	13,148	56,596	(10.2%)
Labour Cost	16,779	35,379	38,245	37,984	38,245	166,632	(30.0%)

Table 6-1-6 (3)

CONSTRUCTION AND MAINTENANCE COST
(TOTAL)

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

(UNIT : 1000Rp)

I T E M	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >	
LOCAL CURRENCY :	150,456	309,856	336,347	382,499	383,140	1,562,298	(76.7%)
Ownership Cost	1,158	2,855	3,233	3,732	3,733	14,711	(0.9%)
Operation Cost	60,615	149,298	168,276	191,434	191,513	761,136	(48.7%)
Material Cost	27,336	39,172	38,995	44,226	44,526	194,255	(12.4%)
Labour Cost	47,695	90,608	95,343	106,503	106,764	446,913	(28.6%)
Contingency	13,652	27,923	30,500	36,604	36,604	145,283	(9.3%)
FOREIGN CURRENCY :	35,760	90,861	105,019	121,062	121,148	473,850	(23.3%)
Ownership Cost	24,987	62,082	69,982	79,845	79,878	316,774	(66.9%)
Operation Cost	3,175	8,067	9,143	10,545	10,540	41,478	(8.8%)
Material Cost	4,379	11,875	15,380	18,054	18,104	67,792	(14.3%)
Labour Cost	0	0	0	0	0	0	(0.0%)
Contingency	3,219	8,837	10,514	12,618	12,618	47,806	(10.1%)
TOTAL COST :	186,216	400,717	441,367	503,561	504,288	2,036,149	
Ownership Cost	26,145	64,937	73,215	83,577	83,611	331,485	(16.3%)
Operation Cost	63,790	157,365	177,419	201,979	202,061	802,614	(39.4%)
Material Cost	31,715	51,047	54,375	62,280	62,630	262,047	(12.9%)
Labour Cost	47,695	90,608	95,343	106,503	106,764	446,913	(21.9%)
Contingency	16,871	36,760	41,015	49,222	49,222	193,090	(9.5%)

< Contingency : 15% >

6.1.4 Construction and Maintenance Equipment Cost

(1) Required Number of Equipment

The required numbers of construction equipment for Kabupaten Kota Baru 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.

- Nil

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 SELATAN KAB : KOTA BARU

EQUIPMENT NAME	WORKABLE	EXISTING	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >
Bulldozer/Ripper	230	0	0.11	0.54	0.64	0.76	0.76
Swamp Bulldozer	230	0	0.01	0.24	0.38	0.46	0.46
Motor Grader	250	0	0.33	0.42	0.33	0.39	0.39
Hand-guide Vib. Roller	250	0	0.16	0.31	0.33	0.40	0.40
Tire Roller	230	0	0.00	0.00	0.00	0.00	0.00
Vibratory Roller (D&T)	250	0	0.30	0.65	0.74	0.89	0.89
Hydraulic Excavator; Wheel	230	0	0.02	0.57	0.85	1.02	1.02
Wheel Loader	250	0	0.32	0.93	1.06	1.27	1.27
Water Tank Truck	250	0	0.19	0.42	0.48	0.57	0.57
Dump Truck	250	0	3.07	7.57	8.66	10.40	10.40
Flat Bed Truck with Crane	250	0	0.21	0.30	0.30	0.36	0.36
Flat Bed Truck	250	0	0.06	0.11	0.12	0.15	0.15
Portable Crusher/Screening	250	0	0.01	0.01	0.01	0.01	0.01
Concrete Mixer	230	0	0.01	0.02	0.03	0.04	0.04
Water Pump	230	0	0.01	0.02	0.03	0.04	0.04
Concrete Vibrator	230	0	0.01	0.02	0.03	0.04	0.04
Asphalt Sprayer	230	0	0.00	0.00	0.00	0.00	0.00

NOTE WORKABLE : workable days in a year

EXISTING : number of existing equipment

Table 6-1-8

EQUIPMENT PURCHASE COST

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

(1000 Rp)

EQUIPMENT NAME	CLASS	CIF (JAKARTA)	PURCHASE NO.	PURCHASE COST
Bulldozer	90 HP	49,150	-	-
Bulldozer/Ripper	90 HP	53,000	1	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	-	-
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	1	29,000
Vibratory Roller	4 ton	29,000	-	-
Rough Terrain Crane	10 ton	100,400	-	-
Hydraulic Excavator; Wheel	0.3 m ³	41,100	1	41,100
Wheel Loader	1.2 m ³	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	1	11,275
Portable Crusher/Screening	30-40 t/h	188,000	-	-
Concrete Mixer	0.5 m ³	18,000	-	-
Water Pump	200 l/min	630	-	-
Concrete Vibrator	3.3 HP	740	-	-
Asphalt Sprayer	850 ltr.	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				632,335
OWNERSHIP COST (FOREIGN)				307,053
EQUIPMENT COST SUPPLEMENTED				325,282

NOTE : OWNERSHIP COST (FOREIGN) for Existing Equipment

Portable Crusher/Screening 9,721

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 : KALINANTAN SELATAN KAB : KOTA BARU

ITEM	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
Site Clearance in Light Bush	m ²	7000.00	64750.00	61250.00	73500.00	73500.00	280000.00
Subgrade Preparation	m ²	72000.00	76875.00	48125.00	57750.00	57750.00	312500.00
Normal Fill	m ³	0.00	5250.00	8750.00	10500.00	10500.00	35000.00
Fill in Swamp	m ³	44.26	9552.04	15625.00	18750.00	18750.00	62721.30
Normal Excavation to Spoil	m ³	455.20	316.80	0.00	0.00	0.00	772.00
Sub Base Course	m ³	7680.00	9740.00	7700.00	9240.00	9240.00	43600.00
Base Course	m ³	0.00	0.00	0.00	0.00	0.00	0.00
Shoulder	m ²	24000.00	32500.00	27500.00	33000.00	33000.00	150000.00
Asphalt Patching	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Surface Dressing (Single)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Surface Dressing (Double)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Earth Drain	m	8280.00	15520.00	14000.00	16800.00	16800.00	71400.00
Earth Drain in Swamp (by machine)	m ³	240.00	10335.00	15625.00	18750.00	18750.00	63700.00
Pipe Culvert 800cm	m	13.60	154.25	239.75	287.70	287.70	983.00
Masonry Culvert (80x80cm)	m	0.00	0.00	0.00	0.00	0.00	0.00
Retaining Wall and Wing Wall (Timber)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Retaining Wall and Wing Wall (Masonry)	m ³	0.00	0.00	0.00	0.00	0.00	0.00
Gabion Protection	m ³	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber; Span 3m; 10T)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber; Span 5m; 10T)	m ²	8.00	32.00	0.00	0.00	0.00	40.00
Superstructure (Timber; Span 8m; 10T)	m ²	286.40	239.20	196.00	235.20	235.20	1192.00
Superstructure (Timber; Span 3m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber; Span 5m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Timber; Span 8m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete; Span 3m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete; Span 5m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete; Span 8m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete; Span 10m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Superstructure (Concrete; Span 15m; BH50)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Pier; for Timber; 10T)	NO	5.60	2.40	0.00	0.00	0.00	8.00
Substructure (Abut; for Timber; 10T)	NO	9.60	14.80	14.00	16.80	16.80	72.00
Substructure (Pier; for Timber; BH50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Abut; for Timber; BH50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Pier; for Concrete; BH50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Substructure (Abut; for Concrete; BH50)	NO	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of Bridge (Timber->Timber)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of Bridge (Timber->Concrete)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of Bridge (Concrete)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Manual routine maintenance of road	Km	64.50	139.00	149.00	149.00	149.00	650.50
Routine maintenance of earth road	Km	2.00	4.00	4.00	4.00	4.00	18.00
Routine maintenance of gravel road	Km	62.50	135.00	145.00	145.00	145.00	632.50
Routine maintenance of asphalt road	Km	0.00	0.00	0.00	0.00	0.00	0.00
Maintenance of Timber Bridge (New)	m ²	0.00	0.00	256.00	192.00	256.00	704.00
Maintenance of Concrete Bridge (New)	m ²	0.00	0.00	0.00	0.00	0.00	0.00
Maintenance of Timber Bridge (Exist)	m ²	2000.25	4000.50	4000.50	4000.50	4000.50	18002.25
Maintenance of Concrete Bridge (Exist)	m ²	0.00	0.00	0.00	0.00	0.00	0.00

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.

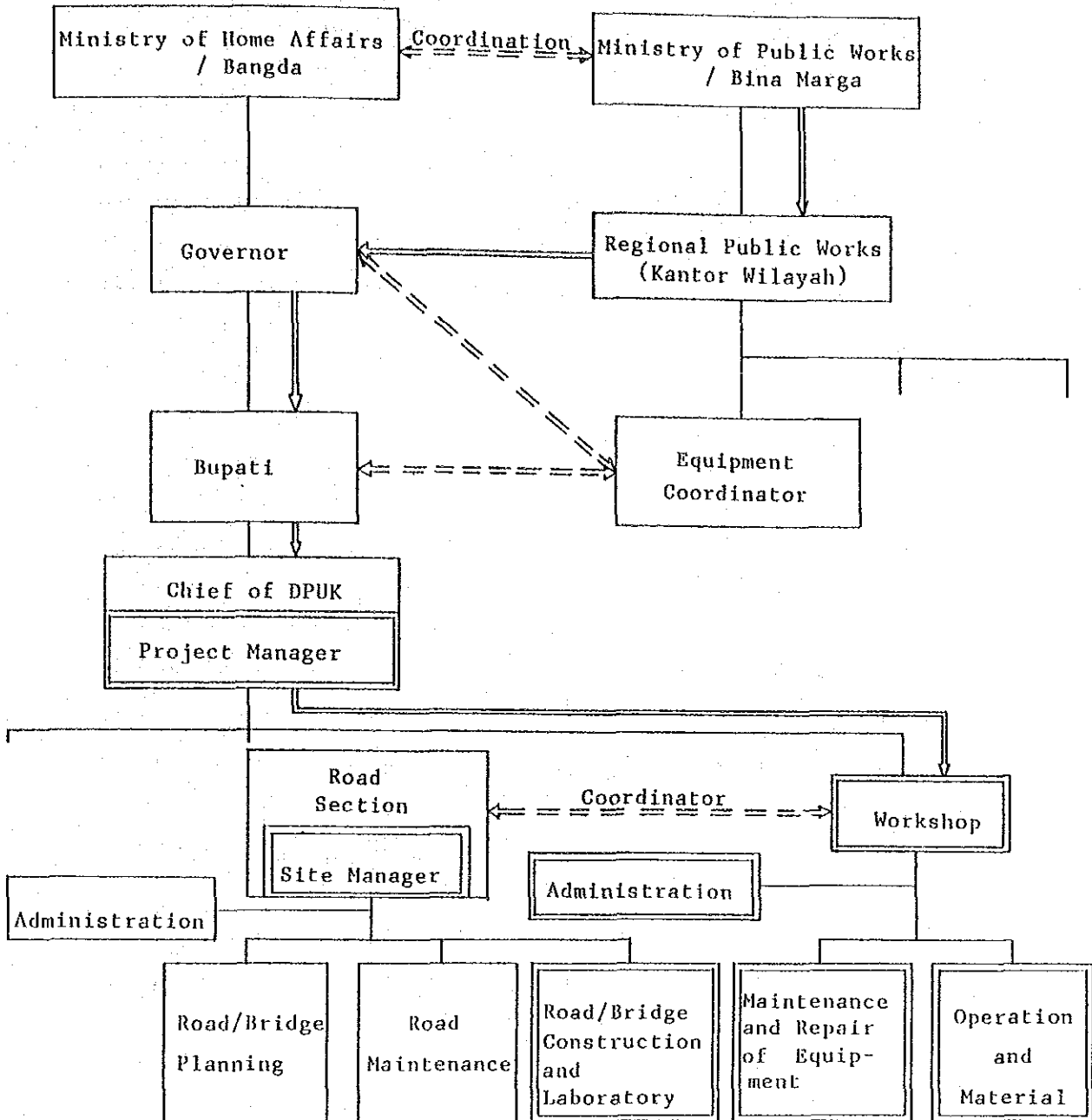
The sub-section of laboratory would be under the relevant Road Section. The proposed organization is shown in Fig. 6-2-1.

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 Pabupaten roads
- Laboratory tests
- Production of crushed stone
- Technical service for the equipment

APPENDIX

INPUT DATA

Appendix A-1 FOR ESTIMATION OF THE PRODUCER'S SURPLUS BENEFIT

PRV. : *KALIMANTAN SELATAN* KAB. : *KOTA BARU* SURVEY YEAR: *1983*

Code No.	KECAMATAN NAME	CULTIVATED AREA : (PA)	YIELD RATE : (Y)	FARMER'S POPULATION : (AP)	CIRCULATED COMMODITY : (PG)
01	<i>PULAU SEMBILAN</i>	<i>0</i>	<i>0.0</i>	<i>3,560</i>	<i>1,000</i>
02	<i>PULAU BARAT</i>	<i>190</i>	<i>3.21</i>	<i>3,170</i>	<i>1,000</i>
03	<i>PULAU SELATAN</i>	<i>651</i>	<i>0.73</i>	<i>510</i>	<i>500</i>
04	<i>PULAU TIMUR</i>	<i>1,357</i>	<i>1.65</i>	<i>3,030</i>	<i>0</i>
05	<i>PULAU SEBUKU</i>	<i>16</i>	<i>0.0</i>	<i>1,530</i>	<i>500</i>
06	<i>PULAU UTARA</i>	<i>580</i>	<i>3.31</i>	<i>24,410</i>	<i>5,000</i>
07	<i>KUSAN HILIR</i>	<i>4,581</i>	<i>3.15</i>	<i>17,050</i>	<i>0</i>
08	<i>SATUI</i>	<i>1,715</i>	<i>1.18</i>	<i>11,270</i>	<i>1,400</i>
09	<i>KUSAN HULU</i>	<i>1,450</i>	<i>1.17</i>	<i>2,560</i>	<i>0</i>
10	<i>BATU LICIN</i>	<i>2,682</i>	<i>2.20</i>	<i>14,390</i>	<i>0</i>
11	<i>KELUMPANG SELATAN</i>	<i>859</i>	<i>0.91</i>	<i>2,450</i>	<i>500</i>
12	<i>KELUMPANG HULU</i>	<i>599</i>	<i>2.47</i>	<i>3,820</i>	<i>0</i>
13	<i>KELUMPANG TENGAH</i>	<i>344</i>	<i>4.70</i>	<i>3,000</i>	<i>0</i>
14	<i>KELUMPANG UTARA</i>	<i>1,278</i>	<i>0.82</i>	<i>2,600</i>	<i>0</i>
15	<i>PAMUKAN SELATAN</i>	<i>371</i>	<i>3.52</i>	<i>2,110</i>	<i>0</i>
16	<i>SAMPANAHAN</i>	<i>561</i>	<i>2.49</i>	<i>3,300</i>	<i>0</i>
17	<i>PAMRIKAN UTARA</i>	<i>190</i>	<i>1.32</i>	<i>3,050</i>	<i>700</i>
18	<i>HAMPANG</i>	<i>101</i>	<i>1.42</i>	<i>1,470</i>	<i>500</i>
19	<i>SUNGGAI JURIAN</i>	<i>102</i>	<i>1.55</i>	<i>1,780</i>	<i>500</i>

	r_1	r_2	r_3	r_4
ANNUAL AVERAGE GROWTH RATE %	<i>5.7</i>	<i>2.9</i>	<i>4.0</i>	<i>6.2</i>

FARMER'S CONSUMPTION : (Cp)	NON-AGRO REQUIREMENT : (NG)
<i>0.15</i> Ton/head/year	<i>0.12</i> Ton/ton

	SEDAN	BUS	TRUCK	MOTOR CYCLE
RATE OF EACH VEHICLE TYPE %	<i>10.56</i>	<i>0.00</i>	<i>8.31</i>	<i>81.12</i>

AVERAGE FREIGHT TONNAGE	<i>0.7</i> Ton/Truck
-------------------------	----------------------

Appendix A-2 Engineering Data

ROAD LINK DATA

PROVINCE :Kalimantan Selatan

KABUPATEN:Kota baru

LINK NO.	BEGINNING POINT (DESA NAME)	END POINT (DESA NAME)	LENGTH (KM)	THROUGH THE KEC. NAME & LENGTH		REMARKS
				KEC. NAME	LENGTH (KM)	
01	Pagatan	Muara Pagatan	9	Kusan Hilir	9	
02	Sei Danau	Satui	8	Satui	8	
03	Pantai	Tapaling	8	Kelumpang Selatan	8	
04	Tapaling	Sangking	5	Kelumpang Selatan	5	
05	Sangking	Sei-Kupang	7	Kelumpang hulu Kelumpang Selatan	6	
06	Bakau	Betung	8	Pamukan Utara	8	
07	Sungai Bali	Sei Dungun	12	Pulau Sebuku	12	
08	Sei Dungun	Serakaman Tengah	2	Pulau Sebuku	2	
09	Serakaman Tengah	Serakaman	3	Pulau Sebuku	3	
10	Serakaman	Mandin	5	Pulau Sebuku	5	
11	Mandin	Sekapung	10	Pulau Sebuku	10	
12	Tanjung Se-loka	Sei Bahim	4	Pulau Laut Selatan	4	
13	Sei Bahim	Teluk Sirih	5	Pulau Laut Selatan	5	
14	Teluk Sirih	Tanjung Salak	14	Pulau Laut Selatan	14	
15	Tanjung salak	Lontar	10	P.Laut Barat P.Laut Selatan	4 6	
16	Lontar	Sebanti	4	Pulau Laut Barat	4	
17	Berangas	Langkang	5	Pulau Laut Timur	5	
18	Langkang	Anderi	1	P.Laut Timur	1	
19	Sebelimbingan	Sei. Pinang	18	Pulau Laut Utara	18	
20	-	-	-	-	-	
21	Senakin	Pudi	10	Kelumpang.T Kelumpang.U	3 7	
22	Tanjung Batu	Senakin	10	Kelumpang Tengah	5	
23	Pudi	Tanjung Mahkota	4	Kelumpang Utara	2	
24	Sei Pinang	Sei Pasir	18	Pulau Laut Utara	18	

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

ROAD LINK DATA

PROVINCE : Kalimantan Selatan

KABUPATEN: Kota Baru

LINK NO.	BEGINNING POINT (DESA NAME)	END POINT (DESA NAME)	LENGTH (KM)	THROUGH THE KEC. NAME & LENGTH		REMARKS
				KEC. NAME	LENGTH (KM)	
25	Sei Pasir	Sembega	10	Pualu Laut Barat	10	
26	Sembega	Sekalian	11	Pulau Laut Barat	11	
27	Panceserai	Pajuntingan	2	Kusan Hilir	2	
28	Sepunggur	Pakketellu	9	Kusan Hilir	9	
29	Sekalian	Semaras	11	Pulau Laut Barat	11	
30	Semaras	Sekarambut	8	Pulau Laut Barat	9	
31	Sekarambut	Setimbangan	10	Pulau Laut Barat	10	
32	Setimbangan	Sebanti	10	P.Laut Barat	10	
33	-	-	-	-	-	
34	-	-	-	-	-	
35	Desa Sei.Taib	Desa Gunung Ulin	7	Pulau Laut Utara	7	Jln. Dalam Kota
36	Desa Baharu	Desa Tirawan	5	P.Laut Utara	5	
37	-	-	-	-	-	
38	Tanjung Mahkota	Mangga	6	Kelumpang - Utara	6	

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

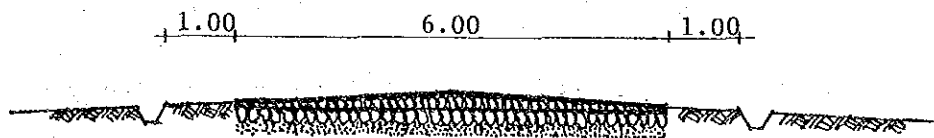
What Kind of Design Criteria has being applied for the new road construction and the improvement for the Kabupaten Road ?

Kriteria Perencanaan yang dipakai pada program penanganan jalan Kabupaten, baik untuk jalan lama maupun pembangunan baru.

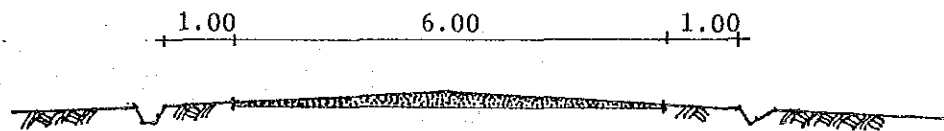
Please draw the Typical Cross Section of the Kabupaten Road.

Buat gambar dan penjelasan dari: Typical cross section yang dipakai pada program penanganan jalan selama ini (baik untuk jalan lama, maupun pembangunan baru)

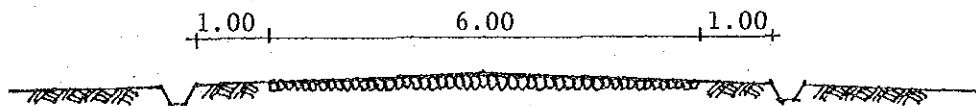
TYPICAL CROSS SECTION.



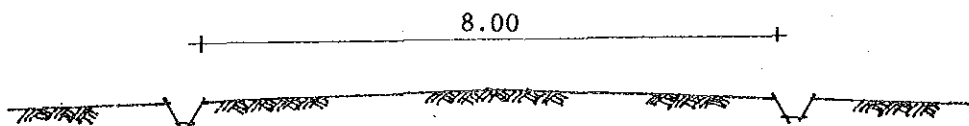
Jalan Asphalt



Jalan Kerikil/Awcas



Jalan Macadam/Batu belah



Jalan Tanah

LINK NO : Nomor Ruas	L O C A T I O N From - To (dari - ke)	Lebar per- kerasan(m)	Type per- kerasan	LENGTH Panjang (KM)	COSTS Harga (Rp 10 ⁶)	REMARKS Keterang: an
		Lebar Jembatan	Type Jembatan			

- * 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

LINK NO : Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m)	Type per- kerasan	LENGTH Panjang (KM)	COSTS Harga (Rp 10 ⁶)	REMARKS Keterangan
		Lebar Jembatan	Type Jembatan			
1	Sei Danau - Satui	3.5	Batu Pecah	9	89,920	
		4.5	Timber	44		
2	Berangas - Langkang	3.5	Batu Pecah	6	54,748	
		4.5	Timber	26		
3	Sebelimbingan - Selaru	3.5	Batu Pecah	15	140,191	
		4.5	Timber	118		

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

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

LINK NO : Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m)	Type per- kerasan	LENGTII Panjang	COSTS Harga (Rp 10 ⁶)	REMARKS Keterang- an
		Lebar Jembatan	Type Jembatan	(KM)		
1	Sei Pinang - Sei Pasir	6	Awcas	20	163,590	
		4.5	Timber	194		
2	Pancaserai - Soraja	3.5	Batu Pecah	8	67,285	
		-	-	-		

* PAVENENT 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

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m)	Type per- kerasan	LENGTH Panjang (KM)	COSTS Harga (Rp 10 ⁶)	REMARKS Keterangan
		Lebar Jembatan	Type Jembatan			
1	Sei Pasir - Sembega	8	Awcas	10	154,850	
		4.5	Timber	128		
2	Sembega - Sekalian	8	Awcas	10	78,850	
		-	-	-		
3	Sepunggur - Pakkatellu	8	Awcas	9	80,750	
		4.5	Timber	19		

* 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

ROADS CONSTRUCTED OR IMPROVED IN 1984/1985

Biaya konstruksi penanganan

jalan dan jembatan Kabupaten thn. 1984/1985

LINK NO Nomor Ruas	L O C A T I O N From - To (dari - ke)	Lebar per-	Type per-	LENGTH Panjang (KM)	COSTS Harga (Rp 10 ⁶)	REMARKS Keterangan
		kerasan(m) Lebar Jembatan	kerasan Type Jembatan			
1	Sembega - Sekalian	-	-	-	35,260	
		4.5	Timber	58		
2	Sekalian - Semaras	8	Awcas	10	139,747	
		4.5	Timber	94		
3	Semaras - Sekarambut	8	Awcas	10	139,747	
		4.5	Timber	102		
4	Sekarambut - Setimbangan	8	Awcas	10	139,747	
		4.5	Timber	64		
5	Setimbangan - Sebanti	8	Awcas	10	120,499	
		4.5	Timber	64		

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

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

PROPINSI : Kalimantan Selatan

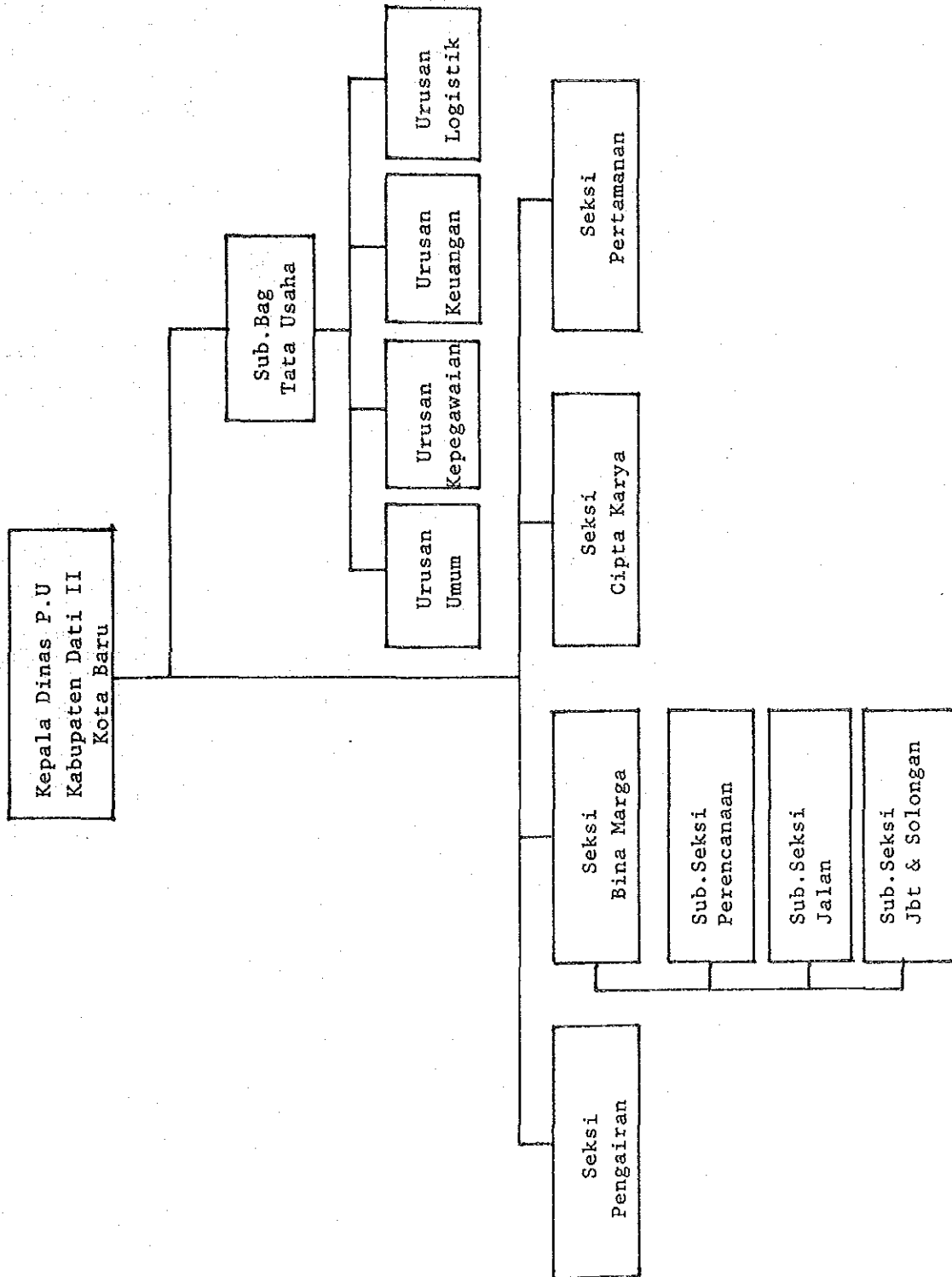
KABUPATEN: Kota Baru

E-04

EXISTING ORGANIZATION IN KABUPATEN

Struktur 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 KABUPATENTenaga Dinas PUK yang adaPROPINSI: Kalimantan SelatanKABUPATEN: Kota Baru

DESCRIPTION / Uraian	NUMBER / Jumlah	REMARKS Keterangan
CONTROLLING STAFF Staff teknis. PUK	(21)	(8)
DPUK ENGINEER Sarjana Teknik	-	-
ASSISTANT ENGINEER Sarjana Muda Teknik	2	-
TECHNICIAN STAFF Staff Teknik (STM)	19	8
ADMINISTRATION Tenaga Administrasi	10	-
SUPERVISOR Tenaga Pengawas	20	4
WORKING FORCE Tenaga Pelaksana Lapangan	(53)	
OPERATORS Operators	8	
DRIVERS Supir	12	
MECHANICS Mechanic	3	
TRADESMAN Tukang	6	
LABOUR Buruh / Pekerja	18	
OTHERS Lain-lain	6	
TOTAL / JUMLAH	(104)	12

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 Selatan

KABUPATEN: Kota Baru

LOCATION Lokasi	AREA (m2) Luas	NUMBER Jumlah	REMARKS Keterangan
Desa Maniang	20,000	1 (satu)	Direncanakan

PROPINSI: Kalimantan Selatan

E-07

KABUPATEN: Kota Baru

LAND ACQUISITION COST

Daftar harga pembebasan tanah

DESCRIPTION Uraian	UNIT Satuan	RATE (RP) Harga	REMARKS Keterangan
CITY/kota	M2	10,000	
VILLAGE / desa	M2	5,000	
RICE FIELD/sawah	M2	500	
DRY FIELD/ladang	M2	300	
MIX CROPS/panen	M2	-	
FOREST/hutan	M2	100	
SWAMP / rawa	M2	100	
OTHERS / lain-lain	M2		

PROPINSI: Kalimantan Selatan

E-08

KABUPATEN: Kota baru

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
38	C3	31,604,000	6	

NOTE: DATI II

PROPINSI: Kalimantan Selatan
 KABUPATEN: Kota Baru

E-09

LIST OF EXISTING EQUIPMENT OF LOCAL CONTRACTOR

Name of contractor

NAME OF EQUIPMENT Jenis peralatan	EXISTING CONDITION/ Kondisi Peralatan					REASON OF BAD CONDI TION/Sebab Kerusakan	REQUIRE - MENT / Ke- butuhan peralatan baru
	TYPE/ Tipe	P.Y	NUMBER / Jumlah				
			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							

LIST OF EXISTING EQUIPMENT OF P.U KABUPATEN

NAME OF EQUIPMENT Jenis peralatan	EXISTING CONDITION/ Kondisi Peralatan					REASON OF BAD CONDT TION/Sebab Kerusakan	REQUIRE - MENT /Ke- butuhan peralatan baru
	TYPE/ Tipe	P.Y	NUMBER / Jumlah				
			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							

Appendix A-3

CONSTRUCTION AND MAINTENANCE COST FOR PROPOSED ROAD LINKS

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINK NO : 31 (IHC) LENGTH : 10 Km

UPGRADE : 4.0m road bed, 4.0m road with surface Subbase Course

(Rp)

ITEM	UNIT	QUANTITY	UNIT COST		COST		TOTAL	
			LOCAL	FOREIGN	LOCAL	FOREIGN		
Site Clearance in Light Bush	m2	0.0	197	91	0	0	0	
Subgrade Preparation	m2	60000.0	25	11	1,500,000	660,000	2,160,000	
Normal Fill	m3	0.0	2,037	863	0	0	0	
Fill in Swamp	m3	0.0	2,974	1,052	0	0	0	
Normal Excavation to Spoil	m3	376.0	1,189	522	447,064	196,272	643,336	
Sub Base Course	m3	6400.0	3,777	1,347	24,172,800	8,620,800	32,793,600	
Base Course	m3	0.0	5,214	2,299	0	0	0	
Shoulder	m2	20000.0	356	146	7,120,000	2,920,000	10,040,000	
Asphalt Patching	m2	0.0	4,658	1,478	0	0	0	
Surface Dressing (Single)	m2	0.0	709	723	0	0	0	
Surface Dressing (Double)	m2	0.0	882	1,139	0	0	0	
Earth Drain	m	6500.0	1,124	119	7,306,000	773,500	8,079,500	
Earth Drain in Swamp (by machine)	m3	0.0	1,468	474	0	0	0	
Pipe Culvert 980cm	m	11.0	57,196	52,136	629,156	573,496	1,202,652	
Masonry Culvert (80x80cm)	m	0.0	79,892	42,320	0	0	0	
Retaining Wall and Wing Wall (Timber)	m2	0.0	15,290	246	0	0	0	
Retaining Wall and Wing Wall (Masonry)	m3	0.0	59,169	11,982	0	0	0	
Gabion Protection	m3	0.0	18,702	120	0	0	0	
New Bridge (Timber)	SET	1.0	---	---	33,764,801	3,448,251	37,212,852	
New Bridge (Concrete)	SET	1.0	---	---	0	0	0	
					Sub Total	74,939,621	17,192,319	92,131,940
Overhead (15%)						11,240,943	2,578,847	13,819,790
					TOTAL COST	86,180,564	19,771,166	105,951,730
Manual routine maintenance of road	Km	10.0	184,356	7,248	1,843,560	72,480	1,916,040	
Routine maintenance of gravel road	Km	10.0	232,263	88,047	2,322,630	880,470	3,203,100	
					Sub Total	4,166,190	952,950	5,119,140
Maintenance of Timber Bridge (New)	m2	256.0	10,021	1,343	2,565,376	343,808	2,909,184	
Maintenance of Concrete Bridge (New)	m2	0.0	2,354	3,216	0	0	0	
Maintenance of Timber Bridge (Exist)	m2	0.0	9,582	2,515	0	0	0	
Maintenance of Concrete Bridge (Exist)	m2	0.0	5,042	2,487	0	0	0	
Earthwork & Pavement Unit Cost (Rp/Km)							6,315,695	
Timber Bridge Unit Cost (Rp/m2)							167,167	
Concrete Bridge Unit Cost (Rp/m2)								
Survived Value (Rp)							13,117,440	
Maintenance Rate without Bridge (%)							8.11	
New Bridge Cost Rate (%)							40.39	

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINK NO : 32 (IIIC) LENGTH : 10 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Subbase Course (Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>>		<<<<< COST >>>>>		TOTAL	
			LOCAL	FOREIGN	LOCAL	FOREIGN		
Site Clearance in Light Bush	m ²	35000.0	197	91	6,895,000	3,185,000	10,080,000	
Subgrade Preparation	m ²	60000.0	25	11	1,500,000	660,000	2,160,000	
Normal Fill	m ³	0.0	2,037	863	0	0	0	
Fill in Swamp	m ³	221.3	2,974	1,052	658,146	232,807	890,953	
Normal Excavation to Spoil	m ³	396.0	1,189	522	470,844	206,712	677,556	
Sub Base Course	m ³	6400.0	3,777	1,347	24,172,800	8,620,800	32,793,600	
Base Course	m ³	0.0	5,214	2,299	0	0	0	
Shoulder	m ²	20000.0	356	146	7,120,000	2,920,000	10,040,000	
Asphalt Patching	m ²	0.0	4,658	1,478	0	0	0	
Surface Dressing (Single)	m ²	0.0	709	723	0	0	0	
Surface Dressing (Double)	m ²	0.0	882	1,139	0	0	0	
Earth Drain	m	8900.0	1,124	119	10,003,600	1,059,100	11,062,700	
Earth Drain in Swamp (by machine)	m ³	1200.0	1,468	474	1,761,600	568,800	2,330,400	
Pipe Culvert Ø80cm	m	13.0	57,196	52,136	743,548	677,768	1,421,316	
Masonry Culvert (80x80cm)	m	0.0	79,892	42,320	0	0	0	
Retaining Wall and Wing Wall (Timber)	m ²	0.0	15,290	246	0	0	0	
Retaining Wall and Wing Wall (Masonry)	m ³	0.0	59,169	11,982	0	0	0	
Gabion Protection	m ³	0.0	18,702	120	0	0	0	
New Bridge (Timber)	SET	1.0	--	--	26,812,663	2,868,973	29,681,636	
New Bridge (Concrete)	SET	1.0	--	--	0	0	0	
					Sub Total			
						80,138,201	20,999,960	101,138,161
Overhead (15%)						12,020,730	3,149,994	15,170,724
					TOTAL COST	92,158,931	24,149,954	116,308,885

Manual routine maintenance of road	Km	10.0	184,356	7,248	1,843,560	72,460	1,916,040
Routine maintenance of gravel road	Km	10.0	232,263	88,047	2,322,630	880,470	3,203,100
			Sub Total		4,166,190	952,950	5,119,140
Maintenance of Timber Bridge (New)	m ²	192.0	10,021	1,343	1,924,032	257,856	2,181,888
Maintenance of Concrete Bridge (New)	m ²	0.0	2,354	3,216	0	0	0
Maintenance of Timber Bridge (Exist)	m ²	0.0	9,582	2,513	0	0	0
Maintenance of Concrete Bridge (Exist)	m ²	0.0	5,042	2,487	0	0	0

Earthwork & Pavement	Unit Cost (Rp/Km)	:	8,217,500
Timber Bridge	Unit Cost (Rp/m ²)	:	177,781
Concrete Bridge	Unit Cost (Rp/m ²)	:	
Survived Value	(Rp)	:	13,117,440
Maintenance Rate without Bridge	(%)	:	6.23
New Bridge Cost Rate	(%)	:	29.35

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINK NO : 50 (IIIC) LENGTH : 55 Km

UPGRADE : 5.5m road bed, 4.0m road with surface Subbase Course

(Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>>		<<<<< COST >>>>>		TOTAL	
			LOCAL	FOREIGN	LOCAL	FOREIGN		
Site Clearance in Light Bush	m2	245000.0	197	91	48,265,000	22,295,000	70,560,000	
Subgrade Preparation	m2	192500.0	25	11	4,812,500	2,117,500	6,930,000	
Normal Fill	m3	35000.0	2,037	863	71,295,000	30,205,000	101,500,000	
Fill in Swamp	m3	62500.0	2,974	1,052	185,875,000	65,750,000	251,625,000	
Normal Excavation to Spoil	m3	0.0	1,189	522	0	0	0	
Sub Base Course	m3	30800.0	3,777	1,347	116,331,600	41,487,600	157,819,200	
Base Course	m3	0.0	3,214	2,299	0	0	0	
Shoulder	m2	110000.0	356	146	39,160,000	16,060,000	55,220,000	
Asphalt Patching	m2	0.0	4,658	1,478	0	0	0	
Surface Dressing (Single)	m2	0.0	709	723	0	0	0	
Surface Dressing (Double)	m2	0.0	882	1,139	0	0	0	
Earth Drain	m	56000.0	1,124	119	62,944,000	6,664,000	69,608,000	
Earth Drain in Swamp (by machine)	m3	62500.0	1,468	474	91,750,000	29,625,000	121,375,000	
Pipe Culvert Ø80cm	m	959.0	57,196	52,136	54,850,964	49,998,424	104,849,388	
Masonry Culvert (80x80cm)	m	0.0	79,892	42,320	0	0	0	
Retaining Wall and Wing Wall (Timber)	m2	0.0	15,290	246	0	0	0	
Retaining Wall and Wing Wall (Masonry)	m3	0.0	59,169	11,982	0	0	0	
Gabion Protection	m3	0.0	18,702	120	0	0	0	
New Bridge (Timber)	SET	1.0	--	--	137,698,008	15,869,952	153,567,960	
New Bridge (Concrete)	SET	1.0	--	--	0	0	0	
					Sub Total	812,982,072	280,072,476	1,093,054,548
Overhead (15%)						121,947,310	42,010,871	163,958,181
					TOTAL COST	934,929,382	322,083,347	1,257,012,729
Manual routine maintenance of road	Km	55.0	184,356	7,248	10,139,580	398,640	10,538,220	
Routine maintenance of gravel road	Km	55.0	232,263	88,047	12,774,465	4,842,585	17,617,050	
			Sub Total		22,914,045	5,241,225	28,155,270	
Maintenance of Timber Bridge (New)	m2	784.0	10,021	1,343	7,856,464	1,052,912	8,909,376	
Maintenance of Concrete Bridge (New)	m2	0.0	2,354	3,216	0	0	0	
Maintenance of Timber Bridge (Exist)	m2	0.0	9,582	2,515	0	0	0	
Maintenance of Concrete Bridge (Exist)	m2	0.0	5,042	2,487	0	0	0	
Earthwork & Pavement	Unit Cost	(Rp/Km)	:	19,643,810				
Timber Bridge	Unit Cost	(Rp/m2)	:	225,259				
Concrete Bridge	Unit Cost	(Rp/m2)	:					
Survived Value	(Rp)	:	63,127,680					
Maintenance Rate without Bridge	(%)	:	2.61					
New Bridge Cost Rate	(%)	:	14.05					

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

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

I T E M	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :							
Bulldozer/Ripper	hr	146.3	738.2	872.7	1047.5	1047.5	3852.2
Swaap Bulldozer	hr	1.4	318.4	520.8	625.0	625.0	2090.6
Motor Grader	hr	494.4	619.2	482.7	579.3	579.3	2754.9
Hand-guide Vib. Roller	hr	234.7	454.4	494.9	593.8	593.8	2371.6
Tire Roller	hr	0.0	0.0	0.0	0.0	0.0	0.0
Vibratory Roller (D&T)	hr	447.5	966.4	1106.8	1328.3	1328.3	5177.3
Hydraulic Excavator; Wheel	hr	18.0	775.1	1171.8	1406.2	1406.2	4777.3
Wheel Loader	hr	476.7	1390.8	1583.2	1900.2	1900.2	7251.1
Water Tank Truck	hr	282.3	615.8	707.8	849.5	849.5	3304.9
Dump Truck	hr	4592.7	11354.8	12989.4	15587.6	15587.6	60112.1
Flat Bed Truck with Crane	hr	311.4	440.0	448.1	537.8	537.8	2275.1
Flat Bed Truck	hr	79.0	160.2	178.6	214.3	214.3	846.4
Portable Crusher/Screening	hr	0.2	2.4	3.7	4.4	4.4	15.1
Concrete Mixer	hr	2.3	26.4	41.1	49.3	49.3	168.4
Water Pump	hr	2.3	26.4	41.1	49.3	49.3	168.4
Concrete Vibrator	hr	2.3	26.4	41.1	49.3	49.3	168.4
Asphalt Sprayer	hr	0.0	0.0	0.0	0.0	0.0	0.0
LABOUR :							
Mandur	man day	726.5	1396.2	1496.9	1796.4	1796.4	7212.4
Skilled Labourer	man day	2673.4	2915.7	2437.0	2924.4	2924.4	13876.9
Carpenter	man day	1439.0	1518.6	1232.1	1478.5	1478.5	7146.7
Mason	man day	0.0	0.0	0.0	0.0	0.0	0.0
Labourer	man day	5049.0	11274.8	12236.4	14683.9	14683.9	57928.0
Driver	man day	945.7	2228.1	2529.7	3035.8	3035.8	11775.1
Operator	man day	385.0	1075.2	1263.5	1516.4	1516.4	5756.5
MATERIAL :							
Bitumen	l	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Oil	l	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	l	0.0	0.0	0.0	0.0	0.0	0.0
Sand	m ³	11.5	130.5	202.9	243.5	243.5	831.9
Cement	bag	34.0	385.6	599.3	719.2	719.2	2457.3
River Stone	m ³	0.0	0.0	0.0	0.0	0.0	0.0
Steel Houlds	set	13.6	154.2	239.7	287.7	287.7	982.9
Timber	m ³	130.6	137.1	110.7	132.9	132.9	644.2
Paint	l	853.6	958.4	799.6	959.5	959.5	4530.6
Reinforcing Steel	kg	433.8	4920.5	7648.0	9177.6	9177.6	31357.5
Tying Wire	kg	3.9	44.7	69.5	83.4	83.4	284.9
Equivalent Royalty	m ³	9842.4	22226.5	25859.5	31031.5	31031.5	119991.4

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

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

ITEM	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :							
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	289.2	623.5	668.5	668.5	668.5	2918.2
Hand-guide Vib. Roller	hr	0.0	0.0	0.0	0.0	0.0	0.0
Tire Roller	hr	289.2	623.5	668.5	668.5	668.5	2918.2
Vibratory Roller (D&I)	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	99.2	214.4	230.2	230.2	230.2	1004.2
Water Tank Truck	hr	0.0	0.0	0.0	0.0	0.0	0.0
Dump Truck	hr	595.5	1286.4	1381.7	1381.7	1381.7	6027.0
Flat Bed Truck with Crane	hr	2306.5	4613.0	4691.4	4671.8	4691.4	20974.1
Flat Bed Truck	hr	1063.2	2291.5	2456.5	2456.5	2456.5	10724.2
Portable Crusher/Screening	hr	49.6	107.2	115.1	115.1	115.1	502.1
Concrete Mixer	hr	0.0	0.0	0.0	0.0	0.0	0.0
Water Pump	hr	0.0	0.0	0.0	0.0	0.0	0.0
Concrete Vibrator	hr	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Sprayer	hr	0.0	0.0	0.0	0.0	0.0	0.0
LABOUR :							
Mandur	man day	410.2	870.5	943.1	937.5	943.1	4104.4
Skilled Labourer	man day	640.3	1280.6	1444.5	1403.5	1444.5	6213.4
Carpenter	man day	343.7	687.5	775.5	753.5	775.5	3335.7
Mason	man day	0.0	0.0	0.0	0.0	0.0	0.0
Labourer	man day	4098.8	8793.7	9456.3	9439.7	9456.3	41244.8
Driver	man day	770.2	1583.8	1651.2	1645.2	1651.2	7301.6
Operator	man day	129.4	279.2	299.5	299.5	299.5	1307.1
MATERIAL :							
Bitumen	l	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Oil	l	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	l	0.0	0.0	0.0	0.0	0.0	0.0
Sand	m ³	0.0	0.0	0.0	0.0	0.0	0.0
Cement	bag	0.0	0.0	0.0	0.0	0.0	0.0
River Stone	m ³	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
Yiaber	m ³	31.2	62.5	70.5	68.5	70.5	303.2
Paint	l	222.6	445.3	502.3	488.0	502.3	2160.5
Reinforcing Steel	kg	0.0	0.0	0.0	0.0	0.0	0.0
Tying Wire	kg	0.0	0.0	0.0	0.0	0.0	0.0
Equivalent Royalty	m ³	1406.2	3037.5	3262.5	3262.5	3262.5	14231.2

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

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

I T E M	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :							
Bulldozer/Ripper	hr	146.3	738.2	872.7	1047.5	1047.5	3852.2
Swamp Bulldozer	hr	1.4	318.4	520.8	625.0	625.0	2090.6
Motor Grader	hr	783.6	1242.7	1151.2	1247.8	1247.8	5673.1
Hand-guide Vib. Roller	hr	234.7	454.4	494.9	593.8	593.8	2371.6
Tire Roller	hr	289.2	623.5	668.5	668.5	668.5	2918.2
Vibratory Roller (D&T)	hr	447.5	966.4	1106.8	1328.3	1328.3	5177.3
Hydraulic Excavator; Wheel	hr	18.0	775.1	1171.8	1406.2	1406.2	4777.3
Wheel Loader	hr	575.9	1605.2	1813.4	2130.4	2130.4	8255.3
Water Tank Truck	hr	282.3	615.8	707.8	849.5	849.5	3304.9
Dump Truck	hr	5188.2	12641.2	14371.1	16969.3	16969.3	66139.1
Flat Bed Truck with Crane	hr	2617.9	5053.0	5139.5	5209.6	5229.2	23249.2
Flat Bed Truck	hr	1142.2	2451.7	2635.1	2670.8	2670.8	11570.6
Portable Crusher/Screening	hr	49.8	109.6	118.8	119.5	119.5	517.2
Concrete Mixer	hr	2.3	26.4	41.1	49.3	49.3	168.4
Water Pump	hr	2.3	26.4	41.1	49.3	49.3	168.4
Concrete Vibrator	hr	2.3	26.4	41.1	49.3	49.3	168.4
Asphalt Sprayer	hr	0.0	0.0	0.0	0.0	0.0	0.0
LABOUR :							
Handur	man day	1136.7	2266.7	2440.0	2733.9	2739.5	11316.8
Skilled Labourer	man day	3315.7	4196.3	3881.5	4327.9	4368.9	20090.3
Carpenter	man day	1782.7	2206.1	2007.6	2232.0	2254.0	10482.4
Mason	man day	0.0	0.0	0.0	0.0	0.0	0.0
Labourer	man day	9147.8	20068.5	21692.7	24123.6	24140.2	99172.8
Driver	man day	1715.9	3811.9	4180.9	4681.0	4687.0	19076.7
Operator	man day	514.4	1354.4	1563.0	1815.9	1815.9	7063.6
MATERIAL :							
Bitumen	l	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Oil	l	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	l	0.0	0.0	0.0	0.0	0.0	0.0
Sand	m ³	11.5	130.5	202.9	243.5	243.5	831.9
Cement	bag	34.0	385.6	599.3	719.2	719.2	2457.3
River Stone	m ³	0.0	0.0	0.0	0.0	0.0	0.0
Steel Moulds	set	13.6	154.2	239.7	287.7	287.7	982.9
Timber	m ³	161.8	199.6	181.2	201.4	203.4	947.4
Paint	l	1076.2	1403.7	1301.9	1447.5	1461.8	6691.1
Reinforcing Steel	kg	433.8	4920.5	7648.0	9177.6	9177.6	31357.5
Tying Wire	kg	3.9	44.7	69.5	83.4	83.4	284.9
Equivalent Royalty	m ³	11248.6	25264.0	29122.0	34294.0	34294.0	134222.6

Appendix A-5

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

PROV : KALIMANTAN SELATAN

KAB : KOTA BARU

(1000 Rp)

I T E M	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :		55,653	150,480	175,107	210,145	210,145	801,530
Bulldozer/Ripper	17979	2,630	13,272	15,690	18,833	18,833	69,258
Swamp Bulldozer	13087	18	4,166	6,815	8,179	8,179	27,357
Motor Grader	15160	7,495	9,387	7,317	8,782	8,782	41,763
Hand-guide Vib. Roller	1673	392	760	827	993	993	3,965
Tire Roller	13008	0	0	0	0	0	0
Vibratory Roller (D&T)	7505	3,358	7,252	8,306	9,968	9,968	38,852
Hydraulic Excavator; Wheel	14671	264	11,371	17,191	20,630	20,630	70,086
Wheel Loader	18278	8,713	25,421	28,937	34,731	34,731	132,533
Water Tank Truck	4832	1,364	2,975	3,420	4,104	4,104	15,967
Dump Truck	6361	29,214	72,227	82,625	99,152	99,152	382,370
Flat Bed Truck with Crane	5916	1,842	2,603	2,650	3,181	3,181	13,457
Flat Bed Truck	4217	333	675	753	903	903	3,567
Portable Crusher/Screening	48574	9	116	179	213	213	730
Concrete Mixer	8764	20	231	360	432	432	1,475
Water Pump	547	1	14	22	26	26	89
Concrete Vibrator	382	0	10	15	18	18	61
Asphalt Sprayer	2120	0	0	0	0	0	0
LABOUR :		30,916	55,229	57,098	68,519	68,519	280,281
Mandur	2750	1,997	3,839	4,116	4,940	4,940	19,832
Skilled Labourer	2750	7,357	8,018	6,701	8,042	8,042	38,160
Carpenter	3500	5,036	5,315	4,312	5,174	5,174	25,011
Mason	3500	0	0	0	0	0	0
Labourer	2500	12,622	28,187	30,591	36,709	36,709	144,818
Driver	2500	2,364	5,570	6,324	7,589	7,589	29,436
Operator	4000	1,540	4,300	5,054	6,065	6,065	23,024
MATERIAL :		25,905	39,355	41,227	49,482	49,482	205,451
Bitumen	375	0	0	0	0	0	0
Asphalt Oil	750	0	0	0	0	0	0
Kerosene	250	0	0	0	0	0	0
Sand	12500	143	1,631	2,536	3,043	3,043	10,396
Cement	5300	180	2,043	3,176	3,811	3,811	13,021
River Stone	12500	0	0	0	0	0	0
Steel Moulds	8000	108	1,233	1,917	2,301	2,301	7,860
Timber	150000	19,590	20,565	16,605	19,935	19,935	96,630
Paint	3500	2,987	3,354	2,798	3,358	3,358	15,855
Reinforcing Steel	1000	433	4,920	7,648	9,177	9,177	31,355
Tying Wire	1200	4	53	83	100	100	340
Equivalent Royalty	250	2,460	5,556	6,464	7,757	7,757	29,994

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

PROV : KALIMANTAN SELATAN

KAB : KOTA BARU

(1000 Rp)

I T E M	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :		34,282	71,822	75,527	75,411	75,527	332,569
Bulldozer/Ripper	17979	0	0	0	0	0	0
Swamp Bulldozer	13087	0	0	0	0	0	0
Motor Grader	15160	4,384	9,452	10,134	10,134	10,134	44,238
Hand-guide Vib. Roller	1673	0	0	0	0	0	0
Tire Roller	13008	3,761	8,110	8,695	8,695	8,695	37,956
Vibratory Roller (D&T)	7505	0	0	0	0	0	0
Hydraulic Excavator; Wheel	14671	0	0	0	0	0	0
Wheel Loader	18278	1,813	3,918	4,207	4,207	4,207	18,352
Water Tank Truck	4832	0	0	0	0	0	0
Dump Truck	6361	3,787	8,182	8,788	8,788	8,788	38,333
Flat Bed Truck with Crane	5916	13,645	27,290	27,754	27,638	27,754	124,081
Flat Bed Truck	4217	4,483	9,663	10,359	10,359	10,359	45,223
Portable Crusher/Screening	48574	2,409	5,207	5,590	5,590	5,590	24,386
Concrete Mixer	8764	0	0	0	0	0	0
Water Pump	547	0	0	0	0	0	0
Concrete Vibrator	382	0	0	0	0	0	0
Asphalt Sprayer	2120	0	0	0	0	0	0
LABOUR :		16,779	35,379	38,245	37,984	38,245	166,632
Mandur	2750	1,128	2,393	2,593	2,578	2,593	11,285
Skilled Labourer	2750	1,760	3,521	3,972	3,859	3,972	17,084
Carpenter	3500	1,202	2,406	2,714	2,637	2,714	11,673
Mason	3500	0	0	0	0	0	0
Labourer	2500	10,247	21,984	23,640	23,599	23,640	103,110
Driver	2500	1,925	3,959	4,128	4,113	4,128	18,253
Operator	4000	517	1,116	1,198	1,198	1,198	5,227
MATERIAL :		5,810	11,692	13,148	12,798	13,148	56,596
Bitumen	375	0	0	0	0	0	0
Asphalt Oil	750	0	0	0	0	0	0
Kerosene	250	0	0	0	0	0	0
Sand	12500	0	0	0	0	0	0
Cement	5300	0	0	0	0	0	0
River Stone	12500	0	0	0	0	0	0
Steel Moulds	8000	0	0	0	0	0	0
Tiaber	150000	4,680	9,375	10,575	10,275	10,575	45,480
Paint	3500	779	1,558	1,758	1,708	1,758	7,561
Reinforcing Steel	1000	0	0	0	0	0	0
Tying Wire	1200	0	0	0	0	0	0
Equivalent Royalty	250	351	759	815	815	815	3,555

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

PRDV : KALIMANTAN SELATAN KAB : KOTA BARU

(1000 Rp)

I T E M	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
EQUIPMENT :		89,935	222,302	250,634	285,556	285,672	1,134,099
Bulldozer/Ripper	17979	2,630	13,272	15,690	18,833	18,833	69,258
Swamp Bulldozer	13087	18	4,166	6,815	8,179	8,179	27,357
Motor Grader	15160	11,879	18,839	17,451	18,916	18,916	86,001
Hand-guide Vib. Roller	1673	392	760	827	993	993	3,965
Tire Roller	13008	3,761	8,110	8,695	8,695	8,695	37,956
Vibratory Roller (D&T)	7505	3,358	7,252	8,306	9,968	9,968	38,852
Hydraulic Excavator; Wheel	14671	264	11,371	17,191	20,630	20,630	70,086
Wheel Loader	18278	10,526	29,339	33,144	38,938	38,938	150,885
Water Tank Truck	4832	1,364	2,975	3,420	4,104	4,104	15,967
Dump Truck	6361	33,001	80,409	91,413	107,940	107,940	420,703
Flat Bed Truck with Crane	5916	15,487	29,893	30,404	30,819	30,935	137,538
Flat Bed Truck	4217	4,816	10,338	11,112	11,262	11,262	48,790
Portable Crusher/Screening	48574	2,418	5,323	5,769	5,803	5,803	25,116
Concrete Mixer	8764	20	231	360	432	432	1,475
Water Pump	547	1	14	22	26	26	89
Concrete Vibrator	382	0	10	15	18	18	61
Asphalt Sprayer	2120	0	0	0	0	0	0
LABOUR :		47,695	90,608	95,343	106,503	106,764	446,913
Manjur	2750	3,125	6,232	6,709	7,518	7,533	31,117
Skilled Labourer	2750	9,117	11,539	10,673	11,901	12,014	55,244
Carpenter	3500	6,238	7,721	7,026	7,811	7,888	36,684
Mason	3500	0	0	0	0	0	0
Labourer	2500	22,869	50,171	54,231	60,308	60,349	247,928
Driver	2500	4,289	9,529	10,452	11,702	11,717	47,689
Operator	4000	2,057	5,416	6,252	7,263	7,263	28,251
MATERIAL :		31,715	51,047	54,375	62,280	62,630	262,047
Bitumen	375	0	0	0	0	0	0
Asphalt Oil	750	0	0	0	0	0	0
Kerosene	250	0	0	0	0	0	0
Sand	12500	143	1,631	2,536	3,043	3,043	10,396
Cement	5300	180	2,043	3,176	3,811	3,811	13,021
River Stone	12500	0	0	0	0	0	0
Steel Moulds	8000	108	1,233	1,917	2,301	2,301	7,860
Timber	150000	24,270	29,940	27,180	30,210	30,510	142,110
Paint	3500	3,766	4,912	4,556	5,066	5,116	23,416
Reinforcing Steel	1000	433	4,920	7,648	9,177	9,177	31,355
Tying Wire	1200	4	53	83	100	100	340
Equivalent Royalty	250	2,811	6,315	7,279	8,572	8,572	33,549

Appendix A-6

QUANTITIES OF BRIDGE ON PROPOSED ROAD LINKS

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINK NO	BRIDGE NAME	Km	From	<< TYPE >>		DESIGN LOAD CLASS	SPAN LENGTH (m)	SPAN NO (no)	SPAN LENGTH (m)	WIDTH (m)	AREA	AREA	PIER (no)	ABUT (no)	ROAD CLASS
				(EXIST)	(NEW)						(EXIST) (m2)	(NEW) (m2)			
31	N.1	2	DSKR	--	TH	10T (C)	20.00	3	6.67	4.00	0.00	80.00	2	2	IIIC
	N.1	4	DSKR	--	TH	10T (C)	18.00	2	8.00	4.00	0.00	64.00	1	2	
	N.1	7	DSKR	--	TH	10T (C)	12.00	2	6.00	4.00	0.00	48.00	1	2	
	N.1	9	DSKR	--	TH	10T (C)	18.00	2	8.00	4.00	0.00	64.00	1	2	
32	MARIABANG	2	STMB	--	TH	10T (C)	8.00	1	6.00	4.00	0.00	24.00	0	2	IIIC
	BULUH KIRI	3	STMB	--	TH	10T (C)	18.00	2	8.00	4.00	0.00	64.00	1	2	
	BULUH KANAN	4	STMB	--	TH	10T (B)	10.00	2	5.00	4.00	0.00	40.00	1	2	
	SEBANTI	9	STMB	--	TH	10T (C)	18.00	2	8.00	4.00	0.00	64.00	1	2	

Appendix A-7

CONSTRUCTION AND MAINTENANCE COST OF BRIDGES
ON PROPOSED ROAD LINKS

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINK NO : 31 (IIIC) LENGTH : 10 Km

(Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>>		<<<<< COST >>>>>		>>>>> TOTAL
			LOCAL	FOREIGN	LOCAL	FOREIGN	
Superstructure (Timber; Span 3m; 10T)	m2	0.00	55,308	4,626	0	0	0
Superstructure (Timber; Span 5m; 10T)	m2	0.00	61,262	5,107	0	0	0
Superstructure (Timber; Span 8m; 10T)	m2	256.00	81,143	6,705	20,772,608	1,716,480	22,489,088
Superstructure (Timber; Span 3m; BH50)	m2	0.00	68,579	5,719	0	0	0
Superstructure (Timber; Span 5m; BH50)	m2	0.00	74,869	6,194	0	0	0
Superstructure (Timber; Span 8m; BH50)	m2	0.00	94,954	7,840	0	0	0
Superstructure (Concrete; Span 3m; BH50)	m2	0.00	62,906	109,285	0	0	0
Superstructure (Concrete; Span 5m; BH50)	m2	0.00	64,634	122,132	0	0	0
Superstructure (Concrete; Span 8m; BH50)	m2	0.00	66,602	133,035	0	0	0
Superstructure (Concrete; Span 10m; BH50)	m2	0.00	72,835	151,094	0	0	0
Superstructure (Concrete; Span 15m; BH50)	m2	0.00	78,553	177,986	0	0	0
Substructure (Pier; for Timber; 10T)	NO	5.00	481,773	43,119	2,408,865	215,595	2,624,460
Substructure (Abut; for Timber; 10T)	NO	8.00	1,322,891	189,522	10,593,128	1,516,176	12,099,304
Substructure (Pier; for Timber; BH50)	NO	0.00	708,545	63,837	0	0	0
Substructure (Abut; for Timber; BH50)	NO	0.00	1,493,946	212,542	0	0	0
Substructure (Pier; for Concrete; BH50)	NO	0.00	2,388,712	483,175	0	0	0
Substructure (Abut; for Concrete; BH50)	NO	0.00	4,851,954	1,009,571	0	0	0
Demolition of Bridge (Timber->Timber)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Timber->Concrete)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	109,643	82,314	0	0	0
Maintenance of Timber Bridge (New)	m2	256.00	10,021	1,343	2,565,376	343,808	2,909,184
Maintenance of Concrete Bridge (New)	m2	0.00	2,354	3,216	0	0	0
Maintenance of Timber Bridge (Exist)	m2	0.00	9,582	2,515	0	0	0
Maintenance of Concrete Bridge (Exist)	m2	0.00	5,042	2,487	0	0	0
(Without Overhead)			TOTAL COST (Timber Bridge)		33,764,601	3,448,251	37,212,852
			(Concrete Bridge)		0	0	0
			TOTAL COST (without Maintenance)		33,764,601	3,448,251	37,212,852
(Overhead : 15%)			TOTAL COST (Timber Bridge)		38,829,291	3,965,489	42,794,780
			(Concrete Bridge)		0	0	0
			TOTAL COST (without Maintenance)		38,829,291	3,965,489	42,794,780

PROV : KALIMANTAN SELATAN KAB : KOTA BARU

LINE NO : 32 (IIC) LENGTH : 10 Km

(Rp)

I T E M	UNIT	QUANTITY	<<< UNIT COST >>>		<<<<< COST >>>>>		>>>>> TOTAL
			LOCAL	FOREIGN	LOCAL	FOREIGN	
Superstructure (Timber; Span 3a; IOT)	m2	0.00	55,308	4,626	0	0	0
Superstructure (Timber; Span 5a; IOT)	m2	40.00	61,262	5,107	2,450,480	204,280	2,654,760
Superstructure (Timber; Span 8a; IOT)	m2	152.00	81,143	6,705	12,333,736	1,019,160	13,352,896
Superstructure (Timber; Span 3a; BMSO)	m2	0.00	68,579	5,719	0	0	0
Superstructure (Timber; Span 5a; BMSO)	m2	0.00	74,869	6,194	0	0	0
Superstructure (Timber; Span 8a; BMSO)	m2	0.00	94,954	7,840	0	0	0
Superstructure (Concrete; Span 3a; BMSO)	m2	0.00	62,906	109,285	0	0	0
Superstructure (Concrete; Span 5a; BMSO)	m2	0.00	64,634	122,132	0	0	0
Superstructure (Concrete; Span 8a; BMSO)	m2	0.00	66,602	133,035	0	0	0
Superstructure (Concrete; Span 10a; BMSO)	m2	0.00	72,835	151,094	0	0	0
Superstructure (Concrete; Span 15a; BMSO)	m2	0.00	78,553	177,986	0	0	0
Substructure (Pier; for Timber; IOT)	NO	3.00	481,773	43,119	1,445,319	129,357	1,574,676
Substructure (Abut; for Timber; IOT)	NO	8.00	1,322,891	189,522	10,583,128	1,516,176	12,099,304
Substructure (Pier; for Timber; BMSO)	NO	0.00	708,545	63,837	0	0	0
Substructure (Abut; for Timber; BMSO)	NO	0.00	1,493,946	212,542	0	0	0
Substructure (Pier; for Concrete; BMSO)	NO	0.00	2,388,712	483,175	0	0	0
Substructure (Abut; for Concrete; BMSO)	NO	0.00	4,851,954	1,009,571	0	0	0
Demolition of Bridge (Timber->Timber)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Timber->Concrete)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	109,643	82,314	0	0	0
Maintenance of Timber Bridge (New)	m2	192.00	10,021	1,343	1,924,032	257,056	2,181,888
Maintenance of Concrete Bridge (New)	m2	0.00	2,354	3,216	0	0	0
Maintenance of Timber Bridge (Exist)	m2	0.00	9,582	2,515	0	0	0
Maintenance of Concrete Bridge (Exist)	m2	0.00	5,042	2,487	0	0	0
(Without Overhead)			TOTAL COST (Timber Bridge)		26,812,663	2,868,973	29,681,636
			(Concrete Bridge)		0	0	0
			TOTAL COST (without Maintenance)		26,812,663	2,868,973	29,681,636
(Overhead : 15%)			TOTAL COST (Timber Bridge)		30,834,562	3,299,319	34,133,881
			(Concrete Bridge)		0	0	0
			TOTAL COST (without Maintenance)		30,834,562	3,299,319	34,133,881

PROV : KALIMANTAN SELATAN KAB : KOTA DARU

LINK NO : 50 (IIC) LENGTH : 55 Km

(Rp)

ITEM	UNIT	QUANTITY	<<< UNIT COST >>>		<<<<< COST >>>>>		>>>>> TOTAL
			LOCAL	FOREIGN	LOCAL	FOREIGN	
Superstructure (Timber; Span 3m; 10T)	m2	0.00	55,308	4,626	0	0	0
Superstructure (Timber; Span 5m; 10T)	m2	0.00	61,262	5,107	0	0	0
Superstructure (Timber; Span 8m; 10T)	m2	784.00	81,143	6,705	63,616,112	5,256,720	68,872,832
Superstructure (Timber; Span 3m; BH50)	m2	0.00	68,579	5,719	0	0	0
Superstructure (Timber; Span 5m; BH50)	m2	0.00	74,869	6,194	0	0	0
Superstructure (Timber; Span 8m; BH50)	m2	0.00	94,954	7,840	0	0	0
Superstructure (Concrete; Span 3m; BH50)	m2	0.00	62,906	109,285	0	0	0
Superstructure (Concrete; Span 5m; BH50)	m2	0.00	64,634	122,132	0	0	0
Superstructure (Concrete; Span 8m; BH50)	m2	0.00	66,602	133,035	0	0	0
Superstructure (Concrete; Span 10m; BH50)	m2	0.00	72,835	151,094	0	0	0
Superstructure (Concrete; Span 15m; BH50)	m2	0.00	78,553	177,986	0	0	0
Substructure (Pier; for Timber; 10T)	NO	0.00	481,773	43,119	0	0	0
Substructure (Abut; for Timber; 10T)	NO	56.00	1,322,891	189,522	74,081,896	10,613,232	84,695,128
Substructure (Pier; for Timber; BH50)	NO	0.00	708,545	63,837	0	0	0
Substructure (Abut; for Timber; BH50)	NO	0.00	1,493,946	212,542	0	0	0
Substructure (Pier; for Concrete; BH50)	NO	0.00	2,388,712	483,175	0	0	0
Substructure (Abut; for Concrete; BH50)	NO	0.00	4,851,954	1,009,571	0	0	0
Demolition of Bridge (Timber->Timber)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Timber->Concrete)	m2	0.00	15,368	1,729	0	0	0
Demolition of Bridge (Concrete)	m2	0.00	109,643	82,314	0	0	0
Maintenance of Timber Bridge (New)	m2	784.00	10,021	1,343	7,856,464	1,052,912	8,909,376
Maintenance of Concrete Bridge (New)	m2	0.00	2,354	3,216	0	0	0
Maintenance of Timber Bridge (Exist)	m2	0.00	9,582	2,515	0	0	0
Maintenance of Concrete Bridge (Exist)	m2	0.00	5,042	2,487	0	0	0
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(Without Overhead)	TOTAL COST (Timber Bridge)				137,698,008	15,869,952	153,567,960
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				137,698,008	15,869,952	153,567,960
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(Overhead : 15%)	TOTAL COST (Timber Bridge)				158,352,709	18,250,445	176,603,154
	(Concrete Bridge)				0	0	0
	TOTAL COST (without Maintenance)				158,352,709	18,250,445	176,603,154

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