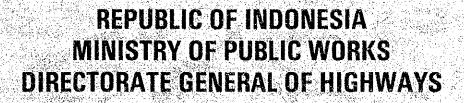
社会開発協力部報告書



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

**KABUPATEN REPORT 28** 



**MARCH 1986** 

**JAPAN INTERNATIONAL COOPERATION AGENCY** 



No. 7



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# REPUBLIC OF INDONESIA MINISTRY OF PUBLIC WORKS DIRECTORATE GENERAL OF HIGHWAYS

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

# **KABUPATEN REPORT 28**

# KABUPATEN NGADA

**MARCH 1986** 

# **JAPAN INTERNATIONAL COOPERATION AGENCY**

国際協力事業団 <sup>愛入</sup> '87.5.21 108 月日 <sup>登録</sup> 16451 5DF

#### PREFACE

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

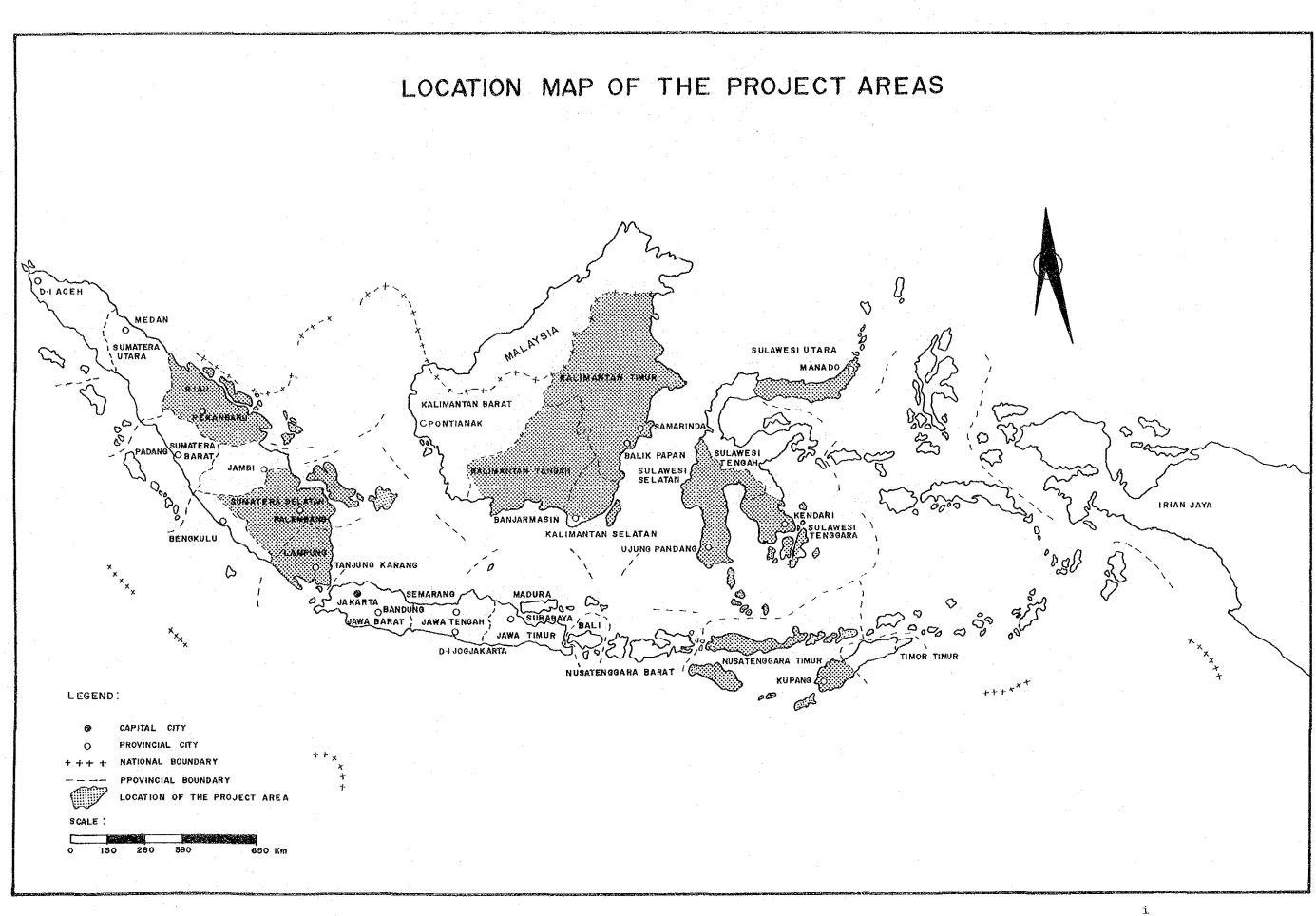
Based upon a request from the Government of Indonesia, the Government of Japan arranged for JICA to conduct the Study and JICA accordingly organized a Study Team. The study was carried out using data which were generally prepared by the Kabupaten, routed through the province, under the instructions of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

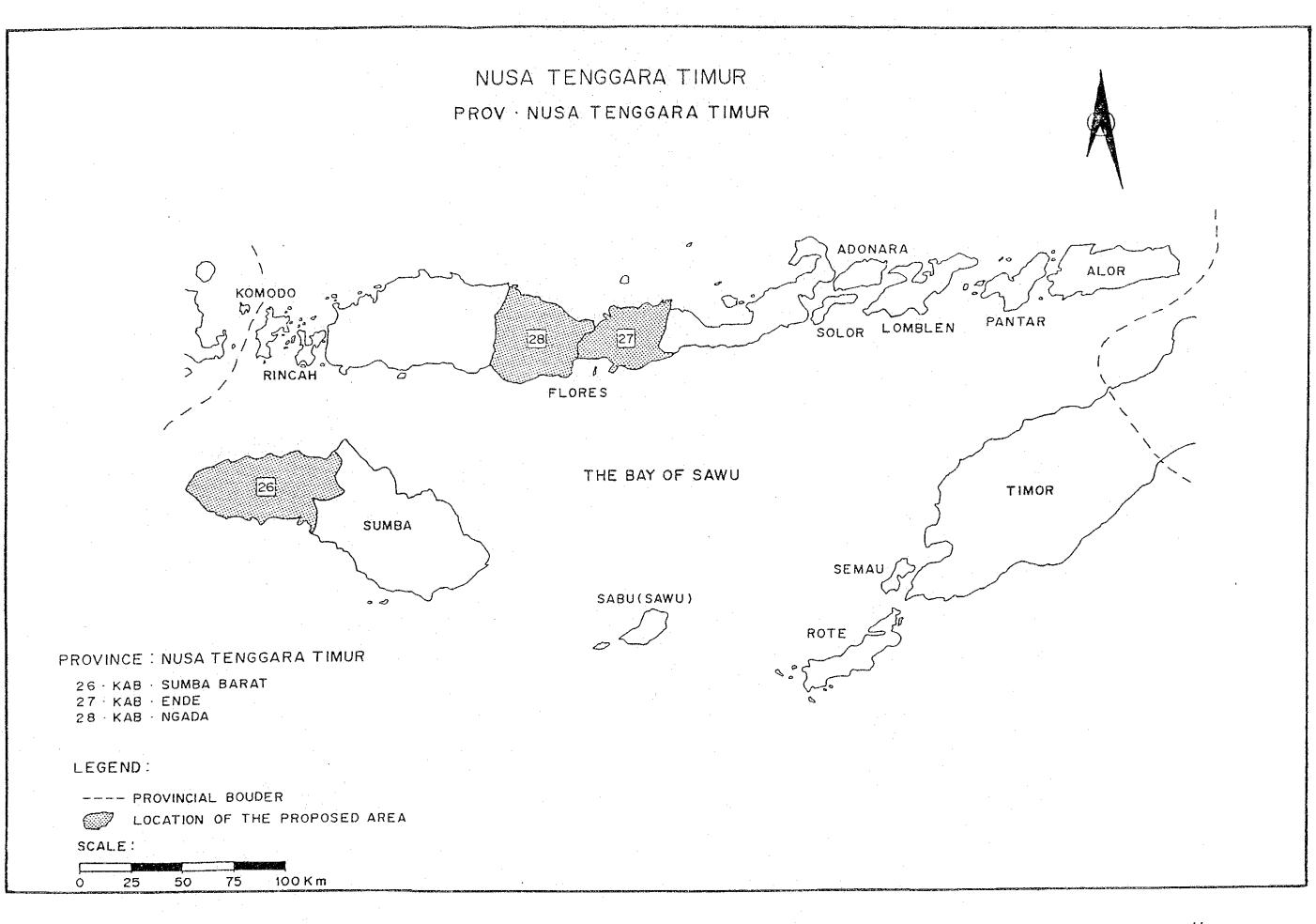
Since the study period was limited, without cooperation of Bina Marga, Bangda and local governments of both province and Kabupaten in collecting the data, the study would not have been completed within the period.

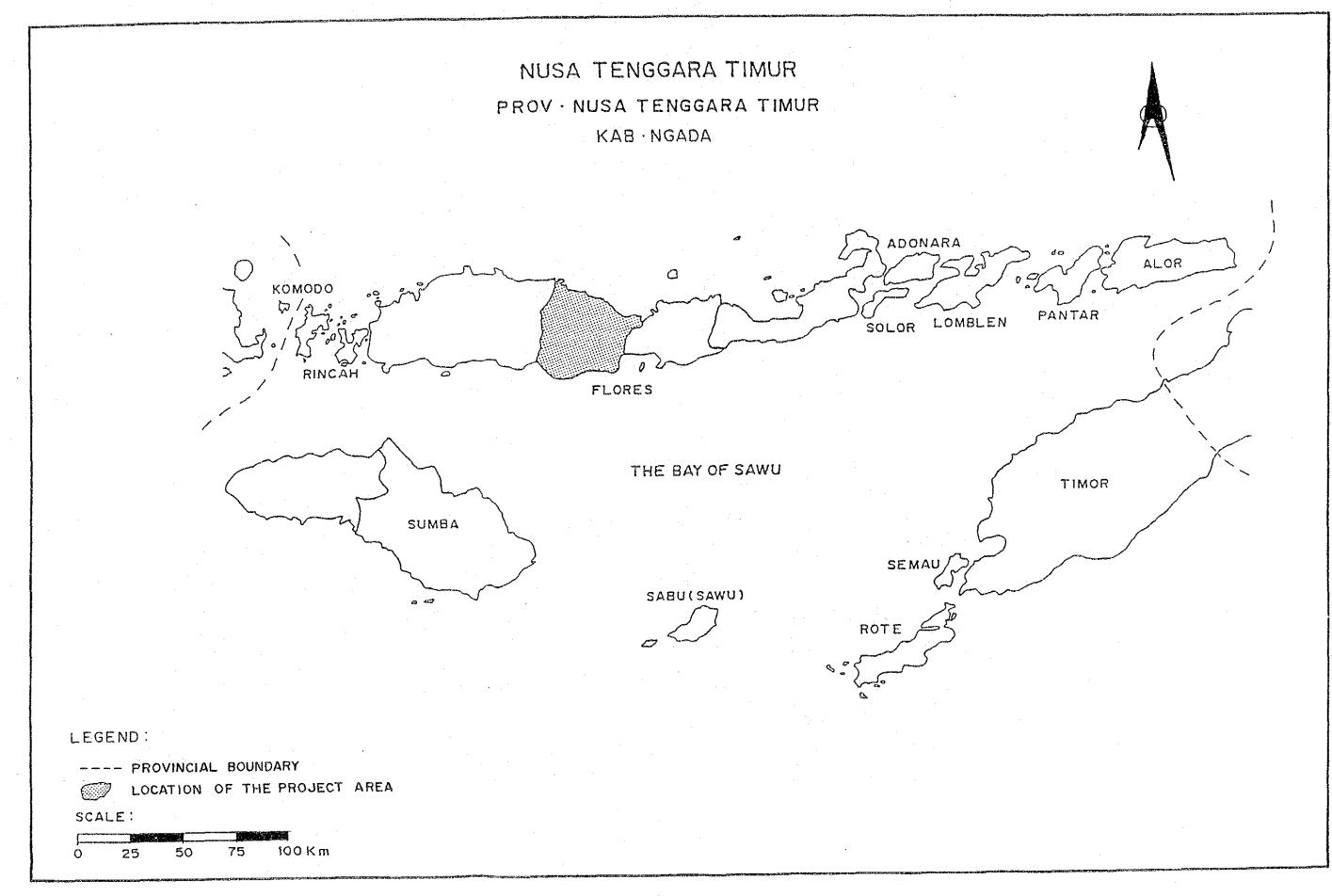
The report consists of the results of the feasibility study and proposed implementation programme of the local road development in the Kabupaten.

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.

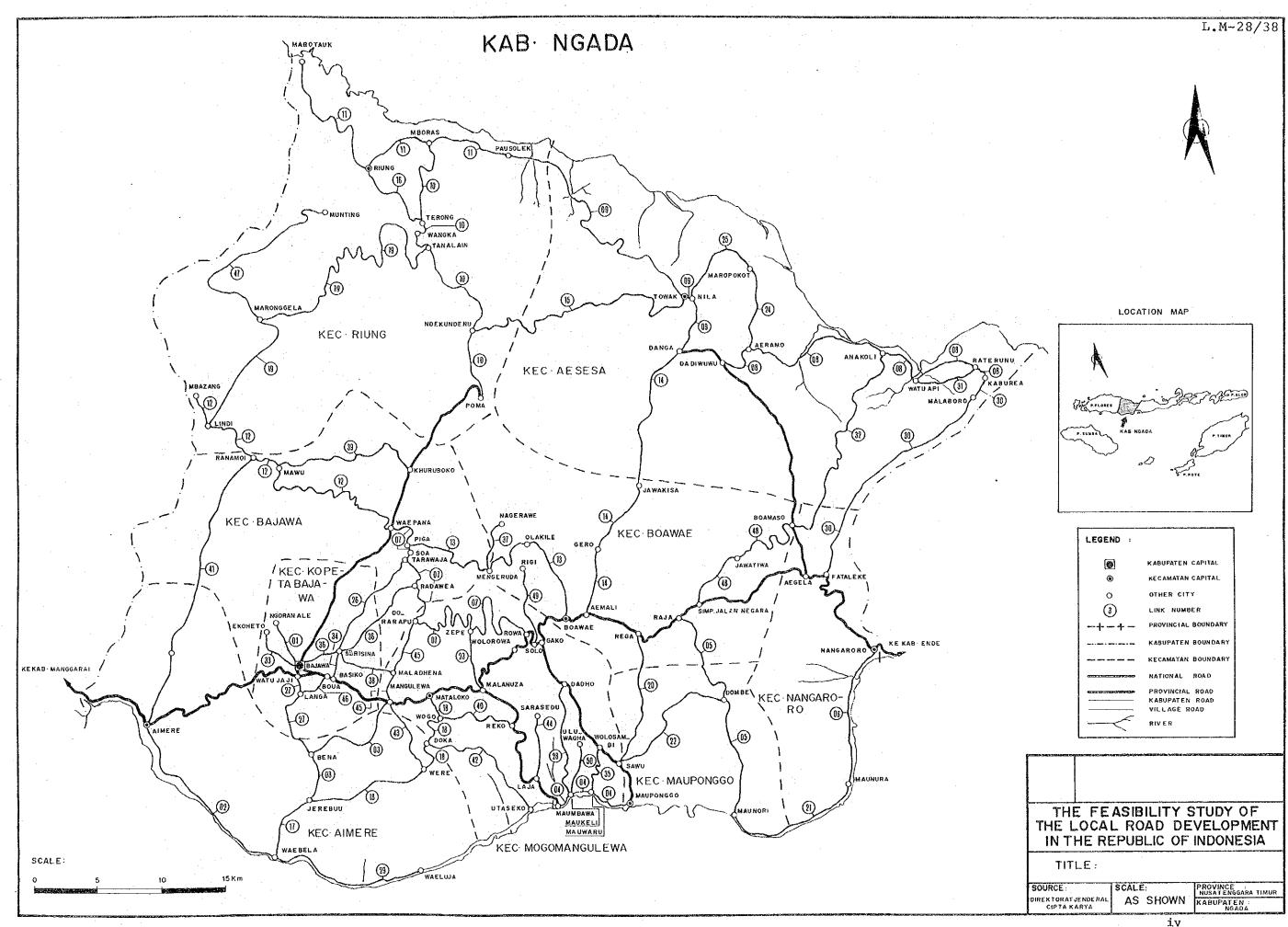
The purpose of the study for the Kabupaten is mainly to estimate the total Project Cost for the local road development but only limited data is available for study base. Therefore a detailed survey and design for the improvement of the Kabupaten roads should be carried out before commencing the Project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











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### Chapter 1 BACKGROUND OF THE KABUPATEN

### 1.1 Topographic and Meteorological Conditions

### 1.1.1 location and Topography

Kabupaten Ngada is located slightly to the west of the centre of Flores Island. Its north coast faces the Flores Sea, and south coast the Sawu Sea. It is bordered on the east by Kabupaten Ende and on the west by Kabupaten Manggarai.

The south of the Kabupaten is entirely covered with 1000 to 1500 meter high volcanic mountains from which steep slopes fall into the sea. On the north coast a flat area lies on the Sissa basin, which is a typical feature of a volcanic island. The capital of the Kabupaten, Bajawa, is located in the southwest of the mountianous region.

The area of the Kabupaten is about 3,038 square kilometers approximately 6 percent of the total of the province. It consists administratively of 9 Kecamatans.

#### 1.1.2 Meteorological Conditions

The average number of rainy days and the average amount of yearly rainfall in Kabupaten Ngada are 69 days and 1,184 mm respectively. One year in the Kabupaten consists of a rainy season and a dry season. The dry season is from June through October in general. However this is variable as Table 1-1-1 shows.

The number of working days which is necessary for planning the construction schedule in chapter 6, is estimated at 250 days using the following formula based upon the data shown in the table referred to above.

Working Days = 365 - Holidays - Rainy Days + (Rainy Days x Holiday) + (0.10 x Rainy Days) 365

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

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METEOROLOGICAL CONDITIONS

Timur	
Tenggara	
Nusa	Ngada
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PROVINCE	ABUPATEN

I 9 8 0         I 9 8 1         I 9 8 1         I 9 8 1         I 9 8 1         I 9 8 1         I 9 8 1         I 9 8 4           RaINY DAYS RAINFALL         RAINFALL <t< th=""><th>KABUPATEN</th><th>: Ngada</th><th></th><th></th><th></th><th>STALLON : NUSAGE</th><th>ໜ່</th><th></th><th></th><th></th><th></th><th></th></t<>	KABUPATEN	: Ngada				STALLON : NUSAGE	ໜ່					
S       RAINFALL       RAINF         4       265       13       213       9       156       14       276         7       92       11       176       14       276       1         4       52       5       95       11       193         6       125       3       16       6       81         4       42       1       12       -       -         6       66       1       1       2       -       -         7       125       3       16       6       81       26         4       42       1       12       -       -       -       -         2       20       1       12       - <th></th> <th>6</th> <th>8 0</th> <th></th> <th>00</th> <th>1~1</th> <th>00</th> <th></th> <th></th> <th>à</th> <th> 1.9</th> <th>8 4</th>		6	8 0		00	1~1	00			à	 1.9	8 4
	HLNOW	RAINY DAYS R	LA INFALL (mm)	RAINY DAYS	RAINFALL (mm)		RAINFALL (mm)	3	DAYS	RAINFALL (mm)	DAYS	RAINFALL (mm)
	January	13	169	14	265	13	213		6	156	TO	182
	February	ø	107	6	120	۲-1 ۲-1	176	:	14	276	14	283
	íarch	<b>9</b>	54	7	92	11	176	÷	14	273	12	221
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	April	9	78	4	52	ŝ	95		11	193	10	174
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	day	2	21	9	125	m	16		9	81	Ś	78
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	June	,	5	4	42	r=1	12		I	<b>1</b>	6	22
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	July	J.	I	9	99	r⊶l	r1		. 1	ł	2	23
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	August	£	17	2	20	<b>1</b>	12		I	<b>1</b>	₽	ıي ا
7         25         2         42         -         -         4         125         3           5         65         13         175         1         15         7         159         8           1         154         16         211         8         169         9         221         9           55         .701         87         1,259         55         886         75         1,511         75	September	£	é	4	49	ı	t		rad	26	2	28
5         65         13         175         1         15         7         159         8           1         154         16         211         8         169         9         221         9           55         .701         87         1,259         55         886         75         1,511         75	October	2	25	2	42	1	ł		4	125	ო	144
1         154         16         211         8         169         9         221         9           55         .701         87         1,259         55         886         75         1,511         75	November	ŝ	65	13	175	7	15		7	159	00	178
55 . 701 87 1,259 55 886 75 1,511 75	December	1	154	16	211	8	169		6	221	6	222
	lotal	. 55	. 701	. 87	1,259		886		75	1,511	75	1,561

Data show the mean value of 5 stations.

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NOTE

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### 1.2 Socio-Economic Conditions

#### 1.2.1 Population

The population of the Kabupaten Ngada in 1984 was 183,532 which was approximately 6.2% of the 2,947,900 total population of Nusa Tenggara Timur Province as shown in Table 1-2-1.

The population density was 0.60 persons per ha which was almost the same as the provincial density of 0.61.

The recent annual average growth rate of population of the Kabupaten is 2.0% which is lower than both the provincial rate of 2.3% and the national rate of 2.2%. This may be caused by outflow of population to other areas.

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:					
SUMBA BARAT	261,721	3.0	458,700	0.57	1984
ENDE	214,627	2.0	204,650	1.05	1984
NGADA	183,532	2.0	303,788	0.60	1984
PROVINCE:					
NUSA TENGGARA TIMUR	2,846,400	1	4,787,600	)	1982
	2,917,900	2.3	4,787,600	} 0.6	1 1983
	2,947,900		4,787,600	J	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 : NUSA TENGGARA TIMUR

KABUPATEN : NGADA

KABUPATEN : NGADA		
KECAMATAN	POPULATION	PROPORTION (%)
AEIMERE	15,966	8.7
WOGOMANGULEWA	24,954	13.6
MAUPONGGO	27,699	15.1
NANGARORO	20,359	11.1
BOAWAE	22,926	12.5
BAJAWA	25,436	13.8
RIUNG	14,807	8.1
AESESA	22,128	12.1
KOPETA BAJAWA	9,257	5.0
TOTAL	183,532	100

e

#### 1.2.2 Land Use

In Kabupaten Ngada, 149,055 ha of the current available land use area, which is approximately 49.1% of the 303,788 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 102,048 ha of agricultural harvest area, 3,175 ha of residential area and 43,832 ha of usable open space which are 68.5%, 2.1% and 29.4% of the current available land use area respectively.

The agricultural harvest area consists of 45,345 ha of paddy field, 12,864 ha of plantation and 43,839 ha of other cultivated area which are 44.4%, 12.6% and 43.0% 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

PROVINCE : NUSA TENGGARA TIMUR

KABUPATEN	WET PADDY FIELD	UPLAND PADDY OTHER FIELD TIVATED	OTHER CUL- FIVATED AREA	PLANTATION AREA	RESIDENTIAL AREA	RESIDENTIAL USABLE OPEN RIVER & FORESTRY OTHERS TOTAL AREA AREA SPACE LAKE AREA	RIVER & LAKE	FORESTRY ( AREA	OTHERS	TOTAL AREA	SURVEY
SUMBA BARAT	13,298 (3.0)	62,061 (13.8)	8,270 (1.8)	59,819 (13.3)	10,371 (2.3)	13,100 (2.9)	42,805 (9.5)	56,043 (12.4)	192,133 (41.0)	450,700 (100)	7861
ENDE	1,401 (0.7)	7,954 (3.9)	14,970 (7.3)	16,300 (8.0)	9,987 (4.9)	r-1	19,485 (9.5)	33,878 (16.6)	33,878 675 (16.6) (0.3)	6	1984
NGADA	7,250 (2.4)	38,095 (12.5)	43,839 (14.4)	12,864 (4.2)	3,175 (1.0)		633		43,837 (14.4)		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 Ngada in 1984 were 29,435 ha and 102,175 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 14,126 ha and 65,522 ton respectively which are 48.0% and 64.1% of the total food crops. The yield rate of paddy production is 4.64 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 1981 through 1984 were 6.0% and 9.0% respectively which indicate favorable development of the paddy production in the long term.

Upland paddy accounts for 40% of the all paddy production. Regarding the fluctuation of annual productivity it is pointed out that the agriculture of the Kabupaten is easily affected by weather changes because of undeveloped irrigation facilities.

The commodity crops, of which palm oil, and coffee are major, are produced in the plantations. The area and production of plantation crops in 1983 were 40,183 ha and 10,891 ton respectively with current growth rates of 16.5% and 16.5% as shown in Table 1-2-5. Thus the plantation crop which is exported is an important agricultural product. 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 84.5% of the total population as shown in Table 1-2-7. Thus this is an agricultural Kabupaten.

Future measures suggested to be taken by the kabupaten include increase of the cultivated area with the progress of road development and appropriation of agricultural investment for improvement of irrigation facilities in order to attain stable growth of productivity.

28-8

# KABUPATEN : NGADA

		Ū	JLTIVATED	AUM			(1.0)
		,		YEAR			<u>(ha)</u> AAGR
ITEM	1979	1980	1981	1982	1983	1984	(%)
PADDY	13,082	17,459	22,792	18,825	17,666	9,778	6.0
OTHERS	15,599	20,755	22,712	19,152	17,894	27,665	-20.0
TOTAL	28,681	38,214	45,504	37,977	35,560	37,443	-9.8
	······	·	PRODUCTI	ON			· · · · · · · · · · · · · · · · · · ·
							(ton)
		1	Y	'EAR			AAGR
ITEM	1979	1980	1981	1982	1983	1984	(%)
PADDY	11,902	38,939	25,184	30,434	30,813	26,459	9.0
OTHERS	41,407	118,784	53,711	77,862	95,817	100,344	-20.0
TOTAL	53,309	157,723	78,895	108,296	126,630	126,803	-6.0
			YIELD RAT	TE			
						(t	on/ha)
				ZEAR			AAGE
ITEM	1979	1980	1981	1982	1983	1984	(%)
PADDY	0.91	2.23	1.10	1,62	1.74	2.71	5.0
Notes :		<u> </u>	<u></u>				

2. Source : Kabupaten concerned with the study

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

KABUPATEN	AREA	PRODUCTION		AAGR (%)
	(ha)	(ton)	AREA	PRODUCTION
SUMBA BARAT	38,564	2,646	0.4	1.3
ENDE	15,309	3,106	5.1	0
NGADA	40,183	10,891	16.5	16.5

# Table 1-2-6POPULATION OF AGRICULTURAL SECTOR

# PROVINCE : NUSA TENGGARA TIMUR

KABUPATEN	AGRICULTURAL	TOTAL	PROPORTION	AAGR	SURVEY
· · · · · · · · · · · · · · · · · · ·	SECTOR	POPULATION	(%)	(%)	YEAR
SUMBA BARAT	187,000	261,721	71.5	2.5	1984
ENDE	178,000	214,627	83.0	5,0	1984
NGADA	160,000	183,532	84.2	5.0	1984

#### Notes :

1. AAGR : Average annual growth rate

2. Source Kabupaten concerned with the Study

# 1.2.4 Other Economic Activities

Notable economic activities excluding agriculture in Kabupaten Ngada are only livestock sector.

According to the Kabupaten data, the production volume of livestock in 1983 recorded approx. 2,410 tons and approx 1,500 tons out of 2,410 tons excluding the consumption of the Kabupaten itself are exported out of the Kabupaten. And this sector is expected to become prosperous.

#### 1.3 Present Status of Kabupaten Roads

### 1.3.1 Outline of Road Networks

The regional trunk roads of Kabupaten Ngada consist of one national road and four provincial roads. The national road runs across the Kabupaten in the southern region from east to west via Bajawa, the Kabupaten capital. Two of the provincial roads lead to the south coast of the Kabupaten, to Manponggo and Maumbawa from Gako and Malanuza, respectively their junctions with the national road. The other two provincial roads run towards the north, to Danga and Poma from Aegela and Bajawa, respectively their junctions with the national road.

However two provincial roads which run towards the central and northern regions do not act as regional trunk roads at present due to their bad road surface conditions.

The Kabupaten roads formed in the central area north of the national road seem to have an important role as the facility for industrial development of the Kabupaten. It seems necessary to develop access roads to the northern coastal area which is expected to be one of the centers for developing the Kabupaten.

#### 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 Ngada are confirmed as 50 links and 937 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 3.08 m per ha. This is distinctly higher than the national density of 0.48 m per ha and distinctly more 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 is well advanced in density of Kabupaten roads.

	Total Length ( km )	Area (ha)	Density (m/ha)
Kabupaten : Ngada	937	303,788	3.08
Province : Nusa Tenggara Tímur	1,882	967,138	1.95
Jawa Is.(Excluding DKI Jakarta)	27,715	13,159,700	2.11

92,038 191,944,300

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

0.48

2. The source 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

Indonesia

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 1 NUSA TENGGARA TIKUR KAD 1 NGADA

								•				(Ka)																(K.a.)
102 1	11	1	THN	۱	KRK	1	ASP 1	818	1	1.1	1	IUTAL	}	1	1	102 1	7)	1	1111	ł	KBK	١	ns?	1	AIB	١.	L 1	TRIAL
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KRK : Grave1/Stone/Telford/Water Bound Macadam

TNH : Earth

LL : Others

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

	ASP	KRK	TNH/LL
Kabupaten : Ngada	0.2	18.3	81.4
Province : Nusa Tenggara Timur	1.6	26.5	71.9
Jawa Is.(Excluding DKI Jakarta)	56.2	25.0	18.8
Indonesia	26.0	26.6	47.4

Thus, in the Kabupaten the proportion of Kabupaten roads with asphalt surface is much lower either than that of Indonesia and of Jawa Island. The proportion of low grade roads such as earth roads and others is distinctly high. This means that the road classification in the Kabupaten is 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:

	Good	Fair	Poor	Bad
Kabupaten : Ngada	16.3	20.2	29.0	34.5
Province : Nusa Tenggara Timur	13.8	29.5	30.7	26.0
Jawa Is.(Excluding DKI Jakarta)	45.6	29.8	19 6	5.0
Indonesia	43.5	21.8	21.1	13.6

The surface condition level of the Kabupaten roads in the Kabupaten is lower than that of Indonesia and Jawa Island.

### Table 1-3-2

### EXISTING ROAD CONDITION BY SURFACE TYPE

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The proportion in good condition is relatively low. Therefore, improvement of Kabupaten roads in poor or bad condition 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 42.0% flat, and 39.0% hilly, 19.0% mountainous. There is no swampy area in the Kabupaten.

### 1.3.3 Bridge Inventory

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

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

The inventory shown in Table 1-3-4 and Table 1-3-5 indicates a total of 29 bridges with a total length of 231 m of which 1 or 6.9% are timber, 8 or 27.6% are concrete and 17 or 58.6% are others. Steel bridges account for only 2 or 6.7% of the total. On the other hand, 121 bridges with a total length of 1,716 m are required to be newly constructed.

# EXISTING ROAD LENGTH BY TERRAIN CONDITION

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

Bridge Type					Spa	ın Lei	igth (	m)				
<u>Dirtugo -JP-</u>	<u>(3</u>	<u>(5</u>	8	<u> &lt;10</u>	$\langle 12 \rangle$		(16		<u>{20</u>	<u>(99</u>	<u>Total</u>	
Timber	<b>-</b> .	-	-	-	2	-	-	-	-	· -	· _	
Concrete	2	2	1	-	3	-		-		**	8	
Steel		-	÷	-		-	54		-	ал.	-	
Others	-	-		. –	-	, <b></b>	-	••	-	-	-	
Total	2	2	1	•	3	:		-	-	-	8	
Existing br	idges	are	of	in	vari	ous	types	but	cond	rete	bridge	i

Existing bridges are of in various types but concrete bridge is prevailing. The majority of spanlengths is within the range of 5 m to 8 m.

### 1.3.4 Traffic

Inventories of the average daily traffic (ADT) on the Kabupaten roads in Kabupaten Ngada 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:

	SEDAN	BUS	TRUCK	MOTOR- CYCLE	TOTAL
Total Trips	498	145	160	513	1,316
Proportion (%)	37.84	11.02	12.16	38.98	100.00
				. · · · ·	

Source : Bina Marga Inventory

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

	SEDAN	BUS	TRUCK	MOTOR-	TOTAL
	<u> </u>			CYCLE	
Proportion (%)	0,00	4.97	14,93	80,10	100.00

Source : Kabupaten.

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

From the above tables the following can be observed:

- Number of total trips might be underestimated

- Proportions are probably reasonable.

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

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

Chapter 2 ESTIMATIONS OF FUTURE TRAFFIC VOLUME AND BENEFIT

### 2.1 Future Traffic Volume

### 2.1.1 Traffic Growth Rate

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

Growth of Production Basis "A":

 $\sqrt{\begin{array}{c} \text{Annual Population Growth} \\ \text{of the Kabupaten} \end{array} \begin{array}{c} \text{Growth of the Total} \\ \text{X} \\ \text{Cultivated Area} \end{array}}$ 

Growth of Productivity "B" :

Growth of the Total X Growth of the Paddy Paddy Field Area Production per ha

Traffic Growth Rate: Initial estimated figure:

 $\overline{GR^{1}} = \sqrt{A X B}$ 

Traffic Growth Rate GR \_Final adjusted figure:

VGR' X 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

A) -	Growth Rate	of Population	1	2.00	(%)
B)	Growth Rate	of Cultivated Are	a r	7.00	(7.)
C)	Growth Rate	of Rice field	:	8.00	(%)
D)	Growth Rate	of Rice yield rate	9 1	5.00	(7)
E)	Growth Rate	of GDP / capita	· ' \$	7.70	(7,)
a) b)		Mean (AxB) Mean (CxD)		4.47	
a) b) c)	Geometrical	Mean (AxB) Mean (CxD) Mean (Axb)		• •	(7)

### , 2.1.2 Present and Future Traffic Volume

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

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

Where :

Tn : Future traffic volume n years later

Te : Traffic volume in 1985

r : Traffic growth rate

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

••

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PROV	NHSA	TEI

PROV : NUSA TENGGARA TIMUR KAB : KGADA

$\begin{array}{cccccccccccccccccccccccccccccccccccc$	50 25 0 40 1 10 2 10 8 0 2 20 1 0 10 10 10 10 0 0 30 15	BUS 20 10	10 10 0 20 0 5 0 10 2 2 0 10 2 0 10 2 0 0 2 0 0 0 2 2 1 0 0 0 0		TOTAL 100 65 10 90 2 35 4 23 10 2 2 50 3 0 3 90 14 15 3 2 40 23 40 23		5.6% 5.6%		****	BUS #6 23 0 46 0 23 0 0 0 0 0 0 0 0 0 0 0 0 0		SPD	TOTAL 229 147 23 206 5 80 9 53 23 5 5 114 7 206 32 34 7 5 92	<pre>1 CLASS 1 1 IJJB- 1 IJJB- 1 II10</pre>	1 2 2 1
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	10 10 0 0 30 15	0 0 0 0 0 0 0	0 0 2 2 1 0 0 0	8 10 2 2 1 20 15	14 15 3 2 40 23		5.6% 5.6% 6.6% 6.6% 6.6% 6.6%		23 23 0 0 0	0 0 0 0	0 0 5 5 2	18 23 5 5 2	32 34 7 5 92	1 111C 1 111C 1 111C 1 111C 1 111C 1 111C 1 1119-	-2
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14 1 AF	0	0	0	0			6.67		0	0	0	0	0		
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47	0	0	0	0			6.6%		0	0	0	0	0		
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### 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

	· · · · · · · · · · · · · · · · · · ·				(км)
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 : NUSA TENGGARA TIMUR

KAB : NGADA

< 1998 >

LÍNK NO	CLASS	SURFACE	NOBIL	BUS	TRUCK	SEPEDA	TOTAL
3	FIIC	KRK	3	. 1	1	. 3	1
5	1118-2	KRK	82	24	27	85	176
· · b	1110	KRK	19	6	6	20	41
1	1119-2	KRK	41	12	13	43	88
. 8	1119-1	ASP	139	40	45	143	296
<u> </u>	1110-2	KRK	55	16	18	57	118
10	1110	KRK	. 7	2	2	- 8	15
11	1110	KAK	7	2	2	1	15
12	1118-2	KRK	64	19	20	66	136
13	1110-1	ASP	117		38	121	250
14	1118-1	ASP	116	34	37		247
15	1118-1	ASP .	117	34	38	121	250
17	IIIC	KRK	1	0	0	- 1	2
18	IIIC	KRK	- 11	3	4	11	24
19	IIIC	KRK	8	2	3	8	17
20	1118-2	KRK	- 17	23	25	80	165
21	1118-2	KRK	23	7	9	24	50
22		KRK	85	25	27	88	181
23	1110	KRK	17	5	6	18	37
24	1118-2	KRK	64	19	21	66	137
25		KRK	55	16	18	56	117
26	1110-2	KRK	47	14	15	48.	100
27	1110	KRK	13	4	4	13	28
28	1118-2	KRK	26	8	8		56
29	IIIC	KRK	1	Ő		. 1	2
30	111B-2	KRK	76	22	24	79	162
	IHID-2	KRK	32	9	10	33	68
	1118-2	KRK	78	23	25	01	
33	1110	KRK	12	4	4	13	27
34		KRK	22	6	7	22	46
36	1119-2	KRK	37	11	12	38	79
37	1110-2	KRK	41	12	13	42	87
38	HIC	KRK	13	. 4	4	13	28
39	HIC	KRK	16	5	5	16	34
40	3111	KRK	7	2	2	7	15
41	1119-1	ASP	138	40	44	142	293
42	1110	KRK	19	6	6	20	41
43	1110	KRK	2	1	i	2	5
44	THC	KRK	10	3	3	11	22
45	1110-2		31	9	10	32	66
46	HIC	KRK	12	4	4	12	26
47	1110	KRK	3	t	1	4	7
48	1118-2	KRK	34	10	11		73
49		KRK	71	21	23	73	152
50	HIC		14	4	4	14	29

### 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 : NGADA

( 1000Rupiah )

																					1
	~~~~	I	LINK I	1	LINK 2	1	LINK 3	1	LINK 4	l	LINK 5	ł	LINK 6		LINK 7		LINK 8	1	LINK 9	I	LINK 10
-		1	5 Kø	1	16 Km	ļ	16 K <b>e</b>	1	7 Ka	1	18 Km		8 Ka		20 Km		43 Ka	1	20 Ka		34 Ke
-	/	1	111B-1	1	1118-2	1	IIIC	1	[]]B-1	1	1118-2	1	1110	1	1118-2		1118-1	1	1118-2	1	1110
-	YEAR	1	78V	.}	AOC .	1	Surplus	1	YOC		Surplus	ţ	Surplus	١	Surplus	  -	Surplus	1	Surplus	1	Surplus
-	1988	1	0	1	0	1	0	ļ	0	1	. 0	1	. 0	1	. 0	]	0	1	0	1	.: 0
	1989	I.	25376	J.	47235	L	298	ł	6382	ł	22662	i.	3960	Ì	6081	I	49694	1	27407	ł	2960
	1990	I	27069	I.	50469	L	298	L	6809	1	24964	l	3960	ł	6704	I	54340	I.	29967	ł	3708
	1991	ł	28565	1	54471	ł	298	١	7182	۱	27267	١	4997	١	7338	İ	58985	١	32830	١	3708
	1992		30490	I	57706	1	298		7609		29569		5706		8165		64145		35892		4455
	1993		32470		61791		883		8164		32300	ł	6427		9183		69772		39133		4456
	1994		34653		65108		883		8622		35358		7174		9637		75445		42385		4538
	1995		37087		69193		1154		9327		38821		7528		10679		82414	· · ·	45709		5953
	1996		39298		73279	1	1154		9882	I	42652		9273		11720		88554		49549		.7417
	1997	ł	41732	ł	78049	I.	1452		10555	I	46484	I	9665		12762		96550		53534	I	8162
-	1998	1	44664	 	83833		1452	1	11291	1	51131	1	11096	1	13827	l ' ::	104957	.1	58096		8246
_	SUN	1	341405	I	641134	I	8170	I	85856	ł	351208		69786	ţ	96096		744857	I	414292	1	53607
-	COST	1	172573	}	317611	1	-53314	ł	12180	1	136363	I	10325	I	-17023	1	195571	i	166587	1	-92354
	/X.a	1	34515	T	19851	I,	-3332	ł	1740	ł	7576	ł	1291	ļ	-851	ļ	4548	L	8329	i	-2716

### 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 [1] B-1, [1] B-2 and [1] C classification.

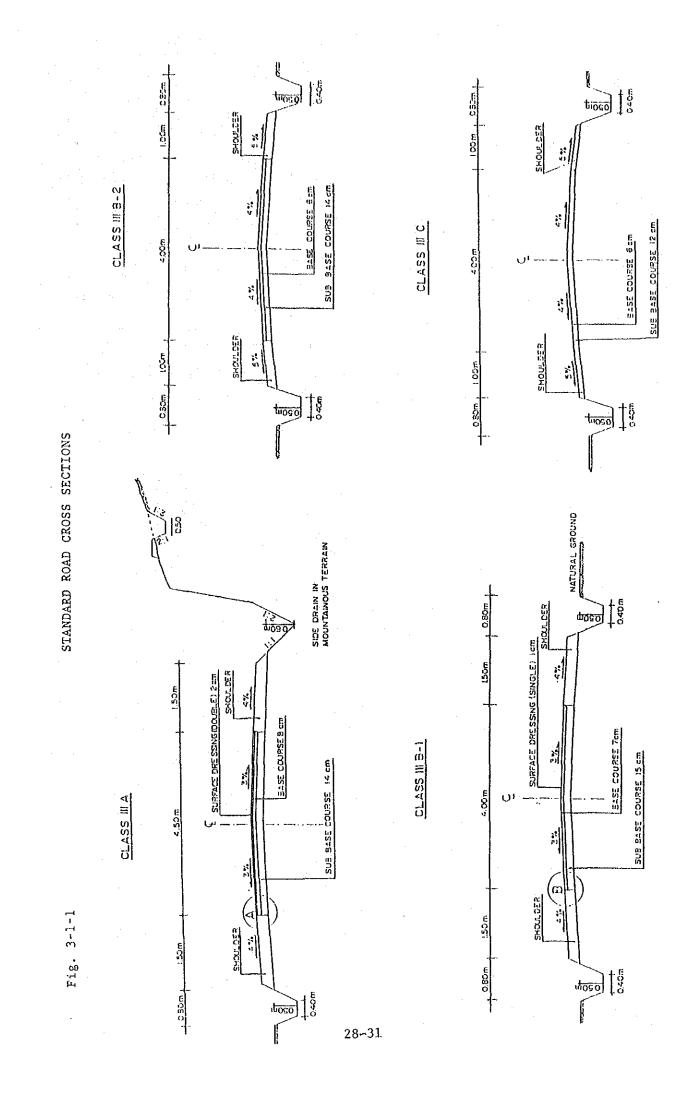
28-29

Table 3-1-1

DESIGN CRITERIA FOR KABUPATEN ROADS

ROAD CLASSIFICATION	CATION	5 	CLASS III	A	CLASS	SS III B	 	CLASS	TTT	-2	CLASS	SS III C	•
SURFACE T	ц ц ц ц ц	ASPHALT	ASPHALT SEAL (DOUBLE)	DOUBLE)	ASPHALT	SEAL (S	(SINGLE)		GRAVEL			GRAVEL	
TRAFFIC VOLUME (Forecast 10 th per day)	ME : ADT th year average		3000 - 500	0	5(	500 - 200		5	200 - 50			50	
T E R A	N I	FLAT TO ROLLING	HILLY	MOUNT- AINOUS	FLAT TO ROLLING	HILLY	MOUNT-	FLAT TO ROLLING	HILLY	- TNOUIA	FLAT TO ROLLING	ATTIH	AINOUS AINOUS
TRAFFIC LA	LANES	+	4	+	+	+	+	+	+	+ H		T	H
DESIGN	DESIRABLE	70	60	40	70	40	30	60	40	30	50	30	AS PRACTI- CABLE
SPEED (Km/hr)	WUMINIW	30	30	30	30	30	AS PRACTI-	30	30	AS PRACTI- CABLE	30	AS PRACTICABLE	ICABLE
GRADIENT	DESIRABLE	4	S	80	4	9	80	4	7	Ø	ະ. ນ	ø	12
(%) (%)	MAXIMUM	7	7	10	7	00	10	2	ज	12	7 :	12	16
PAVEMENT	DESIRABLE	6.0	6.0	e.0	4.5	4.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5
WIDTH (M)	MUMINIM	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0
SHOULDER	DESIRABLE	2.0	1.5	1.5	1.5	1.5	1.0	1.5	1.0	1.0	1.0	1.0	0.75
(M) HIDIH	MINIM	1.5	1.0	0.75	1.0	1.0	0.75	1.0	0.75	0.5	0.75	0.5	0.5
ROAD BED (M)	DESIRABLE	0.01.	0.6	0.6	8.0	7.5	6.5	7.5	6.5	6.5	5.5	5.5	5.0
HIDIM	WUMINIW	6.0	6.0	6-0	5.5	ير ک	5.0	5.5	5.0	4.5	4.5	4.0	.4
RIGHT	DESIRABLE		16			12			12			12	
WAY (M)	WUMINIW		12			10 °			10			œ	
ROAD	PAVEMENT		3			£			7			7	
Ж	SHOULDER		4		-	4.			Ś			ŝ	

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### 3.2 Pavement Design

### 3.2.1 Design Conditions

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

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

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

### 1) Design Traffic Volume

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

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

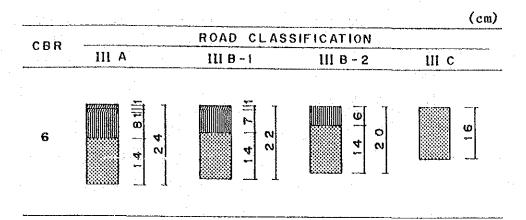
CBR of the laterite is generally in the range of CBR 4 to 10. However site CBR tests should be conducted before construction to finally decide the pavement thickness.

### 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 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

The following two types have been finally selected with the agreement of Bina Marga after studying the actual rural conditions of bridge construction. Fig. 3-3-1 shows the cross sections of standard types.

- a. Timber beam bridge (hereinafter timber bridge) for roads class III B-1, III B-2 and III C.
- b. Reinforced concrete T-girder bridge (hereinafter RC-bridge) for roads class III A.

### 2) Substructure

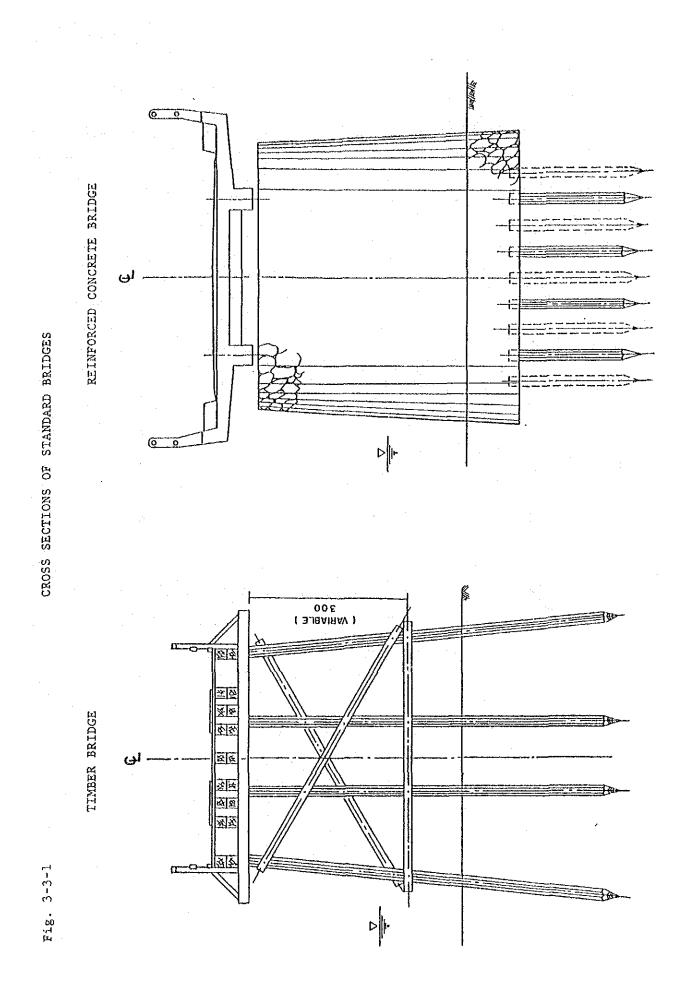
Taking account of the actual combinations of super and substructure types noted from the field survey, the following two types are recommended as standard because of ease of construction and economy.

- a) Timber pile bents for timber bridge
- b) Rubble in Mortar masonry for RC bridge

### 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. 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 widths for the standard bridges have been decided as follows through discussions with Bina Marga considering the actual width of Kabupaten roads:

a) Timber bridge: 4.0 m in general

b) RC bridge : 4.5 m in general

### (3) Span Length

The range of span lengths are determined as:

- a) Timber bridge: 3.0, 5.0 and 8.0 m
- b) RC bridge : 3.0, 5.0, 10.0 and 15.0 m

### 3.3.2 Other Structure

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 transverse drainage.

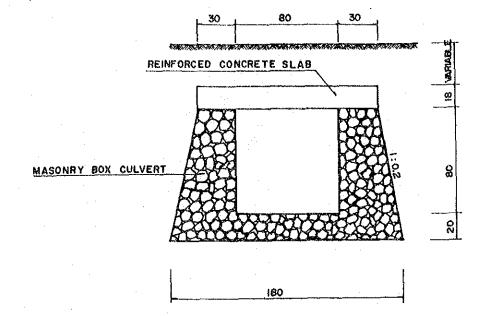
- a) Reinforced concrete pipe culvert ø 80 cm
- b) Rubble in mortar box culvert with RC slab 80 cm X 80 cm

### (2) Retaining Wall

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

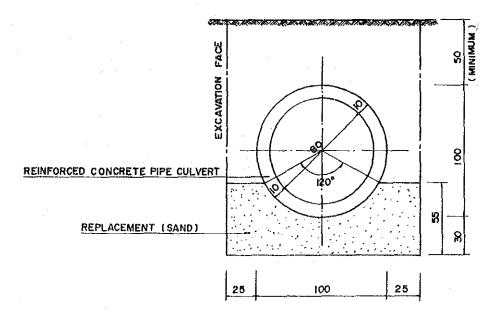
a) Rubble in mortar retaining wall

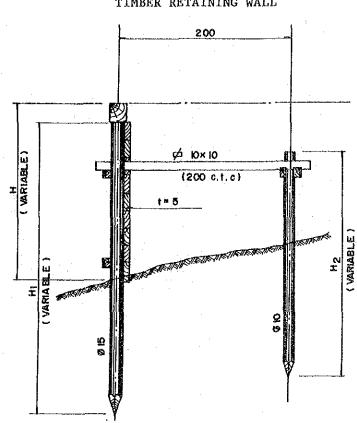
b) Timber retaining wall



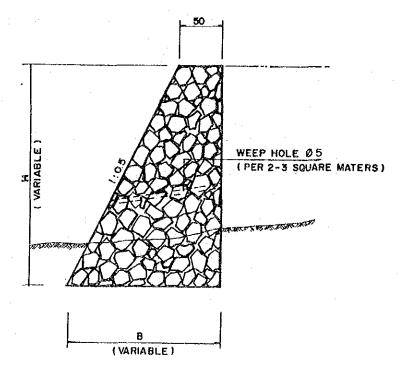
80 x 80 RUBBLE IN MORTAR BOX CULVERTS

Ø 80 RENFORCED CONCRETE PIPE CULVERT





RUBBLE IN MORTAR WALL



TIMBER RETAINING 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 3-4-1CONSTRUCTION METHODS FOR<br/>MAJOR WORKS

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

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### 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.
- is existing equipment types with d. Uniformity of equipment equipment of the in the facilitate repair considered to 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

<ol> <li>Site Clearing in Light Bush</li> <li>Excavation &amp; Embankment         <ol> <li>Normal Fill</li> <li>Fill by Borrow Material</li> <li>Fill in Swamp</li> <li>Fill in Swamp</li> </ol> </li> <li>Subgrade Preparation</li> <li>Subbase Course</li> <li>Base Course</li> </ol>	<ol> <li>Bulldozer 90 HP</li> <li>Dump Truck 3.0 Ton</li> <li>Bulldozer 90 HP</li> <li>Vibratory Roller 4.0 Ton (D&amp;T)</li> <li>Bulldozer 90 HP</li> <li>Dump Truck 3.0 Ton</li> <li>Swamp Bulldozer 90 HP</li> <li>Water Tank Truck 4,000 Ltr</li> </ol>	<ol> <li>Wheel Loader 1.2 m<sup>3</sup></li> <li>Water Tank Truck 4,000 Ltr</li> <li>Wheel Loader 1.2 m<sup>3</sup></li> <li>Vibratory Roller 4.0 Ton (D&amp;T)</li> </ol>
<ul> <li>ii) Fill by Borrow Material</li> <li>iii) Fill in Swamp</li> <li>iv) Excavation to Spoil</li> <li>Subgrade Preparation</li> <li>Subbase Course</li> </ul>	<ul> <li>1- Vibratory Roller 4.0 Ton (D&amp;T)</li> <li>1- Bulldozer 90 HP</li> <li>3- Dump Truck 3.0 Ton</li> <li>1- Swamp Bulldozer 90 HP</li> <li>1- Water Tank Truck</li> </ul>	4,000 Ltr 1- Wheel Loader 1.2 m <sup>3</sup> 1- Vibratory Roller
Material iii) Fill in Swamp iv) Excavation to Spoil 3. Subgrade Preparation 4. Subbase Course	<ul> <li>3- Dump Truck 3.0 Ton</li> <li>1- Swamp Bulldozer 90 HP</li> <li>1- Water Tank Truck</li> </ul>	1- Vibratory Roller
iv) Excavation to Spoil 3. Subgrade Preparation 4. Subbase Course	l- Water Tank Truck	
Spoil 3. Subgrade Preparation 4. Subbase Course		4.U ION (DAT)
4. Subbase Course	1- Bulldozer 90 HP 1- Wheel Loader 1.2 m <sup>3</sup>	4- Dump Truck 3.0 Ton
	<ul> <li>1- Motor Grader 75 HP</li> <li>1- Vibratory Roller 4.0 Ton (D&amp;T)</li> </ul>	1- Water Tank Truck 4,000 Ltr
5. Base Course	<pre>1- Motor Grader 75 HP 1- Vibratory Roller 4.0 Ton (D&amp;T)</pre>	1- Water Tank Truck 4,000 Ltr
	<ol> <li>Motor Grader 75 HP</li> <li>Vibratory Roller 4.0 Ton</li> <li>Portable Crusher/Scree 30-40 Ton/H</li> </ol>	1- Water Tank Truck 4,000 Ltr ens
). Cement Stabilizing	l- Motor Grader 70 HP I- Bulldozer 90 HP I- Wheel Loader 1.2 m <sup>3</sup> I- Flat Bed Truck 3.0 Ton	<ul> <li>1- Vibratory Roller</li> <li>4.0 Ton (D&amp;T)</li> <li>1- Road Stabilizer</li> <li>1- Water Tank Truck</li> <li>4,000 Ltr</li> </ul>
7. Surface Course	<ul> <li>1- Asphalt Sprayer</li> <li>850 Ltr</li> <li>1- Tyre Roller 8-15 Ton</li> <li>1- Portable Crusher/Scree 30-40 Ton/H</li> </ul>	l- Flat Bed Truck 3.0 Ton
3. Concrete	<ol> <li>Concrete Mixer 0.5 m<sup>3</sup></li> <li>Water Pump 200 Ltr/Min</li> <li>Concrete Vibrator</li> <li>3.3 HP</li> </ol>	

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 Grane 3.0 Ton

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### 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	l Set
Portable Hydraulic Jack, Screw Head	1
Hydraulic Jack	ł
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	<b>1</b>
Mechanics Tool Set, Large Vehicle	1
Portable Air Compressor	1
Electric Cord Reel, 15 A, 50 m	1.
0il 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 3-5-2LABORATORY 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 Ngada and other Kabupatens in Nusa Tenggara Timur Province are shown in Table 4-1-1.

Table 4-1-1

UNIT LABOUR PRICE

					· .		(Rp)
KABUPATEN	MAN	SKL LAB	CAP	MAS	LAB	DRIV	OPE
Sumba Barat	2,000	2,000	2,000	2,000	1,500	2,500	2,750
Ende	2,500	1,600	1,750	1,750	1,100	2,500	2,500
Ngađa	1,500	1,300	2,000	2,000	1,100	2,000	3,000
Average	2,000	1,300	1,917	1,917	1,233	2,333	2,750

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 Ngada together with for other Kabupatens in Nusa Tenggara Timur Province.

Table 4-1-2

UNIT PRICE OF MATERIALS

			1		(Rp)
MATERIAL	UNIT	SUMBA BARAT	ENDE	NGADA	AVERAGE
Bitumen	L	500	400	400	433
Asphalt oil	L	1,500	1,500	1,500	1,500
Gasoline	L	300	250	250	267
Sand	<sub>М</sub> З	9,000	8,000	5,000	7,333
Cement	bag	6,000	6,000	5,500	5,833
River Stone	M3	8,000	6,000	4,000	6,000
Steel moulds	Set	8,500	8,500	8,500	8,500
Timber	M3	200,000	200,000	200,000	200,000
Paint	$\mathbf{L}^{+}$	4,000	2,500	1,750	2,750
Reinforcing Steel	Kg	1,500	800	1,750	1,350
Tying Wire	Kg	1,250	1,250	2,500	1,667
Equivalent Royalty	M3	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		NUSA TENGGARA	TIMUR
KABUPATEN	£	NGADA	

					( UNIT	: Rp }	( 6.	85 ⟩	
CODE No	EQUIPHENT NAME	CLA55		LOCAL COS OPERATION			FOREIGN COS OPERATION		TOTA Cos
	Bulldozer	120 HP	31	12,800	13,111	7,76	1,034	8,803	21,91
	Buildozer/Ripper	120 HP	34(	13,821	14,161	8,500	) 1,591	10,091	24,25
	Swamp Bulldozer	120 HP	35	14,065	14,421	8,87	1,662		24,96
	Bulldozer	90 HP	19	8,657	8,854	4,91			14,42
	Bulldozer/Ripper	90 HP	211	9,254	9,166	5,300		6,292	15,75
	Bulldozer	65 HP	14(	6,290	6,430	3,500		3,965	10,39
	Bulldozer/Ripper	65 HP ·	- 15	5 :6,744	6,897	3,81	714	4,533	11,43
	Swamp Bulldozer	90. HP	213	9,244	9,456	5,28	989	6,273	15,72
	Swamp Bulldozer	65 HP	162	6,647	6,809	4,050	) 758	4,808	11,61
	Notor Grader	110 HP	277	11,088	11,365	6,919	7 1,295	6,214	19,57
-	Notor Grader	75 HP	192	7,600	7,792	4,779	894	5,673	13,41
	Motor Grader	65 HP	172	6,689	6,861	4,300	) 804	5,104	11,98
	Road Stabilizer	K=1850 am	34/	3,414	3,758	8,59	428	9,022	12,78
	Vibratory Roller	4 ton	110	3,323	3,439	2,900	) 385	3,285	6,72
	Hand-guide Vib. Roller	1000 Kg	. 94	602	696	849	7 30	879	1,57
	Tire Roller	8-15 ton	12	7,342	7,467	3,10	5 103	3,209	10,6
	Vibratory Roller (D&T)	4 ton	110	3,323	3,439	2,90	) 385	3,285	6,7
	Hand-quide Vib. Roller	600 Kg	66	411	477			621	0,1
	Rough Terrain Crane	10 ton	402	12,926	13,328	10,039	751	10,790	24,1
	Hydraulic Excavator; Wheel	0.3 m3	165					4,655	12,6
	Wheel Loader	1.2 #3	281					7,953	16,6
	Wheel Loader	0.3 m3	91	•		•		2,571	5.6
	Water Tank Truck	4000 Itr.	91					991	39
	Fuel Tank Truck	4000 ltr.	98					1,007	39
	Dump Truck	3.0 ton	162					1,677	5,3
	Flat Bed Truck with Crane	3.0 ton	65		•			1,845	4,9
	Dump Loader Truck	12 ton	154					3,965	22,9
	Dump Truck	5.0 ton	241					2,500	8,6
	Flat Bed Truck	3.0 ton	23					605	3,2
	Portable Crusher/Screening	30-40 t/h	752					21,302	43.6
	Concrete Mixer	0.5 m3	594				•	5,831	8,8
	Water Pump	200 1/min	21	•		-		194	- 14
	Concrete Vibrator	3.3 HP	. 5					75	3
	Asphalt Sprayer	850 Itr.	iR				·	1,163	2,0

### 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
Tanta	4.7.1

UNIT COST BY WORK TYPE EXCEPT BRIDGE WORK

.

FROV :

NUSA TENGGARA TIMUR

KAB I NGADA

10-1

	***************************************				(Kp)
· •••••••	E N	UHIT	LOCAL	FOREIGN	TOTAL
·		_	•		
	Clearance in Light Bush	∎2	153	91	244
	ade Preparation	62	19	. 11	. 30
	1 Fill	53	1,576	B65	2,441
	in Swamp	83	2,325	1,054	3,379.
Nor ea	I Excavation to Spoil	#3	926	523	1,449
	ase Course	#3	2,984	1,350	4,334
	Course	63	4,100	2,303	6,403
Shoul	der	a2	273	145	419
Aspha	it Patching	n2	2,938	1,514	4,452
Sur fa	ce Dressing (Single)	e2	B43	766	1,609
Sur fa	ce Dressing (Double)	#2	1,001	1,207	2,208
Earth	Drain		629	119	748
Earth	Drain in Swamp (by machine)	<b>s</b> 3	1,065	474	1,539
Pipe	Culvert DBOcm	, i	36,892	76,576	113,458
Nason	ry Culvert (B0xB0cm)	9	47,364	53,860	101,224
Retai	ning Wall and Wing Wall (Tieber)	a2	15,772	246	16,018
Retai	ning Wall and Wing Wall (Masonry)	#3	32,773	12,077	44,850
Gabio	n Protection	<b>8</b> 3	11,004	121	11,125
Hanua	l routine maintenance of road	Ke	96,920	7,260	104,180
	ne maintenance of earth road	Ka	85,342	37,948	123,290
	ne maintenance of gravel road	Ka	176,065	88,186	264,251
	ne maintenance of asphalt road	Ka -	273,800	151,400	445,200

# 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 : NUSA TENGGARA TIMUR

KAB : NGADA

				(Rp)
JTEN	UHI)	LDCAL	FOREIGN	TOTAL
		0 44	*	
Superstructure (Timber; Span 3m; 101)	<b>a</b> 2	52,702	2,727	55,429
Superstructure (Timber;Span Smj101)	<b>n</b> 2	58,376	3,012	61,380
Superstructure (limber;Span Om;101)	<b>p</b> 2	77,325	3,961	81,286
Superstructure (Timber; Span 3m; BM50)	#2	65,349	3,373	68,722
Superstructure (Timber:Span 5m;BM50)	<b>B</b> 2	71,346	3,658	75,004
Superstructure (Timber;Span Am;BK50)	s2	90,407	4,632	75,117
Superstructure (Concrete;Span 3m;BH50)	<b>a</b> 2	52,924	171,810	224,734
Superstructure (Concrete;Span Sm;BNSO)	#2	53,990	192,600	246,580
Superstructure (Concrete;Span 8#;BH50)	#2	55,318	210,151	265,469
Superstructure (Concrete;Span10m;BNSO)	#2	60,222	239,232	299,454
Superstructure (Concrete;Span15*;BH50)	#2	64,324	282,524	346,848
Substructure (Pier;for Timber;101)	NO	458,897	25,168	484,065
Substructure (Abut;fur Timber;101)	NO	1,200,388	129,063	1,328,451
Substructure (Pier;for Timber;8850)	NO	674,875	37,224	712,099
Substructure (Abut;for Timber;BH50)	NO	1,362,835	140,846	1,503,681
Substructure (Pier; for Concrete; 8H50)	NO	1,393,463	487,788	1,801,251
Substructure (Abut;for Concrete;0850)	NO	2,949,676	1,017,596	3,966,272
Demolition of Bridge (linber-)limber)	#2	14,316	1,106	15, 122
Demolition of Bridge (Timber-)Concrete)	a2	14,316	1,106	15,422
Demolition of Bridge (Concrete)	n2	73,686	121,003	194,689
Naintenance of Timber Bridge (New)	<b>m</b> 2	9,334	954	10,289
Maintenance of Concrete Bridge (New)	#2	1,822	4,303	6,125
Haintenance of Timber Bridge (Exist)	ø2	8,203	2,322	10,525
Haintenance of Concrete Bridge (Exist)		3,900	2,705	6,605

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### Chapter 5 RESULTS OF ECONOMIC FEASIBILITY EVALUATION

### 5.1 Preliminary Screening

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

- (1) Very short roads, less than 2 Km long, which have no connection with the trunk road network.
- (2) Roads not connected to the network at any point
- (3) Unpreferred roads, due to poor suitability for transportation compared to other existing alternative roads serving the same purpose.
- (4) Road in good condition according to the Bina Marga road inventory which lists improvement projects carried out in the last two or three years
- (5) Roads with asphalt surface in good condition
- (6) Urban roads, except those forming part of a longer route
- (7) Roads serving single large organizations rather than the general public
- (8) Roads with no inventory data
- (9) Kabupaten roads also assigned as provincial roads

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

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

KABUPATEN : NGADA

CRITERIA NO		ROAD	LINK	NO
	1			

### 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.

### PROVINCE : NUSA TENGGARA TIMUR

### KABUFATEN I NGADA

LINK NO	LENGTH	CLASS	IRR (%)	REMARK
35	7 Km	IIIB~1	45.671	VOC
32	25 Km	1119-2	33.841	Surplus
16	15 Km	1118-1	31.795	voc
22	25 Km	IIIE-2	31.572	Surplus
30	-23 Km	1118~2	30.899	Surplus
24	20 Km	1118~2	29.825	Surplus
14	47 Km	<b>IIIB-1</b>	27.453	Surplus
1	S Km	111P-1	26 673	VOC

16	18 Km.	1118~1	31.795	VOC ···
22	25 Km	IIIB-2	31.572	Surplus
30	-23 Km	III8~2	30.899	Surplus
24	20 Km	1118~2	29.825	Surplus
14	47 Km	IIIB-1	27.453	Surplus
1	S Km	1118-1	26 673	VOC
13	25 Km	IIIB-1	22.064	Surplus
2	16 Km	1119-2	20.761	VOC
49	9 Km	1118-2	19.430	Surplus
20	20 Km	IIIB-2	17.676	Surplus
26	15 Km	1118-2	15.853	Surplus
5	18 Km	IIIB-2	13.208	Surplus
37	12 Km	I118-2	12.661	Surplus
15	41 Kin	111B-1	10.828	Surplus
36	12 Km	1118-2	9 875	Surplus
41	56 Km	1118-1	<b>7.8</b> 50	Burplus
45	18 Km	IIIE-2	9.632	Surplus
12	28 Km	IIIB-2	5.831	Surplus
31	10 Km	IIIB-2	5.621	Surplus
	20 Km	1118-2	4.827	Surplus
23	10 Km	IIIC	0.078	Surplus
.3	16 Km	IIIC	0.078	Surplus
25	16 Km	IIIB-2	0.078	Surplus
<u>د</u> م	8 Km	111C	0.078	
27				Surplus
	6 Km		0.078	Surplus
28 29	15 Km 30 Km	IIIB-2	0.078	Surplus
24 7	38 Km 20 Km		0.079 0.079	Surplus
é	43 Km	1118-2	0.078	Surplus
4	7 Km	IIIB-1 IIIB-1	0.078	Eurplus VOC
33	4 Km	IIIC	0.078	Surplus
34	7 Km	IIIC	0.078	Surplus
	13 Km	1110	0.078	Surplus
18	22 Km	IIIC	0.078	Surplus
19	22 KM 50 Km	IIIC	0.078	
38	50 Km 9 Km		0.078	Surplus
39		111C	0.078	Surplus
40	15 Km 4 Km	IIIC	0.078	Surplus
40	4 ка 34 Ка	IIIC	0.078	Surplus
42	12 Km	IIIC	0.078	Surplus Surplus
	12 Km 19 Km		0.078	Surplus
43				,
44	6 Km		0.078	Surplus
21	自 Km 7 Km		0.078	Surplus
46	7 Km 30 Km	IIIC IIIC	0.078	Surplus Surplus
47	18 Km	1118-2	0.078	Surplus
48	18 Km 34 Km		0.078	Surplus
11		IIIC	0.078	Surplus
50	8 km		0.070	ou prus

Table 5-2-2 RESULTS OF SECONDARY ANALYSIS

TRUVINCE I HUSA TENBOARA ELNUR - KOBUPATEN I NUADA

LINK NO	LEDIDITI	CI.ABB	(RR (2)	REHARK
45	- 19 Km	1110	14.1154	ธิการโกล
15.6	17 Km	LEIC	13.010	Burplus
41	556 Km -	1110-2	10.560	Burplus
31	10 Km	1110	7,491	Surplas
12	29 Km	1110	7.203	Burplus
9	20 Em	1110	5.707	Յուսլո

Table 5-2-3 RANKING OF FEASIBILITY ROAD LINKS

.

PROVINCE	1	NUSA	TENGGARA	TIMUR	KABUPATEN	t NGA	DA '
ND ND	LEN	di s		NPV (1000Rp)		IRR (%)	REMARK
14	47			815683	1.987	27.453	Surplus
13				413233	1.614	22.064	Surplus
16	15	Ka	1118-1	383175	2.079	31.795	VUC
22	25	Km	1118-2	352809	2.132	31.572	Surplus
32					2.219		Surplus
30		Kú			2.066	30.899	Burplus
35	7	Km	IIIB-1	250111	2.870	45.671	VOC
24			1118-2	214032	1.978	29.825	Surplus
2	16	Km	1118-2	126991	1.497	20.761	VOC
20				112110		17.676	Surplus
í	5	Kin	1110-1	91882	1.918	26.673	VDC
41	56	Km	1118-2	76439	1.028	10.580	Surplus
15	41	Ka			1.038		
49	9	Km	1110-2	56273	1.453	19.430	Surplus
26	15	Km			1.260		
45		Km		38413	1.212	14.854	Surplus
. <b>5</b> 1	18	14m			1.129		
					1.117		
36		Km	IIIC		1.128		
BUN	411	 Кю		3777018	ال الدين منها الله منه الله منه منه عنها المرب الله الله الله الله الله الله الله الل		

### 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.

(Rnv106)

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

KABUPATEN: Ngada

			(Kpx10-)
COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CONSTRUCTION	891	1,564	2,455
MAINTENANCE	127	378	505
SUPPLEMENTATION	524	-	524
WORKSHOP EQUIPMENT & TOOLS	28	-	28
LABORATORY EQUIPMENT	12	_	12
SURVEY EQUIPMENT	5	-	5
TOTAL	1,587	1,942	3,529

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

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

			(Rpx10 <sup>6</sup> )
COST	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
CIVIL WORK	455	1,925	2,380
CONSTRUCTION & MAINTENANCE EQUIPMENT	1,019	-	1,019
SPARE PARTS	68	17	85
WORKSHOP/LABORATORY/SURVEY EQUIPMENT	45	-	45
TOTAL	1,587	1,942	3,529

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

### 6.1.2 Proposed Road-Links

### (1) Road Link to be Improved

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

- (1) Feasible road links
  - Feasible road links from the primary evaluation
  - Feasible road links from the secondary evaluation
- (2) Road links selected from the engineering points of view
- (3) Road links selected because of basic human needs.

The road links finally proposed to be improved in the Kabupaten are the 9 links with the total length of 191 km which is 20% of the 937 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 : NGADA

REASON FOR SELECTION	ROAD LINK NO
Feasible	
- Primary - Secondary	2,13,14,20,24,26,30, -
Engineering Point of View	4,25
Basic Human Needs	· _ · ·

There are so many feasible road links in the Kabupaten that some road links are not selected to be improved. Among feasible road links following road links are proposed to be improved:

- Road links which form the local road network; and
- Road links which are effective in providing more effective development from road improvement.

Since Road Link No 4 is a trunk road which connects two provincial roads, this road link is selected from the engineering points of view.

Since Road Link No 25 is a key road link which is located at the strategic point to complete the local road network together with a feasible road link, this road link is also selected.

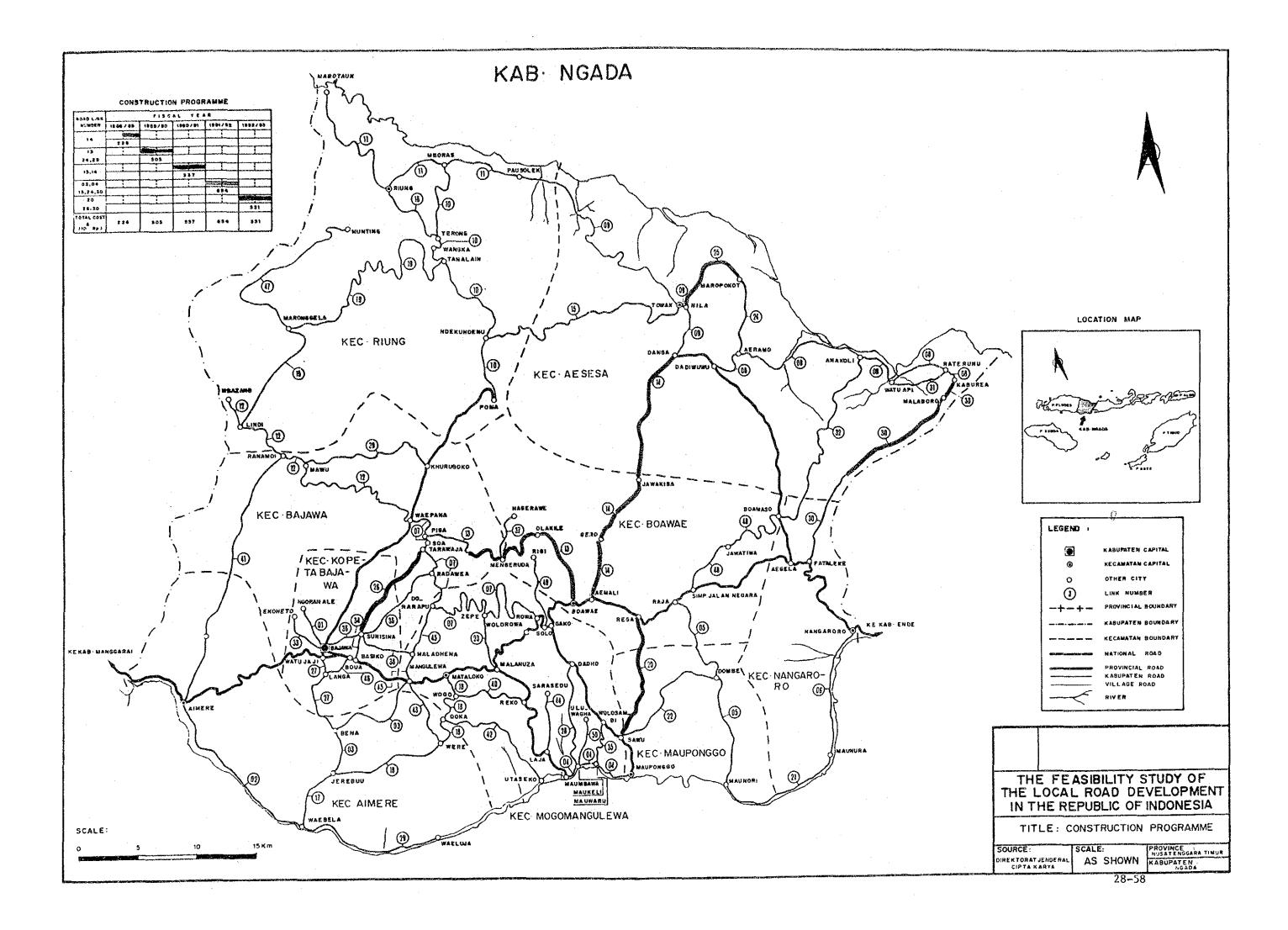
The order of proceeding with the improvement of the proposed road links are decided as shown in Table 6-1-4.

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

PROV : NUSA TENGGARA TIMUR KAB : NGADA

YEAR	<u>.</u>	LINK NO	():rate
1988	;	14 (302)	
1989	;	13 (40%), 14 (30%), 2	
1990	:	13 (40%), 14 (40%)	· · · · · · · · · · · · · · · · · · ·
1991	1	2, 4, 13 (20%), 24	, 30 (40%)
1992	!	20, 26, 30 (602)	

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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

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#### ROAD LINKS TO BE MAINTAINED

PROV : NUSA TENGGARA TIMUR

KAB I NGADA

( 1000Rp )

iooouh i	•													1.1	1	
TOTAL	FOREIGN	LOCAL	BRIDGE	AREA	RC	AREA	TH:	EARTI	GRAVEL	ASPHAL	RB	RU	SD	BA	LENGTH	LINK
COST	COST	COST	COST	(#2)	NO	(a2)	KO	(Kø)	(Ka)	(Ka)	(2)	(X)	(2)	(2)	(Ka)	NO
1,137	226	911	0	0.00	0	0.00	0	5	0	0	0.0	76.0	24.0	0.0	5	l
5,463	1,380	4,083	132	20.00	- 1	0,00	0	- 4	12	. 0	0.0	36.3	18.1	45.6	16	3
4,002	1,210	2,762	1,242	188.00	3	0.00	0	0	6	L L	0.0	6.4	13.6	80.0	· 7	4
6,209	1,567	4,642	0.	0.00	0	0.00	0	3	15	0	9.4	31.9	53.1	5.6	19	5
9,654	2,789	6,865	2,286	301.50	12	28.00	ŧ	0	20	Q	0.0	33.3	t1.0	55.0	20	1
15,897	4,130	11,757	195	28.00	1	0.00	0	l	42	. 0	0.0	5.9	12.2	81.0	43	0
4,690	954	3,736	0	0.00	Û	0.00	¢	19	1	· 0	5.5	12.0	41.5	41.0	20	9
10,27	2,141	7,830	0	0.00	0	0.00	0	16	10	0	6.8	19.3	38, 1	35.9	. 34	10
10,96	2,938	8,025	647	98.00	4	0.00	0	0	28	0	0.0	36.4	63.6	0.0	28	12
10,69	2,125	8,566	0	0.00	0	0.00	0	47	0	0	0.3	46.5	29.7	15.5	47	14
1,51	904	3,615	· D	0.00	0	0.00	Ð	20	0	0	10.0	51.9	32.0	3.3	20	20
6,11	1,619	4,498	221	33.50	3	0.00	0	0	16	0	0.0	1.9	27.5	70.6	16	25
1,50	321	1,184	0	0.00	0	0.00	0	3	1	0	0.0	35.0	65.0	0.0	8	27
91	181	729	0	0.00	0	0.00	0	. 4	0	0	0.0	14.0	86.0	0.0	14	33
1,96	412	1,549	0	0.00	0	0.00	0	1	1	0	12.4	36.4	20.0	31.3	8	43
1,59	316	1,276	0	0.00	Q	0.00	· 0	7	0	. 0	10.0	50.7	18.6	20.7	7	46
4,09	914	3,201	0	0.00	0	0.00	0:	18	0	¢	16.1	79.3	5.6	0.0	19	49
2,04	407	1,640	0	0.00	0	0.00	0	9	0	0	23.3	30.6	41.7	34.4	Ÿ	49
101,74	24,763	76,980	4,713	667.00	24	28,00	1	165	160	 				******	326	SUX

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### 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 Ngada 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 2,455 x  $10^6$  and maintenance cost is Rp 505 x  $10^6$  which is approximately 17% of the total expenditure.

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

PROV I NUSA TENGGARA TIMUR KAB I NGADA

/ HULT . 1000Rn 1

				· · · · · · · · · · · · · · · · · · ·				( UHIT 1	1000Rp 1
	ITEN		< 1788 >	( 1989 )	< 1990 >	( 1991 )	( 1992 )	( TOTAL )	
LOCAL	CURRENCY		141,052	304,086	322,250	426,932	367,979	1,562,297	(63.62)
	Ownership	Cost	2,097	4,924	4,884	7,835	7, 597	27 417	1 1.92)
	Operation	Cost	55,196	129,204	127,465	198,575	201,440		(45.6%)
	Haterial	Cost	45,778	86,897	101,140	86,573	39,136	359,514	(23.01)
	Labour	Cast	19,592	43,390	46,755	78,262	71,709	259,708	(16.6%)
	Contingenc	; y	18,399	39,661	42,031	55,687	47,997	203,770	(13.0%)
FOREIG	N CURRENCY	1	85,446	201,052	213,661	228,347	164,169	892,675	(36.4%)
	Ownership	Cost	30,076	71,932	69,010	110,794	109,662	392,174	(43.92)
	Operation	Cost	4,135	9,870	9,501	15,691	15,732		1 6.211
	Haterial	Cost	40,090	93,119	106,481	72,078	17,362	329,129	(36.92)
	Labour	Cost	0	0	0	0	Q	0	[ 0.0%]
	Contingenc	Ŷ	11,145	26,224	27,869	29,784	21,413	116,435	(13.01)
TOTAL	COST 1		226,509	505,118	535,918	655,279	532,149	2,454,973	
	Ownership	Cost	32,173	76,756	74,674	118,629	117,359	419,591	(17,1%)
	Operation		59,331	139,082	136,966	214 265	217,172	766,017	(31.22)
	Material	Cost	05,868	180,005	207,621	150,651	56,498	688,643	120.121
	Labour	Cost	19,592	43,390	46,755	78,262	71,709	259,708	(10.6%)
	Contingenc	Y .	29,545	65,885	69,902	85,471	67,411	320,214	(13.0%)

< Contingency : 15% >

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

							(UNIT :	1000Rp }
ITEN		( 1988 )	( 1989 )	< 1990 >	< 1991 >	< 1992 >	< TOTAL >	
LOCAL CURRENCY	1	37,830	73,429	75,245	85,369	106,459	378,332	(74,9%)
Orner ship	Cost	512	983	1,017	1,329	1,708	5,549	( 1.51)
Operation	Cast	23,263	45,086	46,297	50,703	61,972	227, 321	(60.12)
Naterial		547	1,051	1,076	50,703 2,004	4,112	8,810	(2.3%)
Labour	Cost	13,508	26,309	26,835	31,333	38,667	136,652	(36.121
		***************************************		***********				
FOREIGN CURRENCY	1	12,218	23,633	24,336	29,476	37,198	126,861	(25,1%)
Оwnership	Cost	10,659	20,614	21,220	23,625	29,191	105,317	(83, 02)
Operation	Cost	1,271	2,455	2,531	2,835	3,510	12,602	( 9,9%)
Naterial	Cast	288	564		3,016			
Labour	Çast	0	0	0	. 0	0	0	( 0.02)
TOTAL COST :		50,048	97,062	99,581	114,845	143,657	505,193	
Ownership	Cost	11,171	21,597	22,245	24.954	30,899	110,866	(21.9%)
Operation				-	53,538		239,923	(47,5%)
Katerial					5,020			
Labour	Cost	13,508	26,309	26,835	31,333		136,652	(27.0%)

#### CONSTRUCTION AND MAINTENANCE COST

#### (TOTAL)

								( UNIT :	1000Rn 1
	****	*******	*****	. <u>19 12 (q. 16 (q. 19 14 (q. 19</u> 14 (q. 19 1	د در سه او او او او او او او او او او او او او	**********			
	1 T E H		< 1988 >	( 1989 )	( 1990 )	( 1991 )	< 1992 >	< TOTAL >	
LOCAL	CURRENCY	1	178,092	377,495	397,503	512,301	474,438	1,940,629	(65,6%)
	Ownership	Cast	2,609	5,907	5,881	9,164	9,405	32,965	( 1.71)
•	Operation	Cost	78,459	174,290	173,762	249,278	263,412	939,201	(48.4%)
	Haterial	Cost	46,325	87,938	102,236			369, 324	(19.0%)
	Labour	Cost	33,100	69,699	73,590	109,595	110,376	396,360	(20.4%)
	Contingenc	Ŷ	18,399	39,661	42,034	55,687	47,997	203,778	(10.5%)
FOREIG	N CURRENCY	<b>!</b>	97,664	224,695	237,997	257,823	201,367	1,019,536	(34.4%)
	Oxnership		40,735	92,445		134,419	130,853	497,491	
	Operation		5,405		12,032			67,539	( 6.6%)
:	Naterial		40,378	93,692	107,059	75,094	21,859		(33.2%)
	Labour	Cost	0	0	0	0	0	0	{ 0.01}
	Contingenc	Y 	11,145	26,224	27,869	29,784	21,413	116,435	{11.4%}
TOTAL	C051 :		276,557	602,180	635,499	770,124	675,806	2,960,166	
	Ownership	Cost	43,344	78,353	96,919	143,583	148,258	530,457	- {17,9%}
	Operation			196,623	185,794	267,804	282,654	1,005,740	(34.02)
	Material		86,703	181,620	209,294	163,671		706,395	(23.92)
	Labour	Cost	33,100	69,699	73,590	109,595		396,360	(13.4%)
	Contingenc	v	29,545	65,885	69,902	85,471	69,411	320,214	(10.81)

< Contingency : LSX >

Table 6-1-6 (3)

#### 6.1.4 Construction and Maintenance Equipment Cost

#### (1) Required Number of Equipment

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

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

- 1-Asphalt Sprayer

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

PROV : NUSA TENGGARA TIMUR KAB : NGADA

EQUIPHENT NAHE	HORKABLE	EXISTING	( 1988 )	< 1989 >	< 1990 >	< 1991 >	< 1992 >
Bulldozer/Ripper	250	0	0.11	0.35	0.30	0.75	0.69
Swamp Bulldozer	250	0	0,01	0.02	0.03	0.01	0.08
Notor Grader	250	0	0.46	0.98	0.93	1.73	1.59
Hand-guide Vib. Roller	250	0	0.09	0.46	0.49	1.00	0.54
Tire Roller	250	0	0.32	0,54	0.64	0.12	0.00
Vibratory Roller (D&T)	250	0	0.37	0.76	0.77	1.46	1.38
Hydraulic Excavator; Nheel	250	0	0.04	0.40	0.42	0.18	1.51
Wheel Loader	250	0	0.56	1.35	1.27	2.25	2.04
Hater Tank Truck	250	0	0.27	0.53	0.55	0.99	0.92
Duap Truck	250	0	5.29	11.85	11.86	19.95	20.12
Flat Bed Truck with Crane	250	0	0.07	0.36	0.39	0.91	0.37
Flat Bed Truck	250	• 0	0.41	0.80	0.93	0.48	0.18
Portable Crusher/Screening	250	1	0.13	0.32	0.27	0.35	0.28
Concrete Mixer	250	0	0.02	0.12	0.12	0.21	0.10
Water Puøp	250	0	0.02	0.09	0.10	0.17	0.08
Concrete Vibrator	250	0	0.01	0.05	0.05	0.10	0.03
Asphalt Sprayer	250	1	0.32	0.54	0.64	0,12	0,00
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				A .		*********	

NOTE WOR

WORKABLE : workable days in a year

EXISTING : number of existing equipment

Table 6-1-8EQUIPMENT PURCHASE COST

PROV : NU

PROV : NUSA TENGGARA TIMUR - KAB : NGADA

	****			
EQUIPHENT NAME	CLASS	CIF (JAKARTA)	PURCHASE ND.	PURCHASE COST
Bulldozer	90 HP	49,150		-
Bulldozer/Ripper	90 HP	53,000	1	53,000
Swamp Bulldozer	90 HP	52,850		
Swamp Bulldozer	65 HP	40,500	-	-
Notor Grader	75 HP	47,800	2	95,600
Road Stabilizer	N=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 =3	41,100	1	41,100
Wheel Loader	1.2 3	70,200	3	210,600
Water Tank Truck	4000 ltr.	12,750	1	12,750
Duap Truck	3.0 ton	14,700	- 17	249,900
Dump Loader Truck	12 ton	56,300	-	
Flat Bed Truck with Crane	3.0 tan	25,190	1	25,190
Flat Bed Truck	3.0 tan	11,275	2	22,550
Portable Crusher/Screening	30-40 t/h	188,000	. 1	188,000
Concrete Nixer	0.5 m3	18,000	1 1	18,000
Hater Pump	200 1/min	630	•	630
Concrete Vibrator	3.3 HP	740	•	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
Notorcycle	100 cc	1,100	3	3,300
		PURCHASE COST	TOTAL	1,019,030
		OWNERSHIP COST	(FURELGN)	495,047
		EQUIPHENT COST	SUPPLEMENTED	523,983
	NOTE :	OWNERSHIP COST (F	OREIGN) for Ex	isting Equipment
		Asphalt Sprayer	·····	2,444

#### 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

PROY : NUSA TENGGARA TIMUR - KAĐ : NGADA

1 T E N	UNIT	< 1788 >	< 1989 >	< 1990 >	( 1991 )	< 1992 >	< TOTAL
Sile Clearance in Light Bush	<b>e</b> 2	0.00	16000.00	16000.00	48500.00	52500.00	133000.0
Subgrade Preparation	<b>6</b> 2	84600.00	144600.00	172800.00	314000.00	310000.00	1026000.0
Normal Fill	e3	0.00	0.00	0.00	2670.00	1590.00	4260.0
Fill in Swamp	<b>m</b> 3	104.40	873.92	908.72	384.76	3206.30	5478.1
Normal Excavation to Spoil	e3	1598.10		4888.00	8938.60	7358.40	27140.0
Sub Base Course	#3	7896.00	13696.00	16129.00	29428.50	26600.00	93748.5
Base Course	•3	3948.00	10588.00	8054.00	13880.00	11400.00	47880.0
Shoulder	#2	28200.00	80200.00	57600.00	124000.00	120000.00	410000.0
Asphalt Patching	B2	0.00	0.00	0.00	33.00	0.00	33.0
Surface Dressing (Single)	e2	56400.00	96400.00	115200.00	20000.00	0.00	288000.0
Surface Dressing (Double)	•2	0.00	0.00	0.00	0.00	0.00	0.0
Earth Drain	8	22110.00	33910.00	41280.00	61100.00	80700.00	239100.0
Earth Drain in Swamp (by machine)	23	720.00	7920.00	8160.00	3600.00	30000.00	50400.0
Pipe Culvert 080ca	8	3.00	363.00	364.00	790.60	213.40	1734.0
Hasonry Culvert (80x80cm)		25.20	25.20	33.60	0.00	19.00	102.0
etaining Wall and Wing Wall (Timber)	e2	0.00	0.00	0.00	0.00	0.00	0.0
Retaining Wall and Wing Wall (Hasonry)	₽Ĵ	12.00	146.40	150.40	274.56	165.54	748.9
Sabion Protection	<b>n</b> 3	0,00	0.00	0.00	0.00	0.00	0.(
						•	
Superstructure (Timber;Span Ja;107)	·∎2	0.00	0.00	0.00	0.00	0.00	0.(
Superstructure (Timber;Span 5m;10T)	a2	0.00	30.40	30.40	100.00	187.20	348.(
Superstructure (Timber;Span 8m;10T)	e2	68.00	96.40	118.40	436.80	46.40	764,0
Superstructure (Timber;Span 3m;BH50)	e2 -	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Timber;Span 5#;BH50)	#2	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Timber;Span 8m;BH50)	s2	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Concrete;Span 3m;BNSO)	#2	0.00	0.00	0.00	0.00	0.00	0.(
Superstructure (Concrete;Span 5m;BNSO)	· #2	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Concrete;Span Ba;BN50)	· 82	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Concrete;Span10m;BH50)	#2	0.00	0.00	0.00	0.00	0.00	0.0
Superstructure (Concrete;Span15o;BHSO)	я2	0.00	0.00	0.00	0.00	0.00	0.0
Substructure (Pier;for Timber;10T)	NO	1.50	2.70	3.20	10.40	4,20	22.0
Substructure (Abut;for Timber;101)	NO	1.80	5.00	5.60	19.60	14.00	46.(
Substructure (Pierifor Timber:BN50)	KO	0.00	0.00	0.00	0.00	0.00	0.0
Substructure (Abut;for Timber;BH50)	NO	0.00	0.00	0.00	0.00	0.00	0.0
Substructure (Pier;for Concrete;8H50)	KO	0.00	0.00	0.00	0.00	0.00	0.0
ubstructure (Abut;for Concrete;BN50)	HO	0.00	0.00		0.00	0.00	0.0
eaclition of Bridge (limber-)limber)	· #2	0.00		0.00	24.00	0.00	24.(
Demolition of Bridge (Timber-)Concrete)	· a2	<b>0.00</b>	0.00	0.00	0.00	0.00	0.(
Demolition of Bridge (Concrete)	#2	0.00	0.00	0.00	0.00	0.00	0.0
lanual routine maintenance of road	Ka	159.40	310.95	316.60	322.50	377.00	1406.5
Routine maintenance of earth road	Ka	78,99	157.95	155.60	118.00	108.00	618.5
Routine maintenance of gravel road	Ka	80.00	152.00	160.00	157.00	197.00	746.0
Routine maintenance of asphalt road	Ku	0.50	1.00	1.00	47.50	72.00	122.0
laintenance of Timber Bridge (Nex)		0.00	0.00	0.00	0.00	220.00	220.0
laintenance of Concrete Bridge (New)	#2 #2	0.00	0.00	0.00	0.00	0.00	0.0
faintenance of Timber Bridge (Exist)	#2	14.00	28.00	28.00	28.00	28.00	126.0
Haintenance of Concrete Bridge (Exist)	#Z	334.50	652.25	667.00	575.00	669.00	2899.7

#### 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.

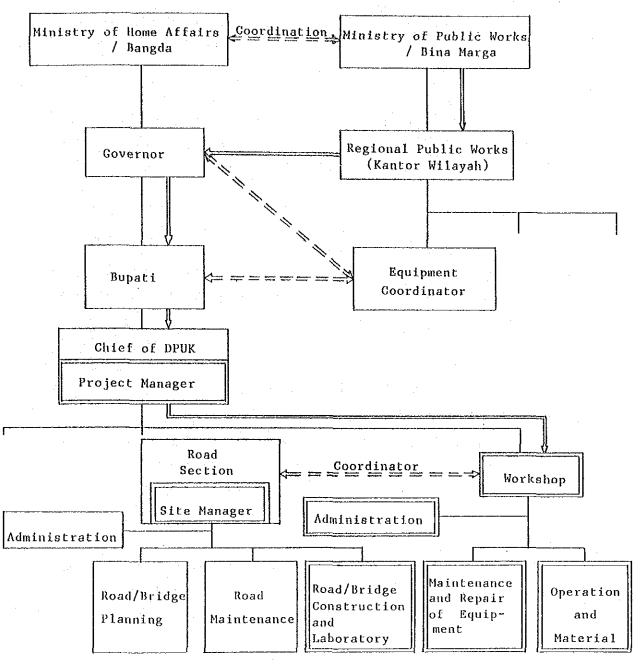
It is recommended that the workshop is newly organized to consist of three sub-sections, i.e. maintenance and repair of equipment, operation and materials, and administration to execute the main tasks described in Clause 3.5.

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.





: Equipment delivery flow

: New position/subsection

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

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

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

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

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

Taking into consideration the conditions mentioned above it is strongly recommended that the DPUK is obliged to lend some equipment with skilled operators to the local contractors in the Kabupatens for the execution of a part of the road improvement works. The types of work executed only by force account are recommended as follows:

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

## APPENDIX

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

Code No.	KECAMATAN NAME	CULTIVATED AREA : (PA)	YIELD RATE : (Y)	FARMER'S POPULATION (AP)	CIRCUI ATET
01	AEIMERE	601	1.39	8,070	0
02	WOGOMANGULEWA	1,906	2.29	13,800	0
03	MAUPONGGO	1,793	2.64	20,470	0
04	NANGARORO	912	1.53	7,680	0
05	BOAWAE	2,478	2.67	12,900	
00	BAJAWA	3,669	2.29	23,500	0
07	RIUNG	625	1.56		0
08	AESESA	2,714	3.93	6,100	
				12,500	0
		<u> </u>			
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NNUAI			RMER'S TION : (Cp)	NON- REQUIRME	AGRO ENT : (NG)
VERAC	7		on/head/year		Ton/ ton

SEDANBUSTRUCKMOTOR<br/>CYCLEAVERAGE<br/>FREIGHT<br/>TONAGEO. 6 Ton/Truck37.8411.0212.1638.98TONAGE0.6 Ton/Truck

28-A-1

RATE OF EACH

VEHICLE TYPE

%

## Appendix A-2 Engineering Data

28-A-2

### PROVINCE : Nusa Tenggara Timur

.

#### KABUPATEN: Ngada

			1			
LINK	BEGINNING POINT	END POINT	LENGTH	THROUGH TH NAME & LE		DINADUG
NO.	(DESA NAME)	(DESA NAME)	(км)	KEC. NAME	LENGTH (KM)	RENARKS
01	Bajawa	Ngoranale	5	Kopeta Bajawa	5	12
02	Aimere	Waebela	16	Aimere	16	8
03	Mangulewa	Jerubuu	16	<u>Aimere</u> Mogomangulewa	15 1	13
04	Maumbawa	Mauponggo	7	Mogomangulewa	7	1
05	Raja	Maunori	18	Mauponggo Boawae	14	11
06	Nangaroro	Maunura	8	Nangaroro	8	23
07	Rowa	Waepana	20	Mogomangulewa Bajawa	13 7	3
08	Dadiwuwu	Kaburea	43	Aesesa	43	10
09	Danga	Pausolek	20	Riung Aesesa	4	14
10	Poma	Mboras	34	Riung	34	5
11	Pausolek	Marotauk	34	Riung	34	15
12	Waepana	Mbazang	28	<u>Bajawa</u> Riung	20 8	4
13	Boawae	Piga	25	Boawae Bajawa	15 10	7
14	Aemali	Danga	47	Boawae Aesesa	20 27	
15	Ndekundenu	Towak	41	Riung Aesesa	6 35	16
16	Riung	Terong	15	Riung	15	
17	Jerebuu	Waebela	13	Aimere	13	18
18	Mataloko	Jerebuu	22	Aimere Mogomangulewa	17	
19	Lindi	Tanalain	50	Riung	50	19
20	Rega	Sawu	20	Mauponggo _Boawae	16	20
21	Maunori	Maunura	8	Mauponggo Nangaroro	3	
22	Sawu	Dombe	25	Mauponggo	25	
23	Malanuza	Zepe	10	Mogomangulewa	10	21
24	Maropokot	Aeramo	20	Aesesa	20	

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

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#### ROAD LINK DATA

### PROVINCE : Nusa Tenggara Timur

#### KABUPATEN: Ngada

LINK	BEGINNING POINT	END POINT	LENGTH	THROUGH TH NAME & LE	· [	REMARKS
NO.	(DESA NAME)	(DESA NAME)	(KM)	KEC. NAME	LENGTH (KM)	KEFAKKD
25	Nila	Maropokot	16	Aesesa	16	2
26	Surisina	Tarawaja	15	Bajawa Kopeta Bajawa	7 8	6
27	Watujaji	Bena	6	Aimere Kopeta Bajawa	1 5	22
28	Dadho	Maukeli	15	Mogomangulewa	15	
29	Waeluja	Waebela	38	Aimere	38	· · · · · · · · · · · · · · · · · · ·
30	Fataleke	Kaburea	25	Nangaroro Aesesa	8 17	· · · · · ·
31	Raterunu	Watuapi	10	Aesesa	10	
32	Boamaso	Anakoli	25	Nangaroro Aesesa	5 20	
33	Bajawa	Ekoheto	4	Kopeta Bajawa	4	24
34	Basiko	Surisina	7.	Kopeta Bajawa	. 7	
35	Wolosambi	Mauwaru	7	Mogomangulewa	7	
36	Bajawa	Radawea	12	Bajawa Kopeta Bajawa	5	9
37	Mengeruda	Nagerawe	12	Bajawa Boawae	2 10	
38	Maladhena	Surisina	9	Mogomangulewa Kopeta Bajawa	1 8	25
39	Khuruboko	Mawu	1.5	Bajawa	15	
40	Wogo	Reko	4	Mogomangulewa	4	
41	Aimere	Ranamoi	56	Aimere Bajawa	<u>27</u> 29	
42	Doka	Utaseko	12	Mogomangulewa	12	
43	Mangulewa	Were	8	Aimere Mogomangulewa	6	, <u>`</u> ,
44	Sarasedu	Laja	6	Mogomangulewa	6	
45	Mangulewa	Dorarapu	18	Mogomangulewa	18	······································
46	Boua	Langa	7	Kopeta Bajawa	7	
47	Maronggela	Munting	30	Riung	30	
48	Simp. Jalan Negara	Boamaso	18	Boawae	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 : Nusa Tenggara Timur

KABUPATEN: Ngada

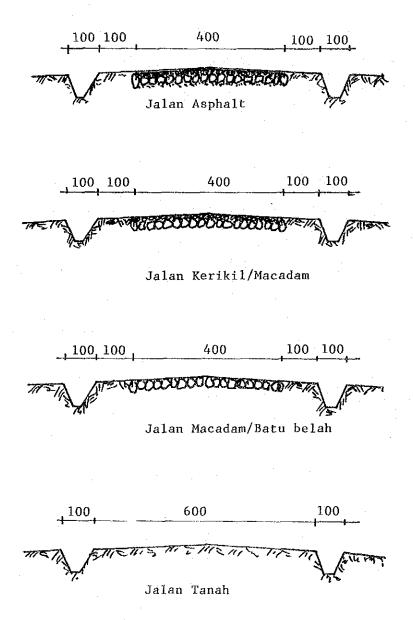
LINK	BEGINNING POINT	END POINT	LENGTH	THROUGH TI NAME & LE	ie kec. Ngth	DEMARKO
NO.	(DESA NAME)	(DESA NAME)	(KM)	KEC. NAME	LENGTH (KM)	REMARKS
49	S o 1 o	Rigi	9	Mogomangulewa Boawae	5	17
50	Maukeli	Uluwagha	8		4	1/
50	Haukeli	o ruwagna	0	Mogomangulewa	8	
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· · · · · · · · · · · · · · · · · · ·						
·						<del> </del> -
					L	

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.



28-A-6

#### KABUPATEN: Ngada

## LOCATION AND COSTS OF THE KABUPATEN

## ROADS CONSTRUCTED OR INFROVED IN 1980/1981

## Blaya konstruksi penanganan

## jalan dan jembatan Kabupaten thn.1980/1981

LINK NO : Nomor Ruas	LOCATION From - To (dari - ke)	Lebar	Туре	LENCTH Panjang	COSTS `Harga	REMARKS Keterang- an
10	Poma - Mboras	Jembatan44	_lembatan Gravel Beton	( KM ) 16 22	(Rp 10 <sup>6</sup> ) 76,566 29,412	
						4
	· · · · · · · · · · · · · · · · · · ·		۱		· · ·	
						·

" PAVENENT TYPE : Pls note the appropriate No. below.

1. : Asphalt surface / penetrasi macadam

2. : Asphalt seal / pelaburan aspal

3. : Gravel / kerikil

L,

4. : Gravel /ANCAS / kerikil / japat

#### E-03-(2)

#### KABUPATEN: Ngada

#### LOCATION AND COSTS OF THE KABUPATEN

#### ROADS CONSTRUCTED OR INPROVED IN 1981/1982

#### Biaya konstruksi penanganan

#### jalan dan jembatan Kabupaten thn. 1981/1982

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m) Lebar	kerasan Type	LENGTH Panjang ( KM )	COSTS Harga (Rp 10 <sup>6</sup> )	RENARKS Keterang; an
<u>i 105</u>	Raja - Maunori	Jembatan4	_Jembaran Gravel	18.75	106,508	
08	Dadiwuwu - Kaburea	4	- Gravel	10	56,573	
10	Poma - Mboras	4 -	Gravel	3	12,500	••••••••••••••••••••••••••••••••••••••
29	Waeluja - Boba	- 1	Beton	- 24 m	52,010	
12	Waepana - Mbazang	4	- Beton	- 32 m	41,190	
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\* 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

28-A-8

#### KABUPATEN: Ngada

## LOCATION AND COSTS OF THE KABUPATEN

## ROADS CONSTRUCTED OR INPROVED IN 1982/1983

## Biaya konstruksi penanganan

## jalan dan jembatan Kabupaten thn. 1982/1983

LINK	LOCATION	Lebar per-	Type per-	LENGTH	COSTS	REMARKS
NO .	From - To	kerasan(m)	kerasan	Panjang	Harga	)
Nomor Ruas	(dari - ke)	Lebar	Туре .			Keterang; an
		Jembatan	Jembaran	( KM )	(Rp 10 <sup>6</sup> )	an
03	Mangulewa - Jerebuu	4	Grave1	10	64,764	
	-	-		-	04,704	
07	Rowa - Soa	4	Gravel	7.5	47,338	
		4	Beton	12 m	13,889	
12	Waepana - Mbazang	4	Gravel	12.5	79,212	
	hacpana - ribazang	4	Beton	24 m	36,482	
0.5						
05	Raja - Maunori	4	Beton	8 m	11,079	
10	Poma - Mboras	4	Beton	4 m	5,148	
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\* 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

28-A-9

E-03-(3)

E-03-(4)

#### KABUPATEN: Ngada

#### LOCATION AND COSTS OF THE KABUPATEN

#### ROADS CONSTRUCTED OR INPROVED IN 1983/1984

#### Biaya konstruksi penanganan

jalan dan jembatan Kabupaten thn. 1983/1984

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m) Lebar Jembatan	kerasan Type	LENGTH Panjang ( KM )	COSTS Harga (Rp 10 <sup>6</sup> )	REMARKS Keterang- an
08	Dadiwuwu - Kaburea	4 	Jembaran Telfort	12	91,896	
25	Danga - Marapokot	4	Telfort	16	116,700	
07	Rowa - Soa	4	Telfort Beton	8 33 m	60,440 47,453	:
12	Waepena - Mbazang	- 4	- Beton	- 26 m	40,970	
10	Poma - Mboras	- 4	Beton	- 6 m	10,253	
	· · · · · · · · · · · · · · · · · · ·					مەرەپ بىرىكى يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ يەرەپ ي
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\* 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

28-A-10

KABUPATEN: Ngada

## LOCATION AND COSTS OF THE KABUPATEN

## ROADS CONSTRUCTED OR INPROVED IN 1984/1985

### Biaya konstruksi penanganan

<u>jalan dan jembatan Kabupaten thn. 1984/1985</u>

LINK NO Nomor Ruas	LOCATION From - To (dari - ke)	Lebar per- kerasan(m) Lebar Lembatan	Туре	LENGTH Panjang ( KM )	COSTS Harga (Rp 10 <sup>6</sup> )	REMARKS Keterang; an
08	Dadiwuwu - Kaburea	4	lemhatan Telfort	16	116,725	
12	Waepana - Mbazang	4 4	Telfort Beton	14.75 7 m	126,968	
04	Maumbawa - Mauponggo	4	Telfort Beton	9 6 m	85,951 8,577	
09	Danga - Pausalek	- 4	Beton	- 8 m	12,090	
		<u>`</u>				
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		e alaure - "Aerum de Maine - 2012) A <sup>hama</sup>	Contracting of the second second second second second second second second second second second second second s			

\* 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

28~A-11

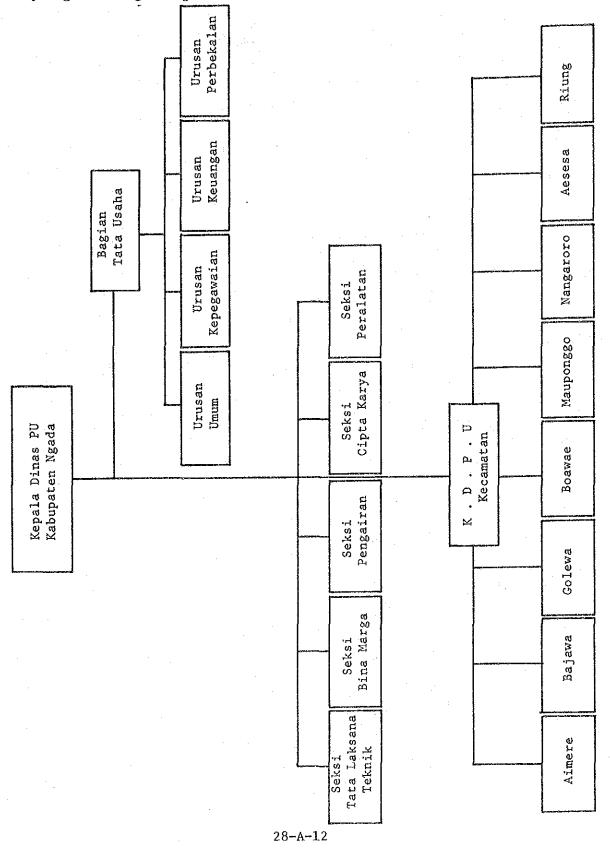
E-03-(5)

#### KABUPATEN: Ngada

#### EXISTING ORGANIZATION IN KABUPATEN

#### Structur Organisasi yang ada dari P.U Kabupaten

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



## EXISTING STAFF RESOURCES OF BINA MARGA OF PU KABUPATEN

# <u>Tenaga Dinas PUK yang ada</u> PROPINSI: Nusa Tenggara Timur

KABUPATEN: Ngada

DESCRIPTION /Uraian	NUMBER / Jumlah	RENARKS Keterangan
CONTROLING STAFF Staff teknis PUK		an i na na na na na na na na na na na na na
DPUK ENGINEED Sarjana Teknik	_	
ASSISTANT ENGINEER Sarjana Muda Teknik	1	-
TECHNICIAN STAFF Staff Teknik (STM)	8	8
ADMINISTRATION Tenaga Administrasi	9	
SUPERVISOR Tenaga Pengawas	11	: .
а 1 м м	•	مین و بالدی و بین ماده ( در ۲۰۰۰ میلی و بالدی و بالدی این و بالدی میلی و بالدی و بین و بین و بین و بین و بین و ا
. WORKING FORCE Tenaga Pelaksańa Lapangan		
OPERATORS Operators	6	5
DRIVERS Supir	2	-
MECHANICS Mechanic	3	3
TRADESMAN Tukang	_	
LABOUR Buruh / Pekerja	8	. 1
OTHERS Lain-lain		
TOTAL / JUMLAII	48	17

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

### LOCATION AND AREA OF DPUK WORKSHOP

Lokasi Workshop DPUK

PROPINSI	: Nusa	Tenggara	Timur

KABUPATEN:	Ngada	•

LOCATION Lokasi	AREA (m2) Luas	NUMBER Jumlah	REMARKS Keterangan
Ogi	13.000		

### PROPINSI: Nusa Tenggara Timur

KABUPATEN: Ngada

LAND ACQUISITION COST Daftar harga pembebasan tanah

		· · · ·	
DESCRIPTION Uraian	UNIT Satuan	RATE (RP) Harga	REMARKS Keterangan
CITY/kota	M2	3,000	
VILLAGE / desa	M2	1,250	
RICE FIELD/sawah	M2	850	
DRY FIELD/ladang	M2	400	
MIX CROPS/ <b>p</b> anen	M2	400	
FOREST/hutan	M2	200	
SWAMP / rawa	M2	200	
OTHERS / lain-lain	M2	200	
	ومجاورها وبرجا والمورز بجاره فاستجاده والمكافرة المحافظ والمحافظ		

E-07

#### KABUPATEN: Ngada

## 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	
2	B2		7	· · · · · · · · · · · · · · · · · · ·	
25	C3	200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200	3		
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			۱۹۹۹ - ۲۰۰۹ ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲ ۱۹۹۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۱۹۹۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹ - ۲۰۰۹		
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NOTE: DATI II

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### KABUPATEN: Ngada

#### LIST OF EXISTING EQUIPMENT OF LOCAL CONTRACTOR

Name of contractor

Name of contractor		nancia de la Constitución			<u></u>		
NAME OF EQUIPMENT	EXISTING CONDITION/ Kondisi Peralatan					latan	REQUIRE -
Jenis peralatan	TYPE/	YPE/ NUMBER / Jumlah		REASON OF BAD CONDT	MENT /Ke- butuhan		
	Tipe	P.Y	GOOD Baik	BAD Rusak	TOTAL Jumlah	CION/Sebal Kerusakan	baru
Bulldozer							
Motor Grader		-	l I				
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	-	<b>-</b> -					
Asphalt Sprayer							
Asphalt Mixing Machine		1			· · · · · · · · · · · · · · · · · · ·		
Mobile Workshop							
Mechanic Rammer							
Plate Tamper							
Pile Driver							
Leg Drill				·			
lland Hammer	· · · · · · · · · · · · · · · · · · ·		1				N
Farm Tractor		./				·	
Dump Truck							
Water Tank Truck			1				
Fuel Tank Truck							
Pick Up			1				
Jeep							
Motorcycle		1	28	-	28		
Generator							
Water Pump							
Others							
-							
· · · · · · · · · · · · · · · · · · ·							

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#### KABUPATEN: Ngada

## LIST OF EXISTING EQUIPMENT OF P.U KABUPATEN

NAME OF EQUIPMENT	EXISTING CONDITION/ Kondisi Peralatan						REQUIRE -
Jenis peralatan	TYPE/ Tipe	P.Y	NUMBER / Jumlah			REASON OF BAD CONDT	MENT /Ke- butuhan
			GOOD Baik	BAD Rusak	TOTAL Jumlah	IION/Sebat Kerusakan	peralatan baru
Bulldozer							
Motor Grader			t	**			
Tyre Roller							
Steel Whell Roller	-						
Vibration Roller							
Wheel Loader							
Front End Loader and Backhoe						·	
Mobile Crane							
Concrete Mixer							**************************************
Stone Crusher	•		·1	1	2		
Portable Compressor			1				
Hydraulic Excavator							
Asphalt Paving Machine							······································
Asphalt Spráyer		1	1	-	1		
Asphalt Mixing Machine							
Mobile Workshop							
Mechanic Rammer							
Plate Tamper						<u> </u>	
Pile Driver			Ì		·		
Leg Drill							
Hand Hammer							×
Farm Tractor							 
Dump Truck							 
Water Tank Truck							
Fuel Tank Truck							
Pick Up		ļ		<u> </u>		·	
Jeep			1	-	1		
Notorcycle			1	-	1		
Generator		ļ					
Water Pump							
Others				· .			
		}				<u> </u>	

28-A-17

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(Rp)

: NUSA TENGGARA TIMUR KAB : NGADA PROV LINK NO : 30 (IIIB-2) LENGTH : 25 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Base Cource

1 T E H			<<< UNIT	COST >>>			>>>>>>
	UNET	QUANTITY	LOCAL	FORELIGN	LOCAL	FOREIGN	TOTA
ite Clearance in Light Bush	#2	<b>0.0</b>	153	91	0	0	
ubgrade Preparation		150000.0	19	11	2,850,000	1,650,000	4,500,00
ormal Fill	#3	1050.0	1,576	865	1,654,800	908,250	2,563,05
ill in Swamp	a3	0.0	2,325	1,054	0	0	
ormal Excavation to Spoil	#3	4299.0	926	523	3,980,874	2,248,377	6,229,25
ub Base Course	#3	14000.0	2,984	1,350	41,776,000	18,900,000	60,676,00
ase Course	n3	6000.0	4,100	2,303	24,600,000	13,818,000	38,418,00
houlder	#2	50000.0	273	146	13,650,000	7,300,000	20,950,00
sphalt Patching	a2		2,938	1,514	0	0	
urface Dressing (Single)	R2			766	. 0	0	1
urface Dressing (Double)	a2	0.0	1,001	1,207	ů	0	
arth Drain	44 4	40500.0	629	119	25,474,500	4,819,500	30,294,0
arch brain arth Drain in Swamp (by machine)	RJ.	40100.0 0.0	1,065	474	401111000	0	
ipe Cuivert DBOcm	ы.) 8	154.0	36,882	76,576	5,679,828	11,792,704	17,472,5
asonry Culvert (80x80cm)	6	0.0	47,364	53,860		0	
etaining Wall and Wing Wall (Timber)	»2		15,772	246	· · · · · · · · · · · · · · · · · · ·	Ő	
etaining Wall and Wing Wall (Hasonry)	a3		32,773	12,077	1,258,483	463,756	1,722,2
	#3 #3			121	112301103	1031100	. Literie
abion Protection			11,004		21,315,586	1,763,374	23,078,9
en Bridge (Tinber)	SET				V 211313131300	11,001014	ralaiati
ew Bridge (Concrete)	SET	1.0				v	
			Sub Total		142,240,071	63,663,961	205,904,0
verhead (15%)					21,336,010	9,549,594	30,885,6
· · ·			TOTAL COST	÷.,	163,576,081	73,213,555	236,789,6
unual routine maintenance of road	Ka		96,920	7,260		181,500	2,604,5
outine maintenance of gravel road	Ka	25.0	176,065	88,186		2,204,650	6,606,2
			Sub Total		6,824,625	2,386,150	9,210,7
aintenance of Timber Bridge (New)	R2		9,334			129,744	1,399,1
aintenance of Concrete Bridge (New)	n2	0,0	1,822	4,303		0	
intenance of Timber Bridge (Exist)	#2	0.0	8,203	2,322		0	
uintenance of Concrete Bridge (Exist)	±2	0.0	3,900	2,705	Ó	0	
			Earthwork &	Pavenent (	Unit Cost (Rp/	Ka) :	8,109,1
			Tinber		Unit Cost - (Rp/		195,1
			Concrete		Unit Cost (Rp/		
			Survived	Value	•	(p) t	30,338,0
			Haintenance				4.
			New Bridge		()		л. П.
					••	·· ·	*1*

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PROV : NUSA TENGGARA TIMUR KAB : NGADA

# LINK NB : 26 (1118-2) LENGTH : 15 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Base Cource

ITEN				í cost >>	\$ X	<<<< C0ST	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
	UNIT	QUANTETY	LOCAL	FOREIGN	LOCAL		IOTAL
	·	· .				**************	
ite Clearance in Light Bush	<b>h</b> 2	0.0	153	91	0	. 0	(
ubgrade Preparation	· 82	90000.0	19	11	•	· •	
ureal Fill	- #3	600.0	1,576	865			2,700,00
ill in Swamp	#3	0.0	2,325	1,054			1,464,60
ormal Excavation to Spoil	<del>a</del> 3	2316.0	926	523		v	
ub Pase Course	a3	8400.0	2,984	1,350			3,355,88
ase Course	a]	3600.0	4,100	2,303			36,405,60
houlder	s2	30000.0	273	146			23,050,80
sphalt Patching	s?	0.0	2,938	1,514		1,000,000	12,570,00
urface Dressing (Single)	#2	0.0	643	766		0	
urface Dressing (Double)	#2	0.0	1,001	1,207	•	0	
arth Drain		20400.0	629	119		() A A 1 T C 1 C	15 000 04
arth Drain in Swamp (by machine)	<b>a</b> 3	0.0	1,065	474		•	15,259,20
ipe Culvert DBOcm	2	84.0	36,882	76,576	•	*	
asonry Culvert (80x80cm)	-	0.0	47,364				9,530,47
etaining Hall and Wing Hall (Timber)	<b>D</b> 2		15,772	53,860		•	
etaining Hall and Hing Hall (Hasonry)	e]	16.0		246		•	
abion Protection	a2 22	0.0	32,773	12,077			717,60
en Bridge (Timber)	SEI		11,004	121		•	
ew Bridge (Concrete)	SET		**		10,069,889		10,854,54
en biloge (concrece)	901	1.0			. 0	0	
			Sub Total	•	79,339,761	36,568,936	115,908,69
verhead ( 15% )					11,900,964	5,485,340	17,386,30
			TOTAL COST		91,240,725	42,054,276	133,295,00
			****	**********			
anual routine maintenance of road	K	15.0	96,920	7,260	1,453,800	108,900	1,562,70
outine maintenance of gravel road	Xa	15.0		88,185	2,640,975		3,963,78
			Sub Total		4,094,775	1,431,690	5,526,46
aintenance of Timber Bridge (New)	<b>■</b> 2	72.0	9,334	954			740,73
aintenance of Concrete Bridge (New)	<b>6</b> 2	0.0	1,922	1,303			
aintenance of Timber Bridge (Exist)	яŻ	24.0	8,203	2,322	196,872	55,728	252,60
aintenance of Concrete Bridge (Exist)	a2	0.0	3,900	2,705	0	0	
							*******
	÷		Earthwork &			Rp/Kel :	8,051,15
			Tinber	-		Rp/#2) :	173,37
			Concrele		Unit Cost (	Rp/#2} :	
			Sur vi ved	Value		(Rp) r	18,202,80
			Haintenance		ut Bridge	(3) :	4,5
			Nex Bridge	Cost Rate		(1) 1	9,3

LINK ND : 25 (IIIC) LENGTH : 16 Km

UPGRADE : 6.0m road bed, 4.0m road with surface Subbase Cource

(Rp) ιτεχ

fill in Swamp       n3       0.0       2,325       1,054       0       0         Moreal Excavation to Spoil       n3       0.0       926       523       0       0         Bobe Base Course       n3       3840.0       4,100       2,303       15,744,000       8,815,520       24,56         Shoulder       n2       3200.0       2,738       1,514       0       0       8,815,520       24,56         Shoulder       n2       0.0       2,738       1,514       0       0       1,467       0       0         Surface Dressing (Single)       n2       0.0       1,001       1,207       0	(((UNIT COST ))) UNIT QUANTITY LOCAL FOREIGN	COST LOCAL FOREIGN	>>>>>> Total	
Subgrade Preparation         n2         0.0         19         11         0         0           Morasi Fill         n5         0.0         1,576         965         0         0           Morasi Eccavation to Spoil         n5         0.0         2,325         1,055         0         0           Sub Base Course         n5         20.0         2,984         1,350         576,800         270,000         0////////////////////////////////////	inht Bush <b>n2 (1,0 153 91</b>	0 0	0	
Normal Fill         #3         0.0         1,576         865         0         0           Fill in Swamp         #3         0.0         2,325         1,054         0         0           Sho Base Course         #3         0.0         2,925         523         0         0           Base Course         #3         200.0         2,984         1,550         \$576,800         270,000         R0           Base Course         #3         3040.0         4,100         2,033         15,141.00         8,813,520         24,353           Shoulder         #2         20.0         1,301         1,207         0         0           Surface Dressing (Single)         #2         0.0         1,001         1,207         0         0           Surface Dressing (Songle)         #2         0.0         1,001         1,207         0         0           Surface Dressing (Songle)         #2         0.0         1,277         0         0         0           Betaining Wall and Ming Wall (Tiaber)         #3         0.0         13,277         14         0         0           Retaining Wall and Ming Wall (Masonry)         #3         0.0         11,077         0         0			· · · (1	
fill in Swamp       n3       0.0       2,325       1,054       0       0         Moreal Excavation to Spoil       n3       0.0       926       523       0       0         Moreal Excavation to Spoil       n3       200.0       2,984       1,350       576,800       270,000       84         Deb Base Course       n3       3840.0       4,100       2,303       15,744,000       8,815,520       24,55         Shoulder       n2       3200.0       2,731       146       8,775,600       4,672,000       15,474         Shuider       n2       0.0       2,731       1,514       0       0       0         Surface Dressing (Boule)       n2       0.0       843       766       0       0       0         Sacht Grain       na sonor (Guvert B00as       na 0.0       47,576       0       0       0       0       0         Retaining Hall and Ming Wall (Hesonry)       n3       0.0       11,004       121       0       0       0       0         Retaining Wall and Ming Wall (Hesonry)       n3       0.0       11,004       121       0       0       0       0         Retaining Wall and Ming Wall (Hesonry)       Sti <t< td=""><td></td><td></td><td>. 0</td></t<>			. 0	
Noraal Excavation to Spoil       a3       0.0       925       523       0       0         Sub Base Course       a3       200.0       2,984       1,350       576,800       270,000       BUB Base Course         Shoulder       a2       3200.0       273       146       B,735,000       4,672,000       13,40         Asphalt Patching       a2       0.0       273       146       B,735,000       4,672,000       13,40         Maphalt Patching       a2       0.0       273       146       B,735,000       4,672,000       13,40         Sub face Derssing (Single)       a2       0.0       1,001       1,207       0       0         Surface Dressing (Souble)       a2       0.0       1,001       1,207       0       0         Earth Brain in Swang (by eachine)       a3       0.0       1,065       744       0       0         Retaining Wall and Ming Wall (Tieber)       a2       0.0       15,772       746       0       0         Retaining Wall and Ming Wall (Masonry)       a3       0.0       32,773       12,017       0       0         Babion Protection       a3       0.0       11,004       121       0       0			0	
Sub Base Course       a3       200.0       2,994       1,350       576,800       270,000       B4         Base Course       a3       3440.0       4,100       2,303       15,744,000       8,815,520       24,353         Shoulder       a2       3200.0       273       146       B,736,000       4,672,000       15,444         Asphalt Patching       a2       0.0       2,938       1,514       0       0         Surface Dressing (Bouble)       a2       0.0       1,001       1,207       0       0         Earth Grain       sa.0.0       6,29       119       0       0       6       0         Fipe Culvert BOose       s.0.0       3,680       7,474       0       0       0       0         Retaining Hall and Ming Hall (Timber)       s.2       0.0       15,772       246       0       0         Retaining Wall and Ming Mall (Timsory)       a3       0.0       21,713       12,077       0       0         Retaining Wall and Ming Mall (Timber)       s.2       0.0       15,772       246       0       0         Retaining Wall and Ming Mall (Timber)       s.2       0.0       15,772       24,0575       0       0		0 0	0	
Base Course         #3         3840.0         4,100         2,303         15,744,000         8,841,520         24,55           Shoulder         #2         32000.0         273         146         By35,000         4,672,000         13,40           Shoulder         #2         0.0         2,733         1514         0         0           Surface Dressing (Single)         #2         0.0         2,733         766         0         0           Surface Dressing (Ouble)         #2         0.0         1,001         1,207         0         0           Earth Grain         #0.0         1,065         474         0         0         0           Farth Urain         #3         0.0         1,065         474         0         0           Fiscory Culvert (80x80ca)         #0.0         35,887         75,576         0         0           Retaining Wall and Wing Wall (Timber)         #2         0.0         15,772         246         0         0           Retaining Wall and Wing Wall (Masonry)         #3         0.0         32,773         12,077         0         0           Retaining Wall and Wing Wall (Masonry)         #3         0.0         11,004         122,070         0		• •	866,800	
Shoulder       s2       32000.0       273       146       B,736,000       4,672,000       13,40         Asphalt Patching       s2       0.0       2,733       1,514       0       0         Surface Dressing (Single)       s2       0.0       B43       766       0       0         Surface Dressing (Souble)       s2       0.0       1,001       1,207       0       0         Earth Drain in Swamp (by machine)       s3       0.0       1,065       474       0       0         Fipe Culvert BB0c#       s0.0       36,882       76,576       0       0         Retaining Hall and Wing Mall (Timber)       s2       0.0       15,772       246       0       0         Retaining Wall and Wing Mall (Masonry)       s3       0.0       32,773       12,077       0       0         Retaining Wall and Wing Mall (Masonry)       s3       0.0       11,004       121       0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0        -0       0       0         Manual routine maintenance of road       Km       16.0       176,672 <td></td> <td></td> <td>24,587,520</td>			24,587,520	
Asphalt Patching       m2       0.0       2,338       1,514       0       0         Surface Dressing (Gouble)       m2       0.0       043       766       0       0         Earth Orain       m       0.0       1,001       1,207       0       0         Earth Orain       m       0.0       623       117       0       0         Earth Orain       m       0.0       1,605       474       0       0         Fipe Culvert BOcon       m       0.0       1,605       474       0       0         Retaining Wall and Ming Wall (Timber)       m       0.0       15,772       246       0       0         Retaining Wall and Ming Wall (Masonry)       m       0.0       11,004       121       0       0         Retaining Wall and Ming Wall (Masonry)       m       0.0       0.0       11,004       121       0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         Munual routine maintenance of road       Km       16.0       16,65       88,188       2,817,040			13,408,000	
Surface Dressing (Single)       m2       0.0       043       766       0       0         Surface Gressing (Gouble)       m2       0.0       1,001       1,207       0       0         Earth Grain       ma       0.0       627       119       0       0         Earth Grain       ma       0.0       1,065       474       0       0         Fige Culvert DBOGe       ma       0.0       35,882       76,576       0       0         Retaining Wall and King Wall (Hasonry)       m3       0.0       15,772       246       0       0         Retaining Wall and King Wall (Hasonry)       m3       0.0       32,773       12,077       0       0         Babion Protection       m3       0.0       15,772       246       0       0         New Bridge (Linber)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         New Bridge (Linber)       SEI       1.0         0       0         Natr			0	
Surface Dressing (Bouble)       #2       0.0       1,001       1,207       0       0         Earth Brain       #3       0.0       627       117       0       0         Earth Drain in Swamp (by machine)       #3       0.0       1,065       174       0       0         Fipe Culvert BB0ce       #       0.0       35,082       75,576       0       0         Retaining Wall and Wing Wall (Habor)       #2       0.0       15,772       246       0       0         Retaining Wall and Wing Wall (Habory)       #3       0.0       11,004       121       0       0         Retaining Wall and Wing Wall (Habory)       #3       0.0       11,004       121       0       0         New Bridge (Limber)       #3       0.0       11,004       121       0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0        0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0 <td>• • • •</td> <td></td> <td>Ċ</td>	• • • •		Ċ	
Earth Grain some (by sachine) solution of the sachine) solution of the sachine the sachine of the sachine of the sachine of the sachine of th			. 0	
Earth Drain in Sxamp (by sachine)       a3       0.0       1,065       474       0       0         Pipe Culvert DB0cm       a       0.0       35,082       75,776       0       0         Kasonry Culvert DB0cm       a       0.0       47,344       53,860       0       0         Retaining Wall and Ming Wall (Hasonry)       a3       0.0       13,772       246       0       0         Retaining Wall and Ming Wall (Hasonry)       a3       0.0       32,773       12,077       0       0         Babion Protection       m3       0.0       11,004       121       0       0         New Bridge (Limber)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         Dverhead       (15%)       3,761,520       2,067,828       5,8         TOTAL COST       28,839,320       15,853,348       44,6         Manual routine maintenance of road       Km       16.0       7,260       1,550,720       116,160       1,6         Kmutine maintenance of Gravel road       Km       16.0       176,065       88,188       2,817,040       1,410,976       4,2 <td></td> <td></td> <td></td>				
Pipe Culvert DBOcs       a       0.0       35,892       76,576       0       0         Masonry Culvert (80x80cs)       a       0.0       47,354       53,860       0       0         Retaining Wall and Wing Wall (Hasonry)       a2       0.0       15,772       246       0       0         Retaining Wall and Wing Wall (Masonry)       a3       0.0       32,773       12,077       0       0         Retaining Wall and Wing Wall (Masonry)       a3       0.0       32,773       12,077       0       0         Retaining Wall and Wing Wall (Masonry)       a3       0.0       11,004       121       0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         Nature       Sub Total       25,076,800       13,785,520       39,8       39,8         Dverhead (15%)       Sus Total       96,802       7,260       1,550,72				
Kasonry Culvert (80x80cs)       s       0.0       47,364       53,860       0       0         Retaining Wall and Wing Wall (Tisber)       s2       0.0       15,772       246       0       0         Retaining Wall and Wing Wall (Masonry)       s3       0.0       32,773       12,077       0       0         Retaining Wall and Wing Wall (Masonry)       s3       0.0       32,773       12,077       0       0         Retaining Wall and Wing Wall (Masonry)       s3       0.0       011,004       121       0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         Dverhead (15%)       SET       1.0         0       0         Manual routine maintenance of road       Ks       16.0       96,920       7,260       1,553,348       44,6         Manual routine maintenance of gravel road       Ks       16.0       176,065       89,188       2,017,040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Maintenance of Subjer Bridge (New)       s2	F THE THE PROPERTY OF THE PROP		, i	
Retaining Mall and Ning Mall (Timber)       m2       0.0       15,772       246       0       0         Retaining Mall and Wing Mall (Masonry)       m3       0.0       32,773       12,077       0       0         Gabion Protection       m3       0.0       11,004       121       0       0         New Bridge Ilimber)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         Dverhead       (152.)       3,761,520       2,067,820       5,8         Dverhead       (152.)       3,761,520       2,067,820       5,8         Manual routine maintenance of road       Km       16.0       7,260       1,550,720       116,160       1,6         Routine maintenance of gravel road       Km       16.0       7,260       1,550,720       116,160       1,6         Sub Total       7,30,058       89,185       2,817,040       1,410,776       4,2         Maintena				
Retaining Wall and Wing Wall (Nasonry)       #3       0.0       32,773       12,077       0       0         Gabion Protection       #3       0.0       11,004       121       0       0         New Bridge (Limber)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         New Bridge (Concrete)       SET       1.0         0       0         Dverhead (15%)       SET       1.0         0       0         Manual routine maintenance of road       Km       16.0       76,920       7,260       1,550,720       116,160       1,6         Manual routine maintenance of gravel road       Km       16.0       176,065       88,186       2,817,040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Maintenance of Scorrete Bridge (New)       #2       0.0       1,822       4,303       0       0         Maintenance of Concrete Bridge (Exist)       #2       0.0       8,203 <t< td=""><td></td><td></td><td>· (</td></t<>			· (	
Gabion Protection       m3       0.0       [1,004       121       0       0         New Bridge (limber)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         New Bridge (Concrete)       SEI       1.0         0       0         Sub Total       25,076,800       13,785,520       39,8         Dverhead (15%)       3,761,520       2,067,829       5,8         Manual routine maintenance of road       Km       16.0       7,260       1,550,720       116,160       1,6         Manual routine maintenance of gravel road       Km       16.0       76,065       88,186       2,817,040       1,410,976       4,2         Sub Total       4,367,760       1,527,135       5,8         Maintenance of Timber Bridge (New)       m2       0.0       9,334       954       0       0         Maintenance of Timber Bridge (Kew)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2	· · · · · · · · · · · · · · · · · · ·			
Manual routine maintenance of road       Km       16.0         0       0         Nanual routine maintenance of road       Km       16.0       76,920       7,260       1,550,720       116,160       1,6         Nanual routine maintenance of gravel road       Km       16.0       96,920       7,260       1,550,720       116,160       1,6         Nanual routine maintenance of gravel road       Km       16.0       96,920       7,260       1,550,720       116,160       1,6         Nanual routine maintenance of gravel road       Km       16.0       96,920       7,260       1,550,720       116,160       1,6         Maintenance of Jimber Bridge (New)       #2       0.0       9,334       954       0       0         Maintenance of Iimber Bridge (New)       #2       0.0       9,203       2,322       0       0         Maintenance of Iimber Bridge (Exist)       #2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       #2       3.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       #2       3.5       3,900       2,705       130,650       90,617       2			(	
New Bridge (Concrete)       SET       1.0        0       0         Sub Total       25,076,900       13,785,520       39,8         Dverhead       (15%)       3,761,520       2,067,828       5,8         TOTAL COST       28,839,320       15,953,348       44,6         Nanual routine maintenance of road       Km       16.0       96,920       7,260       1,550,720       116,160       1,6         Routine maintenance of gravel road       Km       16.0       176,065       88,185       2,817,1040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Maintenance of Jimber Bridge (New)       #2       0.0       9,334       954       0       0         Maintenance of Timber Bridge (Kew)       #2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       #2       33.5       3,900       2,705       130,650       90,617       2         Karthwork & Pavement Unit Cost       (Rp/Km)       :       2,7       1       1       2,7         Timber       Bridge       Unit Cost       (Rp/Az)       :       2,7       1       2,12       1       2,12	•	•		
Sub Total       25,076,800       13,785,520       38,8         Dverhead (15%)       3,761,520       2,067,828       5,8         TOTAL COST       28,838,320       15,853,348       44,6         Nanual routine maintenance of road       Km       16.0       76,920       7,260       1,550,720       116,160       1,6         Routine maintenance of gravel road       Km       16.0       176,065       88,188       2,817,040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Maintenance of Concrete Bridge (New)       #2       0.0       9,334       954       0       0         Maintenance of Concrete Bridge (Exist)       #2       0.0       1,922       4,303       0       0         Maintenance of Concrete Bridge (Exist)       #2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       #2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       #2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       #2       33.5       3,900 <td></td> <td>•</td> <td>(</td>		•	(	
Dverhead (15%)       3,761,520       2,067,829       5,8         IOTAL COST       20,838,320       15,853,340       44,6         Annual routine maintenance of road       Km       16.0       76,920       7,260       1,550,720       116,160       1,6         Routine maintenance of road       Km       16.0       76,920       7,260       1,550,720       116,160       1,6         Routine maintenance of gravel road       Km       16.0       176,065       88,188       2,817,040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Haintenance of Jisber Bridge (New)       m2       0.0       9,334       954       0       0         Maintenance of Concrete Bridge (Exist)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Karthwork & Pavement Unit Cost (Rp/Ka)       :       2,7         Tieber       Bridge       Unit Cost (Rp/Ka)       :       2,7         Survived Value       (Rp)       :       3 <td>ete) 561 1.0</td> <td>U .U</td> <td>l l</td>	ete) 561 1.0	U .U	l l	
TOTAL COST       28,839,320       15,853,348       44,6         tanual routine maintenance of road       Km       16.0       7,260       1,550,720       116,160       1,6         tanual routine maintenance of gravel road       Km       16.0       7,260       1,550,720       116,160       1,6         tanual routine maintenance of gravel road       Km       16.0       7,260       1,550,720       116,160       1,6         tanual routine maintenance of gravel road       Km       16.0       7,260       1,550,720       116,160       1,6         tantenance of gravel road       Km       16,055       88,188       2,817,040       1,410,976       4,2         tantenance of Concrete Bridge (New) $= 2$ 0.0       8,203       2,322       0       0         tantenance of Concrete Bridge (Exist) $= 2$ 3,5       3,900 <th colsp<="" td=""><td>Sub Total</td><td>25,076,800 13,785,520</td><td>38,862,32</td></th>	<td>Sub Total</td> <td>25,076,800 13,785,520</td> <td>38,862,32</td>	Sub Total	25,076,800 13,785,520	38,862,32
Manual routine maintenance of road       Km       16.0       96,920       7,260       1,550,720       116,160       1,6         Routine maintenance of gravel road       Km       16.0       176,065       88,186       2,817,040       1,410,976       4,2         Sub Total       4,367,760       1,527,136       5,8         Maintenance of Jimber Bridge (New)       m2       0.0       9,334       954       0       0         Maintenance of Concrete Bridge (New)       m2       0.0       1,822       4,303       0       0         Maintenance of Timber Bridge (Exist)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Earthwork & Pavement Unit Cost       (Rp/Km)       :       2,7       Timber       Bridge       Unit Cost       (Rp/Km)       :       2,7         Supervised       Waine       (Rp/m2)       :       5       5       5       5       5       5         Supervised		3,761,520 2,067,828	5,829,34	
Routine maintenance of gravel road       Km       16.0       176,065       88,185       2,817,040       1,410,976       4,2         Sub       Total       4,367,760       1,527,136       5,8         Maintenance of Timber Bridge (New)       m2       0.0       9,334       954       0       0         Maintenance of Concrete Bridge (New)       m2       0.0       1,822       4,303       0       0         Maintenance of Timber Bridge (Exist)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       0.3       8,203       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       0.3       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       0.3       5,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       0.3       5,900       2,705       130,650       90,617       2         Earthwork & Pavement Unit Cost       (Rp/Km)       :       2,7       7       1       5       2       2       2       2       2       2       2 <td>TOTAL COST</td> <td>28,839,320 15,853,348</td> <td>44,691,661</td>	TOTAL COST	28,839,320 15,853,348	44,691,661	
Routine maintenance of gravel road       Km       16.0       176,065       88,185       2,817,040       1,410,976       4,2         Sub       Total       4,367,760       1,527,136       5,8         Maintenance of Timber Bridge (New)       m2       0.0       9,334       954       0       0         Maintenance of Concrete Bridge (New)       m2       0.0       1,822       4,303       0       0         Maintenance of Timber Bridge (Exist)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Karthwork & Pavement Unit Cost       (Rp/Km)       :       2,7       Timber       Bridge       Unit Cost       (Rp/Km)       :       2,7         Survived       Value       (Rp)       :       3	strange of and the 16.0 PL 920 7.240	1 550 720 114 140	1,666,08	
Sub         Total         4,367,760         1,527,136         5,8           Maintenance of Timber Bridge (New)         m2         0.0         9,334         954         0         0           Maintenance of Concrete Bridge (New)         m2         0.0         1,822         4,303         0         0           Maintenance of Concrete Bridge (Exist)         m2         0.0         8,203         2,322         0         0           Maintenance of Concrete Bridge (Exist)         m2         33.5         3,900         2,705         130,650         90,617         2           Maintenance of Concrete Bridge (Exist)         m2         33.5         3,900         2,705         130,650         90,617         2           Maintenance of Concrete Bridge (Exist)         m2         33.5         3,900         2,705         130,650         90,617         2           Maintenance of Concrete Bridge (Exist)         m2         33.5         3,900         2,705         130,650         90,617         2           Maintenance of Concrete Bridge Unit Cost         (Rp/Ka)         :         2,7         1         1         2,7           Maintenance of Concrete Bridge Unit Cost         (Rp/m2)         :         2,7         1         1         2,7 <td></td> <td></td> <td>4,228,01</td>			4,228,01	
Maintenance of Timber Bridge (New)n20.09,33495400Maintenance of Concrete Bridge (New)n20.01,8224,30300Maintenance of Timber Bridge (Exist)n20.08,2032,32200Maintenance of Concrete Bridge (Exist)n233.53,9002,705f30,65090,6172Earthwork & Pavement Unit Cost(Rp/Km):2,7TimberBridgeUnit Cost(Rp/Km):2,7Survived Value4101010			5,874,89	
Maintenance of Concrete Bridge (New)       m2       0.0       1,822       1,303       0       0         Maintenance of IImber Bridge (Exist)       m2       0.0       8,203       2,322       0       0         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge (Exist)       m2       33.5       3,900       2,705       130,650       90,617       2         Maintenance of Concrete Bridge Unit Cost (Rp/Km)       :       2,7       1				
Haintenance of Timber Bridge (Exist) m2 0.0 8,203 2,322 0 0 Maintenance of Concrete Bridge (Exist) m2 33.5 3,900 2,705 130,650 90,617 2 Earthwork & Pavement Unit Cost (Rp/Km) : 2,7 Timber Bridge Unit Cost (Rp/Rm) : 2,7 Concrete Bridge Unit Cost (Rp/m2) : Survived Value (Rp) : 3				
Maintenance of Concrete Bridge (Exist) n2 33.5 3,900 2,705 £30,650 90,617 2 Earthwork & Pavement Unit Cost (Rp/Km) : 2,7 Timber Bridge Unit Cost (Rp/n2) : Concrete Bridge Unit Cost (Rp/n2) : Survived Value (Rp) : 3				
Earthwork & Pavement Unit Cost (Rp/Km) ; 2,7 Timber Bridge Unit Cost (Rp/m2) ; Concrete Bridge Unit Cost (Rp/m2) ; Survived Value (Rp) ; 3			221,26	
Timber Bridge Unit Cost (Rp/m2) ; Concrete Bridge Unit Cost (Rp/m2) ; Survived Value (Rp) ; 3	rece or loge (Exist) #2 33.3 3,700 2,703	1301030 701017		
Timber Bridge Unit Cost (Rp/m2) ; Concrete Bridge Unit Cost (Rp/m2) ; Survived Value (Rp) ; 3	Earthwork & Pavement	Unit Cost (Ro/Ka) :	2,793,22	
Concrete Bridge Unit Cost (Rp/#2) : Survived Value (Rp) : 3				
Survived Value (Rp) ; 3				
		-	346,72	
			13.1	
New Bridge Cost Rate (2)		-	1311	

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# LINK NO : 24 (IIIB-2) LENGTH : 20 Km

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UPGRADE : 6.0m road bed, 4.0m road with surface Base Cource

						waac	LOUITO	-92 (Rp)
ITEN			<<< UNIT	COST >>>			COST	·····
	UNIT	QUANTITY	LOCAL	FORELGN	100	AL.	FOREIGN	ATOTA
<b></b>								
Site Clearance in Light Bush	#2	0.0	153	91		0	0	
Subgrade Preparation		120000.0	19	11	2,280,0	-	320,000	3,600,00
Hormal Fill	<b>a</b> 3	0.0	1,576	862	1 . 1 .	0	0	~1000100
Fill in Swamp	a3	0.0	2,325	1,054		0	O	
Normal Excavation to Spoil	<b>a</b> 3	3080.0	926	523	2,852,0	80 1	,610,840	4,462,92
Sub Base Course	. #3	11200.0	2,984	1,350	33,420,8		120,000	48,540,8
Base Course	83	4800.0	4,100	2,303	19,680,0		,054,400	30,734,40
Shoulder	•2	40000.0	273	146	10,920,0		,840,000	16,760,0
Asphalt Patching	#Z	0.0	2,938	1,514		Q	Ŭ,	, ,
Surface Dressing (Single)	#2	0.0	843	766		0	Ó	
Surface Dressing (Double)	62	0,0	1,001	1,207		0	0	
Earth Drain	â	26700.0	629	119	16,794,3	00 3	,177,300	19,971,60
Earth Drain in Swamp (by machine)	#3	0.0	1,065	474	•••	0	0	(
Pipe Culvert D80cs	a	120.0	36,882	76,576	4,425,8	40 9	189,120	13,614,9
Masonry Culvert (80x80cm)	5	0.0	47,364	53,860		0	0	
Retaining Wall and Wing Wall (Timber)	n2	0.0	15,772	216		0	Ó	
Retaining Wall and Wing Wall (Masonry)	e3	32.0	32,773	12,077	1,048,7	36	386,464	1,435,2
Gabion Protection	a3	0,0	11,004	121	• •	0	0	
Hew Bridge (Timber)	SET	1.0			9,441,0	52	749,912	10,190,9
New Bridge (Concrete)	SET	1,0				0	0	,,
			Sub Total		100,862,8	08 48	,418,036	149,310,8
Overhead (15%)					15,129,4	21 7	,267,205	22,398,6
			TOTAL COST		115,992,2	29 55	,715,241	171,707,4
fanual routine maintenance of road	Ке	20.0	96,920	7,260	1,938,4		145,200	2,083,6
Routine maintenance of gravel road	Ke	20.0	176,065	89,166	3,521,3		,763,720	5,205,0
	•-		Sub Total	,-••	5,459,7		,908,920	7,368,6
laintenance of Timber Bridge (New)	#2	60.0	9,334	954	560,0		57,240	617,2
laintenance of Concrete Bridge (New)	#2	0.0	1,922	1,303	,	0	0	11
laintenance of Timber Bridge (Exist)	<b>#</b> 2	0.0	8,203	2,322		0	Ó	
laintenance of Concrete Bridge (Exist)	<b>#</b> 2	0.0	3,900	2,705		0	0	
·						******	<b></b>	
			Earthwork &			(Rp/Kal		7,999,3
			lisber		loit Cost	(Rp/n2)		195,3
			Concrete		Init Cast	(Rp/#2)		
· ·				Value		(Rp)	1	24,270,4
			Haintenance Kew Bridge		it Bridge	(%) (%)	:	4.
			VAN Uridee	LOPE NUMBER		171	;	6.

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PROV : NUSA TENGGARA TIMUR KAĐ : NGADA LINK NO : 20 (IIIĐ-2) LENGTH : 20 Km

UPGRADE : 6.5m road bed, 3.5m road with surface Base Cource

ITEN	UNIT	QUANTITY	<<< UNIT LOCAL	COST >>> FOREIGN	>> LOCAL	COST FORELGN	
					* *		
Site Clearance in Lìght Bush	#2	52500.0	153	91	8,032,500	) 4,777,500	0 12,810,000
iubgrade Preparation	B2	130000.0	19	11	2,470,000	) 1,430,000	0 3,900,000
format Fill	<b>n</b> 3	360.0	1,576	865	567,360	) <u>311,40</u> (	0 878,760
fill in Swamp	a3	3206.3	2,325	1,054	7,454,647	7. 3,379,44	0 10,834,097
Normal Excavation to Spoil	n J	2463.0	926	523	2,280,736	9 L,289,14	9 3,568,887
Sub Base Course	в3	9800.0	2,984	1,350	29,243,200	13,230,00	0 42,473,200
Base Course	#3	4200.0	4,100	2,303	17,220,000	9,672,60	0 26,892,600
Shoul der 👘	<b>m</b> 2	60000.0	273	146	16,380,000	0 8,760,000	0 25,140,000
Asphalt Patching	<b>B</b> 2	0.0	2,939	1,514	· (	) ·	0 0
Surface Dressing (Single)	#2	0.0	843	766		) I	00
Surface Dressing (Double)	<b>m</b> 2	0.0	1,001	1,207	· · · · (	3	0 0
Earth Drain		36000.0	629	119	22,641,00		
Earth Drain in Swamp (by machine)	<b>m</b> 3	30000.0	1,065	474	31,950,000		
Pipe Culvert DBOcm	4	37.0	36,882	76,576	1,364,63	2,833,31	2 4,197,946
Masonry Culvert (80x80cm)	A	18.0	47,364	53,860	852,55	2 969,48	0 1,822,032
Retaining Wall and Wing Wall (Timber)	#2	0.0	15,772	246		0	0 0
Retaining Wall and Wing Wall (Masonry)	<b>£</b> 3	126.5	32,773	12,077	4,145,78	4 1,527,74	0 5,673,524
Gabion Protection	a3	0.0	11,004	121	je i	0	0 0
New Bridge (Timber)	SET	1.0			10,389,42	6 803,54	8 11,192,974
lew Bridge (Concrete)	SET	1.0					0 (
· · · · ·			Sub Total	•	154,994,94	67,487,16	9 222,482,010
Overhead ( 15% )					23,249,22	8 10,123,07	5 33,372,30
			TOTAL COST		178,244,06	7 77,610,24	4 255,854,311
fanual routine maintenance of road	Ke	20.0	96,920	7,260	1,938,10	0 145,20	0 2,083,60
Routine maintenance of gravel road	Ke		176,065	86,186			
			Sub Total		5,459,70		
Naintenance of Timber Bridge (New)	a2	80.0	9,334	954			
Maintenance of Concrete Bridge (New)	n2		1,822	4,303		-	0
Haintenance of Timber Bridge (Exist)	#2		0,203	2,322		0	0
faintenance of Concrete Bridge (Exist)	#2		3,900	2,705		0	0
							· .
•··			Earthwork &	Pavenent	Unił Cosł	(Rp/Ka)	12,149,12
			Timber	Br i dge	Unit Cost	(Rp/#2) :	160,89
			Concrete	Bridge	Unit Cost	(Ap/s2)	, ·
			Survjved	Value	· .	(Rp)	21,236,60
			Naintenance	Rate witho	ut Bridge	(1)	3.0
			New Bridge			(1)	

: NUSA TENGGARA TIMUR KAB : NGADA PROV LINK NO : 14 (IIID-1) LENGTH : 47 Km UPGRADE : 4.0m road bed, 4.0m road with surface Dressing (1)

ITEN			((C UNIT	COST >>>	) i	<<<< C051	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
**********************	UNI 1	Y111AU9	LOCAL	FOREIGN	•	L FORELON	
ite Clearance in Light Bush	#Z	<b>A</b> A	1.0.9			***************	
ubgrade Preparation		0.0 282000.0	153			0 0	
ornal Fill	82 83		19	11	5,358,00	0 3,102,000	8,460,00
ill in Swawp		0.0	1,576	665		0 0	
ormal Excavation to Spoil	10 A 3	348.0	2,325	1,054	807,10		
ub Base Course	₿3 •7		926	523	4,932,80	2 2,786,021	7,718,82
lase Course	R3		2,984	1,350		0 35,532,000	
heulder	e3		4,100	2,303		0 30,307,480	
sphalt Patching	#2		273	146		0 13,724,000	
	#2		2,938	1,514		0 0	
urface Dressing (Single)	a2		843	766	158,484,00	0 144,008,000	302, 192,00
urface Dressing (Double)	#2	0.0	1,001	1,207		0 0	
arth Drain	8	73700.0	629	119	46,357,30	0 8,770,300	55,127,60
arth Drain in Swamp (by machine)	<b>a</b> 3		1,065	474			
ipe Culvert DBOcs	a	10.0	38,882	76,576			
asonry Culvert (80x80cm)	· 8	84.0	47,364	53,860			
etaining Hall and Wing Hall (Timber)	<b>8</b> 2	0.0	15,772	246			• •
etaining Wall and Wing Wall (Masonry)	#3	40.0	32,773	12,077			
abion Protection	#3	0.0	11,004	121		0 (	
ew Bridge (limber)	SET	1.0			26,508,31		
en Bridge (Concrete)	SET	1.0				0 (	
			Sub Tatal		408,820,71	1 247,272,91	656,093,6
verhead (15%)					61,323,10	6 37,090,938	98,414,0
· · · · · · · · · ·			TOTAL COST		470,143,81	7 284,363,847	754,507,6
anual routine maintenance of road	Ke		96,920				
outine maintenance of asphalt road	Ka	47.0	293,800	151,400			
			Sub Total		18,363,84		
aintenance of Timber Bridge (Hew)	₽2		9,334	954		0 209,880	2,263,3
aintenance of Concrete Bridge (New)	s2		1,822	4,303		0 (	)
aintenance of limber Bridge (Exist)	#2	0.0	8,203	2,322		0 (	)
aintenance of Concrete Bridge (Exist)	<b>6</b> 2	0.0	3,900	2,705		0 (	)
			Earthwork &			(Rp/Km) : (Rp/Km2) :	15,361,5
			Timber Concrete		Unit Cost Unit Cost	(Rp/#2) : (Rp/#2) :	147,7
			concrece Survived	Brioge Value	UNIC 5051		ወደ ግለጎ ን
						(Rp) r	96,702,3
			Naintenance		ar ottada	(%) :	3.
			New Bridge	LOST KALE		(%) :	4.

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PROV : NUSA TENGGARA TIMUR KAB : NGADA LINK NO : 13 (IIIB-1) LENGTH : 25 Km

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

(Rp)

		*********					
ITEN	UNIT	QUANTITY	LOCAL	COST >>> Foreign	UCAL		>>>>>> fotal
	"~ · · <b>· · · · ·</b> · · · ·						
Site Clearance in Light Bush	#2	40000.0	153	91	6,120,000	3,640,000	9,760,000
Subgrade Preparation	<b>a</b> 2	150000.0	19	11	2,850,000	1,650,000	4,500,000
Normal Fill	n3	0.0	L <sub>1</sub> 576	865	0	0	( i i i i i i i i i i i i i i i i i i i
Fill in Swamp	n3	1923.8	2,325	1,054	4,472,835	2,027,685	6,500,520
Normal Excavation to Spoll	B3	6875.0	926	523	6,384,770	3 606 085	9,990,85
Sub Base Course	. n3	14000.0	2,984	1,350	41,776,000	18,900,000	60,675,00
Base Course	нЗ	7000.0	4,100	2,303	28,700,000	16,121,000	44,821,00
Shoulder	#2	50000.0	273	146	13,650,000	7,300,000	20,950,000
Asphalt Patching	#2	0.0	2,938	1,514	0	· 0	(
Surface Dressing (Single)	<b>a</b> 2	100000.0	843	766	84,300,000	76,600,000	160,900,000
Surface Dressing (Double)	n2	0.0	1,001	1,207	0	<b>(</b>	
Earth Drain	8	29500.0	627	119	18,555,500	3,510,500	22,066,000
Earth Drain in Swamp (by machine)	#3	18000.0	1,065	171	19,170,000	8,532,000	27,702,000
Pipe Culvert D80cm	8	900.0	36,882	76,576	33,193,800	68,918,400	102,112,20
Nasonry Culvert (80x80cm)	6	0.0	47.364	53,860		0	
Retaining Wall and Wing Wall (Timber)	•2	0.0	15,772	246	0	0	(
Retaining Wall and Wing Wall (Masonry)	#3	336.0	32,773	12,077	11,011,728	4,057,872	15,069,600
Sabion Protection	<b>a</b> 3		11,004	121		0	
Rex Bridge (Timber)	SET	1.0	·		21,293,071	1,629,956	22,923,02
New Bridge (Concrete)	SET	1.0			0	0	
			Sub Total		291,477,704	216,493,498	507,971,20
Overhead (15%)					43,721,655	32,474,024	76,195,67
			TOTAL COST		335,199,359	248,967,522	584,166,88
······	Ka		01 020	7 740	000 561 C	181,500	2,604,50
Manual routine maintenance of road	- Ke		96,920 293,800	7,260 151,400	7,345,000		2,601,00
Routine maintenance of asphalt road	Ke	20.0		131,400		3,966,500	11 11 20100
		454.0	Sub Total	dEL	9,768,000		13,734,50
Haintenance of Timber Bridge (Kew)	#2		9,334			145,008	1,563,77
Maintenance of Concrete Bridge (New)	. <b>₽</b> 2		1,822	4,303			
Maintenance of Timber Bridge (Exist)	#2		8,203	2,322	0	. 0	
Maintenance of Concrete Bridge (Exist)	ø2	0.0	3,900	2,705	0	• 0	
			Earthwork &	Paypeent 1	hit Cost in	p/Ke) :	22,312,21
			Tinber			p/e(2) ; .	173,43
			Concrete	-	· · · · · · · · · · · · · · · · · · ·	p/w2) ;	110110
			Survived	Value o		(Rp) t	51 432 40
			Maintenance		and the second se	(X) :	51,437,40
			New Bridge		-		2.4
			HER NITRAS	Sapr here		(1) :	4.5

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PROV : NUSA TENGGARA TIMUR KAB : NGADA LINK NO : 4 (1110-2) LENGTH : 7 Km

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UPBRADE : 6.0m road bed, 4.0m road with surface Base Cource

11EN ~								(Rp)
	UNET	QUANELTY	LUCAL	COST >>> FOREIGN	( Loca	‹‹‹‹ ነ ዞ	COST Ore Lon	>>>>> Total
			****					
Site Clearance in Light Bush	#2	3000.0	153		480.00			1
Subgrade Preparation	eZ	0.0	19	91	459,00		73,000	732,00
formal fill	a3	350.0	1,576	11		-	.0	(
Fill in Swamp	•3	0.0	2,325	865	551,60		102,750	854,35
forsal Excavation to Spoil	63	270.0		1,054		-	Q	4
Sub Rase Course	83	848.5	926 2. BOL	523	250,02		41,210	391,23
Base Course	#3	1440.0	2,984	1,350	2,591,60		72,475	3,761,07
Shoulder	n7		4,100	2,303	5,904,00		16,320	9,220,32
Asphalt Patching	82	33.0	273	148	3,822,00		000,44	5,866,00
Surface Dressing (Single)	•2	0.0	2,939	1,514	96,95	4	49,962	146,91
Surface Dressing (Double)	#2		843	766		0	0	
Earth Drain		0.0	l,001	1,207		0	0	
Earth Drain in Swamp (by machine)	ë Li	9120.0	629	119	5,736,48		985,280	6,821,76
	83	0.0	1,065	474			0	
Pipe Culvert D80rg Bangary Culvert 200-001	Ø	3.0	36,882	76,576	110,64	6 2	229,720	340,37
Nasonry Cuivert (80x80cm)	8	0.0	47,364	53,860		0 .	0	
Retaining Wall and Wing Wall (Timber)	#Z	0.0	15,772	246		Û	Û	
Retaining Wall and Wing Wall (Masonry)	±3	0.0	32,773	12,077		0	Q	
Babion Protection	· a3	0.0	11,004	121		0	0	
New Bridge (Timber)	SET	1.0			20,619,15	ia I.	199,334	21,818,49
Yex Bridge (Concrete)	SET	1.0					. 0	
:			Sub Total		40,141,44	12 9,1	814,059	49,955,52
Overhead (15%)			·		6,021,21	8 L <sub>1</sub>	472,508	1,493,32
			TOTAL COST		48,162,68	n 11,:	288,167	57,448,84
lanual routine maintenance of road	Ka	7.0	96,920	7,260	678,44	0	50,820	729,28
Routine maintenance of gravel road	Ka	7.0	178,085	80,185	1,232,4	5	617,302	1,849,75
			Sub Total		1,910,89		668,122	
Naintenance of Timber Bridge (New)	#2	200.0	9,334	954	1,866,80		190,800	2,057,60
laintenance of Concrete Bridge (New)	· #2	0.0	1,822	4,303		0	0	
faintenance of Timber Bridge (Exist)	82	0.0	8,203	2,322		0	Ó	
Maintenance of Concrete Bridge (Exist)	#2	188.0	3,900	2,705	733,20	0	508,540	-1,241,74
***************************************				******			*	
•			Earthwork &	Pavement U	nit Cost	(Rp/Ka)	:	4,622,51
			Tinber	Bridge U	nit Cost	(Rp/n2)	;	125,45
			Concrete	•	nit Cost	(Rp/#2)	:	•
	,		Survived	Value		(Rp)	1	1,882,03
			Maintenance		t Bridge	(2)	1	7.9
			New Bridge		3	(1)	_	43.6

LINK NO : 2 (1118-2) LENGTH : 16 Km

UPGRADE : 6.5m road bed, 4.0m road with surface Base Cource

1128	UNIT	QUANFITY	<<< UNIT Local	COST >>> Forelon	/\ Local	COST COST	
Site Clearance in Light Bush	#2	37500.0	153	91	5,737,500	3,412,500	9,150,000
Subgrade Preparation	#2	104000.0	19	11	1,976,000		
Normal Fill	#3	1900.0	1,578	865	2,994,400		
Fill in Smamp	a3	0.0	2,325	1,054	່ ໌ (		
Normal Excavation to Spoil	•3	2490.0	926	523	2,305,740		
Sub Base Course	#3	8960.0	2,984	1,350	26,736,640		
Base Course	•3	3840.0	4,100	2,303	15,744,000		
Shoulder	a2	40000.0	273	146	10,920,000		
Asphalt Patching	#2	0.0	2,938	1,514	•	ņ <sup>.</sup> 0	
Surface Dressing (Single)	e2	0.0	843	765	i	0 6	)0
Surface Dressing (Double)	m2		1,001	1,207		0 0	) - 0
Earth Drain	1		629	119	2,000,22	0 378,420	
Earth Drain in Swamp (by machine)	<b>n</b> 3	0.0	1,065	474		0 0	) 0
Pipe Culvert DBOca	P	426.0	36 882	76,576	15,711,73	2 32,621,376	48,333,108
Masonry Culvert (80x80cm)	8	0.0	47,364	53,860		0 0	) 0
Retaining Wall and Wing Wall (Timber)	•2	0.0	15,772	245		0 (	) Q
Retaining Wall and Wing Wall (Masonry)	n3	160.0	32,773	12,077	5,243,68	0 1,932,320	7,176,000
Gabion Protection	#3	0.0	11,004	121		0 (	3 <b>0</b>
New Bridge (Timber)	SET	1.0			25,411,81	9 L,849,104	27,260,923
New Bridge (Concrete)	SET	1.0	<b></b>			0 (	) 0
			Sub Total		114,781,73	1 71,063,010	185,844,741
Overhead ( 15% )					17,217,25	9 10,659,45	27,876,710
		·	TOTAL COST		131,998,99	0 01,722,46	213,721,451
Manual coulting asighappen of road	Ks	16.0	96,920	7,260	1,550,72	0 116,16	0 1,666,890
Manual routine maintenance of road Routine maintenance of gravel road	Ka		176,065	88,186	2,817,04		
Routine Maintenance of graves load	hB	10.0	Sub Total	001100	4,367,76		
Naintenance of Timber Bridge (New)	#Z	172.0	9,334	954	1,792,12		
Naintenance of Concrete Bridge (New)	#2			4,303			0 (
Naintenance of Timber Bridge (Exist)	#Z		8,203	2,322			0 (
Maintenance of Concrete Bridge (Exist)	#Z		3,900	2,705		<b>)</b>	0 (
	**						
				Pavenent Un		(Rp/Ka) :	
			Timber			(Rp/a2) :	
			Concrete		nit Cost	(Rp/m2) :	
			Survived	Value	n	(Rp) :	1 1
				Rate without	-	(1) ;	3.2
			New Bridge	LOSI NATE		· (X) - +	14.6

# Appendix A-4

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

ITEN	UNIT	( 1988 )	( 1989 )	( 1000 )	/ 1001 \	1 1007 1	< 101AL >
	****					1111 J.	101NL /
UIPHENT :							
5.11.1							
Bulldozer/Ripper	hr	157.4	523.0	442.2	1120.4	1028.5	3271.5
Swamp Bulldozer	hr	3.4	29.1	30.2	12.8	106.8	102.3
Notor Grader	hr	678.4	1462.5	1385.9	2592.2	2374.9	
lland-guide Vib. Roller	ħr	120.4	680.5	720.7	1496.8	805.6	
Tire Roller	hr		803.3	959.9	199.9	0.0	2399.7
Vibratory Roller (D&T)		555.0	1138.6	1152.6	2189.6	2066.9	7102.7
Hydraulic Excavator; Wheel		57.0	597.0	616.0	270.0	2252.1	3792.1
Hheel Loader	hr	838.2	2024.2	1891.4	3360.1	3051.9	11165.8
Water Tank Truck	hr	392.1	780.7	815.2	1481.5	1376.7	4846.2
Dump Truck	hr	7925.5	17772.1	17775.2	29910.9	30177.3	103561.0
Flat Bed Truck with Crane	hr	99.7	539.3	572.7	1359.5	554.6	3125.8
Flat Bed Truck	hr	800.8	1189.9	1390.2	705.0	257.1	4143.6
Portable Crusher/Screening	hr	190.8	467.1	395.3	520.4	405.8	1979.4
Concrete Nixer	hr	26.0	168.3	177.0			820.3
Water Pusp	hr	18.7	134.1	140.4			650.8
Concrete Vibrator	hr	4.2	65.9	67.4	135.5		312.2
Asphalt Sprayer	hr	469.9	603.3	959.9	166.6	0.0	2399.7
BOUR :							
Nandur	nan day	B26.3	2014.7	2165.5	3705.4	3264.9	11976.8
Skilled Labourer	san day	881.7	1941.1		5591.8	2528.7	13178.3
Carpenter	nan day	317.6	666.0	772.1	2708.3	1286.0	5750.0
Hason	øan dav	36.2	170.6	182.7	274.5	182.8	846.9
Labourer	san day	10066.3	21175.5		35642.3	37449.6	127826.4
Oriver	man day		3628.2	3719.4	5821.4	5683.9	20517.4
Operator	nan day nan day	699.9	1874.4	1804.7	2874.1	2675.9	9929.0
IERIAL :	·		·				
Bitumen		01740 0	174607 7	10/300 0	78061 B	A A	103011 0
Asphalt Dil	1	19270.0	164683.3	196799.9	34211.1	0.0	492044.2
Kerosene	1		32936.6	39360.0	6033.3 0171 5	0.0	98399.9
		23029.9	39363.3	47039.9	8171.5	0.0	117604.6
Sand	m3 1	299.1	844.1	943.9	852.2	238.0	3177.3
Cement	bag - 7	16.3	1027.4	1052.8	2080.8	642.3	4879.6
River Stone	a3	36.2	170.6	182.7	274.5	182.8	846.8
Steel Houlds	set	3.0	363.0	364.0	790.6	213.4	1734.0
Tinber	AJ	28.6	58.3	67.9	241.9	115.6	512.3
faint	1	182.0	391.0	451.6	1609.1	832.0	3465.7
Reinforcing Steel	kg	465.4	11949.4	12101.5	25220.1	7071.4	56810.8
Tying Wire	kg	4.1	108.5	109.9	229.2	64.2	515.9
Equivalent Royalty	<b>m</b> 3	14888.9	30903.4	31779.6	53003.5	40488.0	179063.4

### 28-A-27

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

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11EH	UNIT	< 1988 >	< 1989 >	< 1990 >		( 1992 )	< TOTAL >
QUIFNENT :						:	
		1			an La th		
Buildozer/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	675.9	1315.8	1342,4	1178.5	1318.5	5831.1
Hand-quide Vib. Roller	hr	7.5	15.0	15.0	712.5	1080.0	
Tire Roller	hr	675.9	1315.8	1342.4	1178.5		5931.1
Vibratory Roller (D&T)	hr	0.0	0.0	0.0	0.0	0.0	0.0
Rydraulic Excavator; Wheel	hr	0.0	0.0	0.0	0.0		0.0
Wheel Loader	hr	127.6	242.7	255.4	304.8	396.9	1327.4
Water Tank Truck	hr	0.0	0.0	0.0	0.0	0.0	0.0
Dung Truck		781.5	1486.9	1563.2	3253.7	4540.9	11626.2
Flat Bed Truck with Crane	hr			717.6			3183.0
Flat Bed Truck	hr	2590.0	5047.9	5142.4	5049.2		23672.8
Portable Crusher/Screening	hr	63.9		127.8	153.7	200.6	667.5
Concrete Nixer	hr	1.2	2.3	2,4	2.1	2.4	10.4
Water Pump	hr	1.2	2.3	2.4	2.1	2.4	10.4
Concrete Vibrator	hr	1.2	2.3	2.4	2,1	2.4	10.4
Asphalt Sprayer	hr	0.0	0.0	0.0	0.0	0.0	0.0
ABOUR :							
Kandur	san day	776.1	1512.4	1541.6	1778.5	2177.4	7786.0
Skilled Labourer	∎an daγ	16.9	33,4	33.8	496.7	884.6	1465.3
Carpenter	#an day	5.5	11.0	11.1	10.2	86.7	124.5
Nason	man day	0.0	0.0	0.0	0.0	0.0	0.0
Labourer		9308.9	18140.1	18484.2	21360.8	25971.2	93265.2
Driver	#an day	634.8	1231.9		1509.5	1896.3	6536.3
Operator	man day	269.0	519.9	533.0	495,4	573.1	2389.4
NTERIAL :					· ·	÷.	
Bitumen	.1	67.5	135.0	135.0	6412.5	, 9720.0	16470.0
Asphalt Dil	1	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	1	7.5	15.0	15.0	712.5	1080.0	1830.0
Sand	<b>s</b> 3	2.4	4.8	4.9	120.8	102.4	315.3
Cenent	bag	17.9	34.9	35.0	30.8	35.9	155.2
River Stone	<b>H</b> 3	0.0	0.0	0.0	0.0	0.0	0.0
Steel Houlds	set	0.0	0.0	0.0	0.0	0.0	0.0
Tiaber	•3	0.4	0.8	0.8	0.7	7.6	10.3
Faint	. 1	1.5	3.1	3.1	3.1	52.0	62.8
Reinforcing Steel	kg -	92.1	179.7	184.3	158.4	184.3	799.9
Tying Wire	kg	0.8	1.6	1.6	1,4	1.6	7.0
Equivalent Royalty	#3	1810.2	3440.4	3620.6	4319.7	5624.6	19915.5

28-A-28

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

ITËN	UN1 T	< 1988 >	< 1989 >	( 1990 )	( 1991 )	< 1992 >	( TOTAL )
				× 117V 7	······································		( IUINL )
0111 DHENT .							
QUIPHENT :				· .			
Bulldozer/Ripper	hr	157.4	523.0	442.2	1120.4	1028.5	3271.5
Swamp Bulldozer	hr	3.4	29.1	30.2	12.8	106.8	182.3
Notor Grader	hr	1354.3	2778.3	2720.3	3770.7	3693.4	14325.0
Hand-guide Vib. Roller	hr	127.9	695.5	735.7		1995.6	5654.0
Tire Roller	hr	1145.8	2119.1	2302.3	1345.1	1318.5	8230.8
Vibratory Roller (D&T)	hr	555.0	1138.6	1152.6	2189.6		7102.7
Hydraulic Excavator; Wheel	hr	57.0	597.0	616.0	270.0	2252.1	3792.1
Hheel Loader	hr	965.8	2266.9	2146.8	3664.9	3448.8	12493.2
Water Tank Truck	hr	392.1	780.7	815.2		1376.7	4846.2
Dump Truck	hr	8707.0	19259.0	19338.4	33164.6	34710.2	115107.2
Flat Bed Truck with Crane	hr	458.5	1239.7	1290.3	1980.8		
Flat Bed Truck	hr	3190.6	6237.8	6532.6	5755.0	6100.4	27816.4
Portable Crusher/Screening	hr	254.7	588.6	523.1	674.1		2646.9
Concrete Nixer	hr	27.2	170.6	179.4	302.3	151.2	830.7
Water Puop	hr	19.9	136.4	142.8	247.4		661.2
Concrete Vibrator	hr	5.4	68.2	67.8	137.6	41.6	322.6
Asphalt Sprayer	hr	469.9	803.3	959.9	166.6	0.0	2399.7
ABOUR :		·					
Handur	nan day	1602.4	3527.1	3707.1	5483.9	5442.3	19762.8
Skilled Labourer	ean day	898.5	1974.5	2268.8	6088.5	3413.3	14643.6
Carpenter	aan day	323.1	677.0	783.2	2718.5	1372.7	5874.5
Hason	man day	36.2	170.6	182.7	274.5	182.8	846.8
Labourer	nan day	19375.2	39315.6	41976.9	57003.1	63420.8	221091.6
Driver	aan day	2299.3	4860.1	4983.2	7330.9	7580.2	27053.7
Operator	nan day	967.9	2394.3	2337.7	3369.5	3249.0	12318.4
MATERIAL :							
Bituren	J	96417.4	164818.3	196934.9	40623.6	9720,0	508514.2
Asphalt Dil	1	19270.0	32936.6	39360.0	6833.3	0.0	98399.9
Kerosene	1	23037.4	39378.3	47054.9	8884.0	1080.0	119434.8
Sand	#3	301.5	848.9	948,8	973.0	420.4	3492.6
Cenent	bag	94.2	1062.3	1088.6	2111.6	678.1	5034.8
River Stone	. #3	36.2	170.6	182.7	274.5	192.8	846.8
Stee) Houlds	set	3.0	363.0	364.0	790.6	213.4	1734.0
lisber	83	29.0	59.1	69.7	212.5	123.2	522.8
Paint	1	183.5	394.1	454.7	1612.2	084.0	3528.5
Reinforcing Steel	kg	557,5	12129.1	12280.0	25378.5	7255.7	57609.6
Tying Wire	kg	4.9	110.1	111.5	230.6	65.8	522.9
Equivalent Royalty	#3	16699.1	34343.8	35400.2	57323.2	54112.6	197878.9

Appendix A-5

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

							( 1000 Rp )
ITEN	UNIT	< 1988 >	< 1989 >	< 1990 >	< 1991 >	( 1992 )	< TOTAL >
		, , , , , , , , , , , , , , , , , , ,			:		
EQUIPMENT :		91,504	215,838	211,640	332,895	334,531	1,186,408
Bulldozer/Ripper	15758	2,480	8,241	6,969	17,655	16,207	51,551
Swamp Bulldozer	11617	39	338	350	148	1,240	2,115
Notor Grader	13465	9,134	19,692	18,661	34,903	31,978	114,368
Hand-guide Vib. Roller	1575	189	1,071	1,135	2,357	1,268	5,020
Tire Roller	10676	5,016	8,576	10,247	1,778	0	25,617
Vibratory Roller (DAT)	6724	3,731	7,655		14,722	13,897	47,755
Hydraulic Excavator; Wheel	12601		7 522	7,762	3,402	28,378	47,782
Hheel Loader	16660	13,964			55,979		
Hater Tank Truck	3912	1,533	3,054	3,189	5,795		18,956
Dusp Truck	5389	42,710	95,773	95.790	161.189	162,625	558,087
Flat Bed Truck with Crane	4981	496	2.686	2 852	6.771	2,762	15.567
Flat Bed Truck	3265	1,960	3,885	4.539	2,304	839	13,527
Portable Crusher/Screening	43673	8,332	20,399	17.263	22,727	17,722	86,443
Concrete Nixer	8879	230	1,494	1,571	2,665	1,321	7,281
Hater Pump	477	8	63	66	117	53	307
Concrete Vibrator	310	1	20	20	42	12	95
Asphalt Sprayer	2050	963	1,646	1,967	341	0	4,917
ABOUR :		19,592	43,390	46,755	78,262	71,709	259,708
Nandur	1500	1,239	3,022	3,248	5,558	4,897	17,964
Skilled Labourer	1300	1,146	2,523		7,269	3,287	17,130
Carpenter	2000	635	1,332		5,416	2,572	11,499
ห้สรงก	2000	72		365	549	365	1,692
Labour er	1100	11,072	23,293	25,841	39,206	41,194	140,606
Driver	2000		7,256	7,438	11,642	11,367	41,032
Operator	3000	2,099	5,623	5,414	8,622	8,027	29,785
IATERIAL :		85,860	180,005	207,621	158,651	56,498	688,643
Bitunen	400	30,539	65,873	78,719	13,684	0	196,815
Asphalt Oil	1500	28,905	49,404	59,040	10,249	0	147,598
Kerosene	250	5,757	9,940	11,759	2,042	.0	29,398
Sand	5000	1,495	4,220	4,719	4,261	1,190	15,885
Cenent	5500	419	5,650	5,790	11,444	3,532	26,835
River Stone	4000	144	682	730	1,098	731	3,385
Steel Houlds	8500	25	3,085	3,074	6,720	1,813	14,737
Timber	200000	5,720	11,660	13,580	48,380	23,120	102,460
Paint	1750	318	684	790	2,815	1,456	6,063
Reinforcing Steel	1750	814	20,911	21,182	44,135	12,374	99,416
lying Hire	2500	10	271	274	573	160	1,288
Equivalent Royalty	250	3,722	7,725	7,944	13,250	12,122	44,763

28-A-30

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

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PROV : NUSA TEI			КАВ	: NGA			( 1000 Rp 1
THE REPORT	UNIT	< 1788 >	< 1999 >	< 1990 >	< 1991 >	< 1992 >	< TOTAL >
UIPNENT :		35,705	69,138	71.073	70 402	96,3BI	350,789
				1 1 1 1 1 1 1	1111	101001	200,101
Bulldozer/Ripper	15758	0	0	. 0	0	0	0
Swamp Bulldozer	11617	0	0	-	, Û	0 -	
Notor Grader	13465		17,717		15.869		
Hand-guide Vib. Roller	1575	11	23	23	1.122	1.701	2,880
Tire Roller	10676	7,215	14,047	14.331	1,122 12,581	14.076	62.250
Vibratory Roller (D&T)	6724	0	0	0	0	. 0	
Hydraulic Excavator; Wheel	12601	0	0		Ū,	0.	
Wheel Loader	16660		4,043				
Water Tank Truck	3912	0	0	0	-100	0	
Duap Truck	5389	4,211	8.012	8.424	17.534	24.470	62.651
Flat Bed Truck with Crane	4981	1,787	3,400	3,574	3.094	3,909	15,852
Flat Bed Truck	3265	8,456	16,481	16,789	16,485	19.078	77,289
Portable Crusher/Screening	43673	2,790	3,488 16,481 5,306 20	5,581	6,712	8,760	29,149
Concrete Nixer	6879	10	20	21	18	21	90
Hater Pump	477	0	. 1	1	1	1	4
Concrete Vibrator	310	0	· . 0	0	0	Ū.	0
Asphalt Sprayer	2050	0	0	0	0	0	0
ABOUR :		13,508	26,309	26,835	31,333	38,667	136,652
Handur	1500	1,164	2,268		2,667	3,266	11,677
Skilled Labourer	1300	21		43	645	1,149	1,901
Carpenter	2000	11	22	22	20	173	248
Nason	2000	. 0	0	0	0	0	0
Labourer	1100	10,239	19,951	20,332	23,496	28,568	102,589
Driver	2000	1,269	2,463	2,527	3,019	3,792	13,070
Operator	3000	804	1,559	1,599	1,485	1,719	7,167
ATERIAL :		835	1,615	1,673	5,020	8,609	17,752
Bitusen	400	27	54	54	2,565	3,888	6,588
Asphalt Oil	1500	0	0	0	0	0	• 0
Kerosene	250	1	3	3	170	270	455
Sand	5000	12	24	24	604	912	1,576
Cement	5500	98	191	196	169	196	850
River Stone	4000	0	0	0	0	0	0
Steel Noulds	8500	0	0	0	0	0	0
Tinber	200000	80	160	160	140	1,520	2,060
Paint	1750	2	5	5	5	91	109
Reinforcing Steel	1750	161	314	322	277	322	1,396
Tying Hire	2500	2	4	4	3	4	17
Equivalent Royalty	250	452	860	905	1,079	1,405	4,702

28-A-31

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

PROV : NUSA TE					UA		( 1000 Rp )			
ITEN	UNIT	< 1988 >	( 1989 )	< 1990 >						
QUIPHENT :		127,209	284,976	282,713	411,387	430,912	1,537,197			
Bulldazer/Ripper	15758	2,480	8,241	6,969	17,655	16,207	51,551			
Swamp Bulldozer	11617	39	338	350	148	1,240	2,115			
Notor Grader	13465	18,234	37,409	36,736	50,771	49,731	192,891			
Hand-guide Vib. Roller		200	1,094	1,158	3,479	2,969	8,900			
Tire Roller		12,231								
Vibratory Roller (D&T)		3,731	7,655	7,750	14,722	13,897	47,755			
Hydraulic Excavator; Wheel		718	7,522	7,762	3,402	28,378	47,782			
Wheel Loader	16660	16,089	37,765	35,764	61,056	57,456	208,131			
Water Tank Truck		1,533	3,054	3,189	5,795	5,385	18,956			
Dump Truck	5389	46,921	103,705	104 214	178,723	187,095	620,738			
Flat Bed Truck with Crane		2,283	6,174	6,426	9,865	6,671	31,419			
Flat Bed Truck	3265	10,416	20,366	21,328	18,789	19,917	90,816			
Portable Crusher/Screening	43673	11,122	25,705	22,844	29,439	26,402	{15,572			
Concrete Nixer	6879	240		1,592	2,683					
Water Pump		8	64	67	118	54	311			
Concrete Vibrator	310		20	20	42	12	95			
Asphalt Sprayer	2050	963	1,646	1,967	341	0	311 95 4,917			
ABOUR :		33,100	69,699	73,590	107,595	110,376	396,360			
Kandur		2,403								
Skilled Labourer		1,167								
Carpenter	2000	646	1,354	1,566						
Kason	2000	12	341	365	549	365	1,692			
Labour er	1100	21,311	43,247	46,173	62,702	69,762	243,195			
Driver	2000	4,590	9,719 7,182	9,965	14,661	15,159	54,102			
Operator	3000	2,903	7,182	365 46,173 9,965 7,013	10,108	9,746	36,952			
ATERIAL :		86,703	181,620	209,294	163,671	65,107	706,395			
Bitumen	400	38,566	65,927	78,773	16,249	3,888	203,403			
Asphalt Oil	1500	28,905	49,404		10,249	.0	147,598			
Kerasene	250	5,758	9,843	11,762	2,220	270	29,853			
Sand	5000	1,507	4,244	4,743	4,865	2,102	17,461			
Ceaent	5500	517	5,841	5,986	11,613	3,728	27,685			
River Stone	1000	144	682	730	1,098		3,385			
Steel Houlds	8500	25	3,085	3,094	6,720	1,813	14,737			
Tisber	200000	5,800	11,020	13,740	48,520	24,640	104,520			
Paint	1750	320	689	795	2,820	1,547	6,171			
Reinforcing Steel	1750	975	21,225	21,504	44,412	12,696	100,812			
Tying Hire	2500	12	- 275	278	576	164	1,305			
Equivalent Royalty	250	4,174	8,585	8,849	14,329	13,528	49,465			

# Appendix A-6

.

QUANTITIES OF BRIDGE ON PROPOSED ROAD LINKS

FROV

# I NUSA TENGDARA TIMUR

KAB : NGADA

	****		*****					÷1	;	4.5				· .		
LINK Xo	BRIDGE NAME	Ke	From	(* TY (EXIST)	PE >> (New)	DESI8N Load	SPAN Class	LENGTH (m)	NO	SPAN LENGTH (B)	NIDTH (m)	AREA (EXIST) (#2)	AREA (NEN) (a2)		ABUT (no)	RDAD Class
2	LEKOBOKO	- 1	AINR	KK	 1H	10T	(C)	8.00	 1	8.00	4.00	24.00	32.00	0	 2	1118-2
	HAEBUA	, 1	AINR	-	ΪĦ.		(8)	10.00	2	5.00	4.00	0.00	40.00	i	2	1110 4
	WAELAKO	5	AINR		TH	10T	(0)	16.00	2	8.00	4.00	0.00	64.00	1	2	
	NGABALENA	12	AINR		TN	ior	(3)	14.00	2		4.00	0.00	55.00	i	2	
4	AEKOKO	6	NP66	68				26.00	 1	25.00	4.00	104.00		0	2	1118-2
:		. 7	np66	60				12.00	1	12.00		48.00		0	2	
	AETORO		NPGG		TM	101	(C)	50.00	7	7.14	4.00	0.00	200.00	6	2	
	NAUNDANA	10	MP66	KB				12.00	1	12.00	3.00	36.00		0	2	
13	OLAKILE	5	BOWE		TN	10T	(C)	12.00	2	6.00	4.00	0.00	48.00	1	2	1118-1
	NAEHUTU I	11	BONE		TH	101	(8)	10.00	2	5.00	4.00	0.00	40.00	i É	2	
		11			ĨĦ	101	(8)	9.00	2	4.50	4.00	0.00	36.00	1	2	
	NENGERUDA		BOXE	**	TN	IOT	(C)	7.00	1	7.00	4.00	0.00	28.00	0	. 2	
14	GERO I		ANLI		TM	LOT	(C)	15.00	. 2	7.50	4.00	0.00	60.00	1	2	1119-1
	GERO II	3	ÁHL I		TN	101	(C)	25,00	14	6.25	4.00	0.00	100.00	3	2	
	JANAKISA II	12	AMLI		' MT	101	(C)	15.00	2	7.50	4.00	0.00	60.00	ł	2	
20	LOKABO	10	REGA		ĨĦ	101	(B)	10.00	2	5.00	4.00	0.00	40.00	1	2	1118-2
	¥. I	20	REGA		18	101	(8)	10.00	2	5.00	4.00	0.00	40.00	i	2	
24	N. I		NRPK		JK	101	(C)	8.00	1	8.00	4.00	0.00	32.00	0	2	IIIB-J
	N. I	15	MRPK		TN	10T	(C)	7.00	1	7.00	4.00	0.00	28.00	0	2	
25	MBAY I	1	DNGA	KB				4.00	ł	4.00	3.50	14.00		0	2	1110
		11	DNSA	KB				3.00	1	3.00	3.50	10.50		0	2	
	HBAY	- 14	DNGA	KB				3.00	1	3.00	3.00	9.00		0	2	
26	N. I	2	SRSN	u				6.00	1	6.00	4.00	24.00		. 0	2	1118-
	H. I	5	SRSN		- 316	101	{Ç}}	8.00	1	8.00	4.00	0.00	32.00	0	2	
	H. I	7	SRSN		TX	101	(8)	10.00	2	5,00	4.00	0.00	40.00	i	2	
30	N, I	3	FILK		 TH	101	(B)	5.00	1	5,00	4.00	0.00	20.00	0	2	111B-
	R, I	6	FILK	·	TN	LOT	(0)	6.00	· 1	6,00	4.00	0.00	24.00	0	2	
	N. I		FTLK		TH	IQT	(B)	9.00	2	4.50	4.00	-	-	1	2	
	H. I		FTLK		18	LOT	(B)	10.00	2	5.00	4.00	0.00	40.00	t	2	
	H. I	[9	FTLK	·	TK	101	(B)	4,00	1	4.00	4.00	0.00	16.00	0	2	

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

FROV : NUSA TENGGARA TIMUR KAB : NGADA LINK NO : 2 (IIIB-2) LENGTH : 16 Km

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	۰.	11 pr	

							( nµ )
I T E H	UNIT	QUANTITY	<<< UNIT LOCAL	COST >>> FOREIGN	(((( Local	COST FOREIGN	>>>>> TOTAL
	******	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		***********	Fue 2009		
Superstructure (Timber;Span 3m;101)	42	0.00	52,702	2,127	0	0	0
Superstructure (Timber;Span 5#;101)	• •2	40.00	58,376	3,012	2,335,040	120,480	2,455,520
Superstructure (Timber;Span Bm;101)	#2	152.00	77,325	3,961	11,753,400	602,072	12,355,472
Superstructure (Timber;Span 3m;BH50)	#2	0.00	65,349	3,373	0	0	
Superstructure (limber;Span 5m;BMSO)	æ2	0.00	71,346	3,658	- 0	0	(
Superstructure (limber;Span 8m;8M50)	#Z	0.00	90,487	4,632	. 0	. 0	
uperstructure (Concrete;Span 3#;BH50)	e2	0.00	52,924	171,810	0	. 0	. (
Superstructure (Concrete;Span 5m;BNSO)	• •2	0.00	53,980	192,600	0	0	. (
Superstructure (Concrete;Span 8m;BHSO)	#2		55,318	210,151	0	• 0	(
Superstructure (Concrete;Span10#;BN50)	i ∎2	0.00	60,222	239,232	0	0	
Superstructure (Concrete;Span15#;BM50)	<b>n</b> 2	0.00	64,324	282,524	0	0	(
Substructure (Pier;for Timber;101)	KO	3.00	458,897	25,168	1,376,691	75,504	1,452,19
Substructure (Abut;for Timber;101)	NO	8.00	1,200,388	128,053	9,603,104	1,024,504	10,627,60
Substructure (Pier;for Timber;BNSO)	NO	0.00	674 875	37,224	0	0	
ubstructure (Abut;for Timber;BN50)	NO	0.00	1,362,835	140,846	0	0	
Substructure (Pier;for Concrete;BN50)	ND	0.00	1,393,463	487,788	0	0	
Substructure (Abut;for Concrete;BN50)	NO	0.00	2,948,676	1,017,596	0	. 0	
Demolition of Bridge (limber-)limber)	#2	24.00	14,316	1,106	343,584	26,544	370,12
Demolition of Bridge (Timber-)Concrete)	62	0.00	14,316	1,106	0	0	(
emolition of Bridge (Concrete)	<b>B</b> 2	0.00	73,686	121,003	0	0	
laintenance of Timber Bridge (New)	#2	192.00	9,334	954	1,792,128	183,169	1,975,29
laintenance of Concrete Bridge (New)	#Z		1,922	4,303	0	0	
faintenance of Timber Bridge (Exist)	#2		8,203	2,322	0	0	
laintenance of Concrete Bridge (Exist)	#2		3,900	2,705	0	0	·
( Without Overhead )		01AL POST	(Timber Brid		25,411,819	1,849,104	27,260,92
/ HİCHAAC AAĞUNKAA /	1	101UF 2031	Concrete Br		23,411,017	1,011,110,	*.1.0.1.1
	ļ	IOTAL COST	Without Main		25,411,819	1,849,104	27,260,92
( Overhead : 15% )	ו	OTAL COST	(Timber Brid (Concrete Br		29,223,592 0	2,126,470 0	31,350,06
			Without Main		29,223,592	2,126,470	31,350,06

LINE NO: 4 (IIIB-2) LENGTH : 7 Km

							(-Rp.)
11EN	UNIT	QUANTITY	<<< UNIT LOCAL	COST >>> Foreton	////// LOCAL	COST FOREIGN	<<<<<<>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
		**********				**********	
Superstructure (Timber;Span 3m;101)	#2	0.00	52,702	2,727	0	. Ö	
Superstructure (limber;Span Sm;101)	#?	0.00	58,376	3,012	n n	0	
Superstructure (Timber;Span 8m;101)	a2	200.00	77,325	3,961	15,465,000	792,200	16,257,20
Superstructure (lieber;Span 3m;BH50)	#2	0.00	65,349	3,373	0	111,200	10110/10
Superstructure (limber;Span 5m;BH50)	#2	0.00	71,346	3,658	0	. 0	
Superstructure (Timber;Span 80;8850)	₩2	0.00	90,487	4,632	0	Ň	
Superstructure (Concrete;Span 3#;BNSO)	#2	0.00	52,924	171,810	0	ň	
Superstructure (Concrete;Span Sa;BM50)	₽2	0.00	53,980	192,600	Ď	Ň	
Superstructure (Concrete;Span 80;DHSO)	62	0.00	55,318	210,151	· õ	Ő.	
Superstructure (Concrete;Span10n;BK50)	#2	0.00	60,222	239,232	0	ů Ú	
Superstructure (Concrete;Span15m;BH50)	#2		64,324	202,524	Ő	Û,	
Substructure (Pier;for Timber;101)	ND	6.00	458,897	25,168	2,753,382	151,008	2,904,39
Substructure (Abut;for Timber;101)	NO	2.00	1,200,388	128,063	2,400,775	256,126	2,656,90
Substructure (Pier;for Timber;BN50)	NO NO	0.00	674,875	37 ; 224	0	2001120	tippein
Substructure (Abut;for Timber;BN50)	NO	0.00	1,362,835	140,846	ů	. 0	
Substructure (Pier:for Concrete;BNSO)	NO	0.00	1,393,463	487,700	Ň	0	
Substructure (Abut;for Concrete;BN50)	NO	0.00	2,948,676	1,017,596	0	Ő	
Demolition of Bridge (Timber->Timber)	#Z	0.00	14,316	1,105	õ	Ð	
Devolition of Bridge (Timber->Concrete)	B2	0.00	14,316	1,105	Ň		
Desolition of Bridge (Concrete)	a2	0.00	73,686	121,003	Ŏ	U O	
chartes of bridge (concrete)	87	0.00	101000	1411003	v	v	
faintenance of Timber Bridge (New)	в2	200.00	9,334	954	1,866,800	190,800	2,057,60
faintenance of Concrete Bridge (New)	62	0.00	1,822	4,303	0	0	
laintenance of Timber Dridge (Exist)	#2	0.00	8,203	2,322	0	· . 0	
Maintenance of Concrete Bridge (Exist)	n2	188.00	3,900	2,705	733,200	508,540	1,241,7/
/ 1944 A A					*************	· · · · · · · · · · · · · · · · · · ·	
( ¥ithout Overhead )	1	UIAL CUST	(Timber Bride		20,619,158 0	1,199,334	21,818,4
		GTAL POOT	(Concrete Bri		•	0	DE 610 4
		UINL LUDI	(without Hair	ICENANCEI	20,619,158	1,199,334	21,818,4
( Overhead : 15% )	1	OTAL COST	(Tinber Brid		23,712,032	1,379,234	25,091,2
			(Concrete Bri		0	0	AE 404 8
	]	UTAL COST	lwithout Hair	ncenancel	23,712,032	1,379,234	25,091,2

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PROV : NUSA TENGGARA TIMUR KAD : NGADA LINK NO : 13 (IIIB-1) LENGTH : 25 Km

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· · · ·							( Rp )
ITEN	******				\\\\\\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1. I. I. I. I. I. I. I. I. I. I. I. I. I.	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
******	UNII 	QUANTITY	LOCAL	FOREIGN	LOCAL	FOREIGN	IOTAL
uperstructure (limber;Span 3m;101)	#2	0.00	52,702	2,727	0	0	0
uperstructure (limber;Span 5m;101)	<b>b</b> 2	76.00	58,376	3,012	4,436,576	228,912	4,665,488
uperstructure (limber;Span Bm;101)	62	76.00	77,325	3,961	5,876,700	301,036	6,177,730
uperstructure (Timber;Span 3m;BH50)	#2	0.00	65,349	3,373	0	. 0	· · · (
operstructure (limber;Span Sm;BN50)	•2	0.00	71,346	3,658	0		
uperstructure (Timber;Span Bm;BNSO)	#2	0.00	70,487	1,632	0		
uperstructure (Concrete;Span 3m;BHSO)	m2	0.00	52,924	171,810	0	0	$\{ e_i \} \to \{ e_i \}$
uperstructure (Concrete;Span 5a;BH50)	#2	0.00	53,980	192,600	0	0	
uperstructure (Concrete;Span 8m;BHSO)	• •2	0.00	55,318	210,151	. 0	0	· 1
uperstructure (Concrete;Span10a;BMSO)	•2	0.00	60,222	239,232	0	0	
operstructure (Concrete;Span15a;BH50)	e2	0.00	64,324	282,524	0	. 0	
ubstructure (Pier;for Timber;10T)	ND	3.00	458 897	25,169	1,376,691	75,504	1,452,19
ubstructure (Abut;for Timber;101)	NO	8.00	1,200,398	128,063	9,603,104	1,024,504	10,627,60
ubstructure (Pier;for Timber;BN50)	KD	0.00	674,875	37,224	Û	0	
ubstructure (Abut; for Timber; 8K50)	NO	0.00	1,362,835	140,846	0	0	
Ibstructure (Pier;for Concrete;BMSO)	NO	0.00	1,393,463	487,788	0	Ó	
ubstructure (Abut;for Concrete;BH50)	NO	0.00	2,948,676	1,017,596	0	· 0 ·	
nolition of Bridge (Timber-)Timber)	#2	0.00	14,316	1,105	0	Ó	
molition of Bridge (Timber-)Concrete)	aZ	0.00	14,315	1,106	0	0	. •
emolition of Bridge (Concrete)	æ2	0.00	73,686		0	0	
aintenance of Timber Bridge (New)	#2	152.00	9,334	954	1,418,768	145,008	1,563,77
intenance of Concrete Bridge (New)	•2	0.00	1,822	4,303	0	• 0	
aintenance of fimber Bridge (Exist)	s2	0.00	8,203	2,322	0	0	
aintenance of Concrete Bridge (Exist)	<b>n</b> ?	0.00	3,900	2,705	0	0	
( Without Dverhead )		NTAL ENST	(Timber Brid		21,293,071	1,629,956	22,923,02
· ····································	•		(Concrete Br		0	0	
	. <b>I</b>	OTAL COST	(without Mai		21,293,071	1,629,956	22,923,07
		0TAL 200-			74 401 670	1 074 440	
( Overhead : 15% )	J		(Timber Brid		24,487,032	1,874,449	26,361,40
	-		(Concrete Br		0 34 407 072	() *** ***	01 711 1
		DIAL CUST	(without Hal	ncenancel	24,487,032	1,874,449	26,361,48

LINK NO : 14 (IIIB-1) LENGTH : 47 Km

ITEN					C051 >>>		COST	>>>>>
		UNII	DUANTITY	LOCAL	FOREIGN	LOCAL	FOREIGN	A101
uperstructure (Timber;Span 3m	TATE	<b>8</b> 2	0.00	52,702	2,727	0	^	
uperstructure (linber;Span 5m		#2 #2	0.00	58,376	3,012	U A	0	
uperstructure (limber;Span 8m		82	-	77,325	3,961	17,011,500	871,420	17,882,92
uperstructure (limber;Span 3m		#2	0.00	65,349	3,373	0	011,120	filmeri v
uperstructure (Timber;Span 5m		2	0.00	71,346	3,658	Ň		
uperstructure (Timber;Span 8m		52	0.00	90,487	4,632	, U	ň	
uperstructure (Concrete;Span		.2	0.00	52,924	171,810	ů N	. 0	
uperstructure (Concrete;Span		-2	0.00	53,980	192,600	0	. 0	
uperstructure (Concrete;Span		a2	0.00	55,318	210,151	0	· Å	
uperstructure (Concrete;Span)		#2		60,222	239,232	Ň	А.	
uperstructure (Concrete;Span)		62	0.00	64,324	282,524		Ő.	
ubstructure {Piersfor Timbers		NO	5.00	458,897	25,169	2,294,485	125,840	2,420,32
ubstructure (Abut;for Timber;		NO	6.00	1,200,388	128,063	7,202,328	768,378	7,970,70
ubstructure (Pier;for Timber;		ND	0.00	674,875	37,224	111011010	/55,0/0	. Invite
ubstructure (Abut;for Timber;		NO	0.00	1,362,835	140,846	ò	0	
ubstructure (Piersfor Concret		ND	0.00	1,393,463	487,788	0	ů	
ubstructure (Abut;for Concret		NO	0.00	2,948,676	1,017,596	0	Ő	
emplition of Bridge (limber-)		112 112	0.00	14,316	1,106	0	. 0	
emolition of Bridge (Timber->		#2	0.00	14,316	1,106		ů	
exolition of Bridge (Concrete		#2	0.00	73,686	121,003	• 0	ò	
aintenance of limber Bridge (	Novi	#Z	220.00	9,334	954	2,053,480	209,880	2,263,38
aintenance of Concrete Bridge		#2	0.00	1,822	4,303	110031100	. Ö	110010
aintenance of limber Bridge (		#2 #2	0.00	8,203	2,322	· •	0	
aintenance of Concrete Bridge		a2	0.00	3,900	•	0		
statemente of contrete of toge	1211507	#Z	0.00	31700 ···	21703	v	v	
								*********
( Without Overhea	d )	T	OTAL COST	(Timber Bride		26,509,313	1,765,638	28,273,9
		1.1		(Concrete Dri		0	0	
		Ĩ	OTAL COST	(without Nai)	ntenance)	26,509,313	1,765,638	28,273,9
			و چی سر یو مه به هدینو یو 	*************				
( Overhead : 15%	)	1	OTAL COST	(Timber Brid		30,484,560	2,030,484	32,515,0
				(Concrete Br		0	0	
		Ĩ	UTAL COST	(without Hai	ntenance}	30,484,560	2,030,484	32,515,0

PROV : NUSA TENBGARA TIMUR KAB : NGADA LINK NO : 20 (IIIB-2) LENGTH : 20 Km

( Rp ) ITEM ((((( COST >>>>> UNIT QUANTITY LOCAL FORELGN LOCAL FOREIGN TOTAL ........ Superstructure (Timber;Span 3m;10T) 0.00 52 52,702 2,727 â â 0 Superstructure (linber; Span Satiot) a2 -80.00 58,376 3,012 4,670,0B0 240.960 4.911.040 Superstructure (Timber;Span Re;10T) #2 0.00 77,325 3,961 · 0 . 0 Ô Superstructure (limber; Span 3m; BMSO) 3,373 #Z 0.00 65,349 0 0 0 Superstructure (Tlaber;Span 5a;BMSO) 0.00 82 71,346 3,658 Û Ô Û Superstructure (limber;Span 8m;BH50) •2 0.00 90,487 ÷ 0 1,632 0 ۸ Superstructure (Concrete;Span 3m;8H50) #2 0.00 52,924 171,810 0 ۸ A Superstructure (Concrete;Span 5x;BM50) e2 0.00 53,980 192,600 0 ۵ ۵ Superstructure (Concrete; Span 8m; BM50) n2 0.00 55,318 210,151 - 0 0 Û Superstructure (Concrete; Span10a; BNSO) ₽2 0.00 60,222 239,232 0 a A Superstructure (Concrete; Span15m; BMS0) #2 0.00 61,324 282,524 Û đ đ Substructure (Pier:for Timber:101) NO 25,169 2.00 458,897 917,794 50,336 968,130 Substructure (Abut; for Timber; 101) NO 128,063 4.00 1,200,388 4,801,552 512,252 5,313,804 Substructure (Pier; for Timber; 8850) ×0 0.00 674.875 37,224 · 0 0 0 Substructure (Abut; for Timber; BN50) NO 0.00 1,362,835 140,846 0 Û 0 Substructure (Pier; for Concrete; 8850) NQ 0.00 1.393,463 487,788 0 0 0 Substructure (Abut; for Concrete; BN50) NQ 0.00 2,948,676 1,017,596 Ð Û ٥ Demplition of Bridge (Timber-)Timber) 0.00 B2 14,316 1,106 - Ø 0 0 Demolition of Bridge (limber-)Concrete) •2 0.00 14,316 1,105 0 Q 0 Demolition of Bridge (Concrete) n2 0.00 73,686 121,003 0 0 0 Maintenance of Timber Bridge (New) 80.00 9.334 951 745,720 #2 76.320 823.040 Maintenance of Concrete Bridge (New) 0.00 1,822 4,303 0 ŧZ. . 0 0 Maintenance of Timber Bridge (Exist) a2 0.00 8,203 2,322 0 0 0 Maintenance of Concrete Bridge (Exist) 0,00 3,900 ð Ô a2 2,705 0 ( Without Overhead ) TOTAL COST (Timber Bridge) 10,389,426 803,548 11,192,974 (Concrete Bridge) 0 ð 0 TOTAL COST (without Haintenance) 10,389,426 803,548 11,192,974 ( Overhead : 15% ) TOTAL COST (Timber Bridgel 11,947,840 924,080 12,871,920 0 (Concrete Bridge) 0 0 TOTAL COST (without Maintenance) 11,947,840 924,080 12,871,920

28-A-38

FROV	ţ	NUSA TENGGA	RA TIMUR	KAB	: NGADA
LINK NO	ŧ	24 (1118-2)	) LENGT	rh i	20 Km

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···						*	(Rp)
ITEN				COST >>>	****	COST	<b>&gt;&gt;&gt;&gt;&gt;</b>
a na a sa a a an an an an an an an an an an an a	UNIT	QUANTITY	LOCAL	FOREIGN	LOCAL	FORETON	TOTAL
uperstructure (fieber;Span 3e;101)	#2	0.00	52,702	2,127	0	0	0
uperstructure (Timber;Span 5m;101)	#2	0.00	58,376	3,012	0	0	Û
uperstructure (lieber;Span 8a;101)	a2	60.00	17,325	3,961	4,639,500	237,660	4,877,160
uperstructure (Timber;Span 3m;BHSO)	#2	0.00	65,349	3,373	0	0	
uperstructure (limber;Span 5m;BHSO)	a2	0.00	71,346	3,658	Q	0	
Operstructure (Timber;Span 8m;BM50)	6 <u>7</u>	0.00	90,487	4,632	0	0	· · · (
uperstructure (Concrete;Span 3m;BHSO)	•7	0.00	52,924	171,810	0	0	(
Ruperstructure (Concrete;Span 5m;BH50)	ø2	0.00	53,780	192,600	0	0	0
uperstructure (Concrete;Span 8m;BNSO)	82	0.00	55,318	210,151	0	0	Ċ
Superstructure (Concrete;Span10a;BN50)	=2		60,222	239,232	. 0	Ō	1
uperstructure (Concrete;Span15a;BH50)	62		64,324	282,524	0	0	, (
Substructure (Pier;for Tinber;101)	NO	0.00	458,897	25,169	0		
ubstructure (Abut;for Ticher;101)	NO	4.00	1,200,388	128,063	4,801,552	512,252	5,313,80
Substructure (Pier;for Timber;8850)	NO	0.00	674,875	37,224	0	0	
ubstructure (Abut;for limber;8H50)	KQ	0.00	1,362,835	140,846	0	ů.	
Substructure (Pier; for Concrete; 8850)	HO		1,393,463	487,788	Ő	. 0	-
Substructure (Abut;for Concrete;8N50)	NO	0.00	2,948,676	1,017,596	ů.	ő	
Demolition of Bridge (Timber-)Timber)	•2		14,316	1,106	ů ·	0.	
Perolition of Bridge (Timber-)Concrete)	a2		14,316	1,106	0	. 0	
Demolition of Bridge (Concrete)	¢2		73,686	121,003	Ň	· ^	
control of single consists.		0100	101000	3113000	v	v	
faintenance of Timber Bridge (New)	<b>s</b> 2	60.00	9,334	954	560,040	57,240	617,28
laintenance of Concrete Bridge (New)	· •2	0.00	1,822	4,303	0	0	
laintenance of limber Bridge (Exist)	£2	0.00	8,203	2,322	0	0	•
faintenance of Concrete Bridge (Exist)	#2		3,900	2,705	0	0	
( Without Overhead )		TOTAL COST	(Tinber Brid		9,441,052	749,912	10,190,98
and the second second second second second second second second second second second second second second second			(Concrete Br		0	0	14 184 54
		IUTAL COST	(without Mai	ntenancel	9,441,052	749,912	10,190,96
J D			///		10 853 910		11 710 J
( Overhead + 15% )		IUTRL COST	(fimber Brid		10,857,210	862,399	11,719,60
			(Concrete Br		•	0 017 700	11 310 14
		IUTAL LUST	(without Nal	ncenauce)	10,857,210	862,399	11,719,60

LINK NO : 25 (IIIC) LENGTH : 16 Km

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1 T E H	UNET	QUANTITY		COST >>> Foreign	 (////////////////////////////////	COST FORE IGN	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
							1018 
perstructure (limber;Span 3m;101)	<b>a</b> 2	0.00	52,702	5 141	•		
perstructure (Timber;Span 5a;101)	•2	0.00	58,376	2,727	0	. 0	
perstructure (limber;Span 8m;101)	#2 #2	0.00		3,012	U -	.0	. <sup>1</sup> .
iperstructure (Timber;Span 3m;BN50)	#2		77,325	3,961	0	Q	
perstructure (Timber;Span 5m;BNSO)		0.00	65,349	3,373	0	0	
operstructure (Timber;Span 8m;BMSO)	#2	0.00	71,346	3,659		. 0	
	#2	0.00	90,407	4,632	0	0	
perstructure (Concrete;Span 3m;BH50)	#2	0.00	52,924	171,810	0	0	
perstructure (Concrete;Span 5m;BH50)	#2	0.00	53,980	192,600	0	0	
perstructure (Concrete;Span 0m;BN50)	#Z	0.00	55,318	210,151	Q	. 0	
uperstructure (Concrete;Span10#;BH50)	#Z	0.00	60,222	239,232	· 0	0	
uperstructure (Concrete;Span15#;BN50)	#2	0.00	64,324	202,524	0	· 0	
bstructure (Pierjfor Timber;101)	NÖ	0.00	458,897	25,168	0	0	
Abstructure (Abut;for Timber;101)	NO	0.00	1,200,388	120,063		- 0 -	
ubstructure (Pier;for Timber;8850)	ND	0.00	674,875	37,224	0	Ŭ.	
ubstructure (Abut;for Timber;BN50)	NØ	0.00	1,362,835	140,846	0	0	
bstructure (Pier;for Concrete;BMSO)	NO		1,393,463	487,788	õ	. 0	
ubstructure (Abut;for Concrete;BNSO)	NO		2,948,676	1,017,596	. 0	Ŏ	
molition of Bridge (Timber-)limber)	s2	0.00	14,316	1,106	Ň	0	
molition of Bridge (limber-)Concrete)	a2	0.00	14,316	1,106	0	0	
molition of Bridge (Concrete)	#2	0.00	73,686	121,003	0	0	
abilition of bridge (contrete)		0.00	101000	1211000	U	v	
intenance of Timber Bridge (Nem)	a2	0.00	9,334	954	0	0	
intenance of Concrete Bridge (New)	e2	0.00	1,822	4,303	0	. 0	
intenance of Timber Bridge (Exist)	#2	0.00	8,203	2,322	0	0	
intenance of Concrete Bridge (Exist)	<b>n</b> 2		3,900	2,705	130,650	90,617	221,2
( Without Overhead )	I	OTAL COST	(Timber Bride		0	0	
		- 14	(Concrete Bri		0	0	
	1	OTAL COST	(without Main	itenance)	. 0	. 0	
	· · · · · · · · · · · · · · · · · · ·					••••••••	*****
( Overhead t 15% )	1	DIAL COST	(limber Bride		0	0	
			(Concrete Bri		-0	0	
	. 1	IDTAL COST	(without Hair	ntenancel	0	0	

PROV : NUSA TENGGARA TIMUR KAB : NGADA LINK NO : 26 (1118-2) LENGTH : 15 Km

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ITEH A A A A A A A A A A A A A A A A A A A	UNIT	QUANTITY	KKK UNIT Local	COST >>> FOREIGN	UCAL	COST Fore ign	>>>>>> Total
							********
Superstructure (Timber;Span 3m;101)	62	0.00	52,702	2,727	0	0	
Superstructure (Timber;Span Sm;10T)	e2	40.00	58,376	3,012	2,335,040	120,400	2,455,520
operstructure (Timber;Span 8m;10T)	e2	32.00	77,325	3,961	2,474,400	126,752	2,601,15
uperstructure (Timber;Span 3m;BHSO)	. ∎2	0.00	65,349	3,373	0	. 0	
uperstructure (Timber;Span 5m;BH50)	•2	0.00	71,346	3,658	0	0	
Superstructure (Timber;Span Ba;RMSO)	n2	9.00	90,487	4,632	0	0	
uperstructure (Concrete;Span 3m;BNSO)	#2	0.00	52,924	171,910	0	0	
imperstructure (Concrete;Span Sa;BHSO)	#2	0.00	53,980	192,600	0	0	1
uperstructure (Concrete;Span 8m;BH50)	e2	0.00	55,318	210,151	0	0	
uperstructure (Concrete;Span10s;BH50)	#2	0.00	60,222	239,232	0	0	
Superstructure (Concrete;Spani5e;BHSO)	#2	0.00	64,324	282,524	0	Q	
Substructure (Pier;for Timber;101)	NO	1.00	458,897	Z5,16B	458,897	25,168	484,06
Substructure (Abut; for Timber; 10T)	NO	4.00	1,200,388	128,063	4,801,552	512,252	5,313,80
Substructure (Pier;for Timber;BN50)	NO	0.00	674,875	37,224	0	0	. ,
Substructure (Abut;for Timber;BN50)	NO	0.00	1,362,835	140,845	0	0	
Substructure (Pier;for Concrete;BM50)	HØ	0.00	1,393,463	487,789	0	0	
Substructure (Abut;for Concrete;BH50)	NO	0.00	2,948,676	1.017.596	0	0	•
Demolition of Bridge (Timber-)Timber)	#2	· .	14.316	1,105	0	. 0	
Demolition of Bridge (Timber-)Concrete)	82	0.00	11,316	1,106	0	Ó	
Demolition of Bridge (Concrete)	a2		73,686	121,003	0	0	
laintenance of Timber Bridge (New)	42	72.00	9,334	954	672,048	68,688	740,73
laintenance of Concrete Bridge (New)	ø2	0.00	1,822	4,303	0	0	
laintenance of Timber Bridge (Exist)	82	24.00	8,203	2,322	196,872	55,728	252,60
faintenance of Concrete Bridge (Exist)	#2	0.00	3,900	2,705	0	0	,
( Hithout Overhead )		TOTAL COST (Timber Bridge)			10,069,089	784,652	10,854,54
			(Concrete Br	idge)	0	` 0	
		TOTAL COST	(without Kaintenance)		10,069,889	784,652	\$0,854,5
( Overhead : 15% )		TOTAL COST	(Timber Bridge)		11,580,372	902,350	12,482,7
			(Concrete Br		0	0	
		TOTAL COST	(without Hai	ntenance)	11,580,372	902,350	12,482,7

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LINK NO 1 30 (IIIB-2) LENOTH 1 25 Km

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ITEN	UN17	QUANTITY		COST >>> FOREIGN	<<<<< Local	COST FOREIGN	>>>>>> Total
	*******	*******		***********	**************	************	
Superstructure (Timber;Span 3#;101)	#2	0.00	52,702	2,727	0		. 0
Superstructure (Timber;Span 5m;101)	#2	112.00	58,376	3,012	6,538,112	337, 344	6,875,456
Superstructure (Tlaber;Span 8a;101)	n2	24.00	77,325	3,961	1,855,800	95,064	1,950,864
Superstructure (Timber;Span 3m;BH50)	e2	0.00	65,349	3, 373	0	0	////////
Superstructure (Timber;Span 5m;BH50)	<b>a</b> 2	0.00	71,346	3,659	Ő		ſ
Superstructure (Timber;Span 8m;BH50)	42	0.00	90,487	4,632	0	0	
Superstructure (Concrete;Span 3m;BN50)	<b>¤</b> 2	0.00	52,924	171,810	0	Ó	
Superstructure (Concrete;Span 54;BH50)	n2	0.00	53,980	192,600	0.	Ō	
Superstructure (Concrete;Span 8m;BN50)	#2	0.00	55,318	210,151	0	0	(
Superstructure (Concrete;Span10m;BH50)	e2	0.00	60,222	239,232	0	0	
Superstructure (Concrete;Span15;8K50)	. <b>#</b> 2	0.00	64,324	282,524	.0	. 0	
Substructure (Pier; for Timber; 10T)	NO	2,00	458,897	25,168	917,794	50,336	968,13
Substructure (Abut;for Timber;107)	NG	10.00	1,200,388	128.063	12,003,880	1,280,630	13,281,51
Substructure (Pier;for Timber;BH50)	KØ	0.00	674,875	37,224	0	0	
Substructure (Abut; for Timber; BHSO)	NQ	0.00	1,362,635	140,846	0	ò	
Substructure (Pier;for Concrete;8050)	NÐ	0.00	1, 393, 463	487.788	Ō	8	
Substructure (Abut; for Concrete; 8H50)	NO	0.00	2,948,676	1,017,596	0	0	
Desolition of Bridge (Timber-)limber)	я2	0,00	14,316	1,105	0	0	• •
Demolition of Bridge (limber-)Concrete)	#2	0.00	14,316	1,105	0	0	
Desolition of Bridge (Concrete)	.82	0.00	73,686	121,003	0	0	÷
Maintenance of likber Bridge (New)	#2	136.00	9,334	954	1,269,424	129,744	1,399,16
Maintenance of Concrete Bridge (New)	a2	0.00	1,822	4,303	0	0	
Haintenance of Timber Oridge (Exist)	a2	0.00	8,203	2,322	. 0	0	
Haintenance of Concrele Bridge (Exist)	•2	0.00	3,900	2,705	<b>0</b>	0	
/ Williams Durachard 1		DIAL DUAL	///		91 715 EDJ		
( Without Overhead )	. 1	UTHE CUST	(Timber Brid) (Concrete Bri		21,315,586	1,763,374	23,078,98
	1	OTAL COST	twithout Nain		21,315,586	1,763,374	23,078,98

( Overhead : 15% )	TOTAL COST	(Timber Bridge)	24,512,924	2,027,980	26,510,801
· .		(Concrete Bridge)	0	0	0
	TOTAL COST	(without Maintenance)	24,512,924	2,027,080	26,540,804

