社会開発調査部報告書

No. 22

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS

Feasibility Study
on
The Rural Road Network Development Project

FINAL REPORT (Volume 12)

PROJECT EVALUATION
IN
THE PROVINCE OF LEYTE

OCTOBER, 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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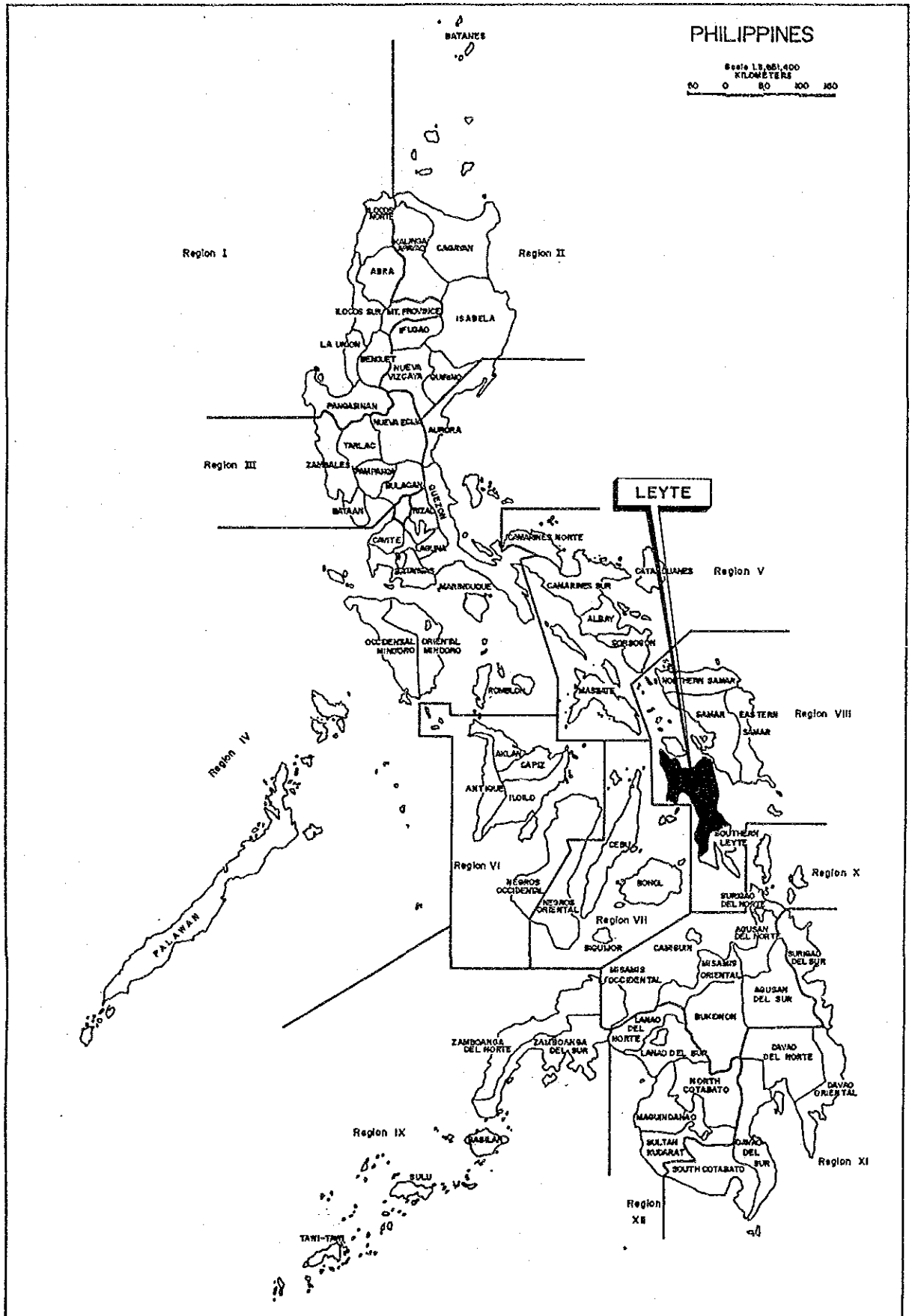

FEASIBILITY STUDY
ON
THE RURAL ROAD NETWORK DEVELOPMENT PROJECT

LOCATION MAP

VOLUME - 12
PROVINCE OF LEYTE

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CHAPTER 1
SOCIO-ECONOMIC PROFILE OF THE PROVINCE

1.1 GENERAL

The Province of Leyte was selected as one of the Study Provinces which represents the province of the following characteristics:

- Economically less developed
- Average level in road development
- Topographically flat and mountainous

1.2 GEOGRAPHY AND TOPOGRAPHY

The province is located in the northern and central portions of Leyte Island which is composed of the provinces of Leyte and Southern Leyte. Leyte shares 78% of land area of the island.

Mountain ranges run through from the north to south at about the center of the Island. Eastern area of the ranges is generally flat land. Western area of the ranges is mostly mountainous with narrow flat land along the western coastal line.

Slope map of the province is shown in Figure 1.2-1.

1.3 POPULATION

The province is composed of two (2) cities and forty-one (41) municipalities. The provincial capital is located at Tacloban City which is also the regional capital of Region VIII. The subprovince of Biliran was excluded from the study.

Population in 1990 is estimated at 1,420,000. The average annual population growth rate for the period of 10 years from 1980 to 1990 was estimated 1.8% which is much lower than the national average of 2.4%. Population density of the province in 1990 is 252.1 persons per square kilometer which is higher by 1.2 times than the national average of 205 persons per sq. km.

Population, the average annual population growth rate and population density by city/municipality are presented in Table 1.3-1. Distribution of cities and municipal towns together with their population is shown in Figure 1.3-1. Cities and municipal towns are widely distributed in the province except mountainous areas which run north to south in the central part of the province.

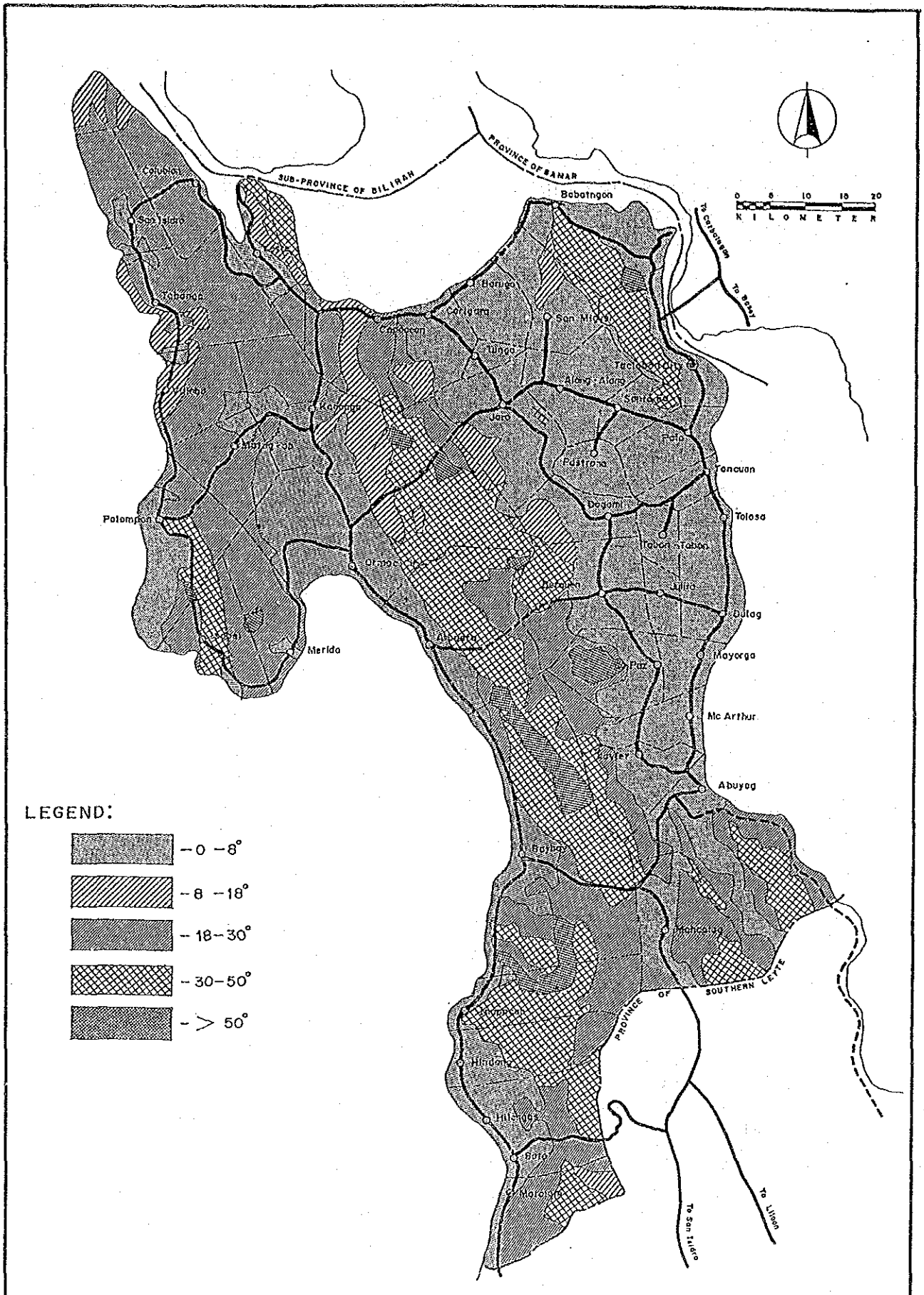

FIGURE 1.2 - 1 SLOPE MAP

Table 1.3-1

POPULATION, LAND AREA AND DENSITY (1990)
Province of Leyte

City/Municipality	Projected Population (1990)	Annual Growth Rate (%)	Land Area (km^2)	Density (p/km^2)
1. Tacloban City	122,506	1.8	100.9	1,214.1
2. Ormoc City	125,439	1.8	464.3	270.2
3. Abuyog	51,221	2.1	294.7	173.8
4. Alangalang	35,274	1.8	150.5	234.4
5. Albuera	33,224	1.9	181.2	183.3
6. Babatngon	18,400	1.1	137.8	133.5
7. Barugo	26,495	1.8	78.5	337.5
8. Bato	29,812	2.0	87.1	342.3
9. Baybay	89,188	1.8	410.5	217.7
10. Burauen	54,294	1.2	178.0	305.0
11. Calubian	28,875	0.8	137.0	210.8
12. Capoocan	24,766	1.8	185.4	133.6
13. Carigara	38,070	1.0	94.9	401.1
14. Dagami	25,255	1.4	160.0	157.8
15. Dulag	32,343	1.4	39.0	829.3
16. Hilongos	54,917	2.3	136.9	401.1
17. Hindang	19,829	2.0	127.4	155.6
18. Inopacan	18,889	1.7	182.4	103.5
19. Isabel	18,156	1.3	97.5	186.2
20. Jaro	33,360	1.1	148.7	224.3
21. Javier	20,680	1.8	141.8	145.8
22. Julita	10,585	0.8	53.3	198.6
23. Kananga	35,589	2.3	144.2	246.8
24. La Paz	18,870	1.3	171.5	110.0
25. Leyte	34,996	1.8	238.3	146.9
26. Mac Arthur	15,249	1.8	48.6	313.8
27. Mahaplag	26,107	2.5	172.0	151.8
28. Matag-ob	25,920	4.7	31.7	817.7
29. Matalom	30,495	1.5	75.4	404.4
30. Mayorga	12,449	2.5	61.6	202.1
31. Merida	21,933	1.5	122.7	178.8
32. Palo	40,468	2.6	67.6	598.6
33. Palompon	48,845	1.9	104.0	469.7
34. Pastrana	12,970	1.8	79.3	163.6
35. San Isidro	23,607	0.6	109.2	216.2
36. San Miguel	14,015	1.8	120.1	116.6
37. Santa Fe	12,286	2.3	81.9	150.0
38. Tabango	36,630	2.2	129.2	283.5
39. Tabon-Tabon	7,729	1.8	23.9	323.4
40. Tanauan	34,733	1.0	68.1	510.0
41. Tolosa	12,981	1.8	31.7	409.5
42. Tunga	5,938	1.8	38.2	155.4
43. Villaba	36,910	1.8	126.0	292.9
T O T A L	1,420,298	1.8	5,633.0	252.1

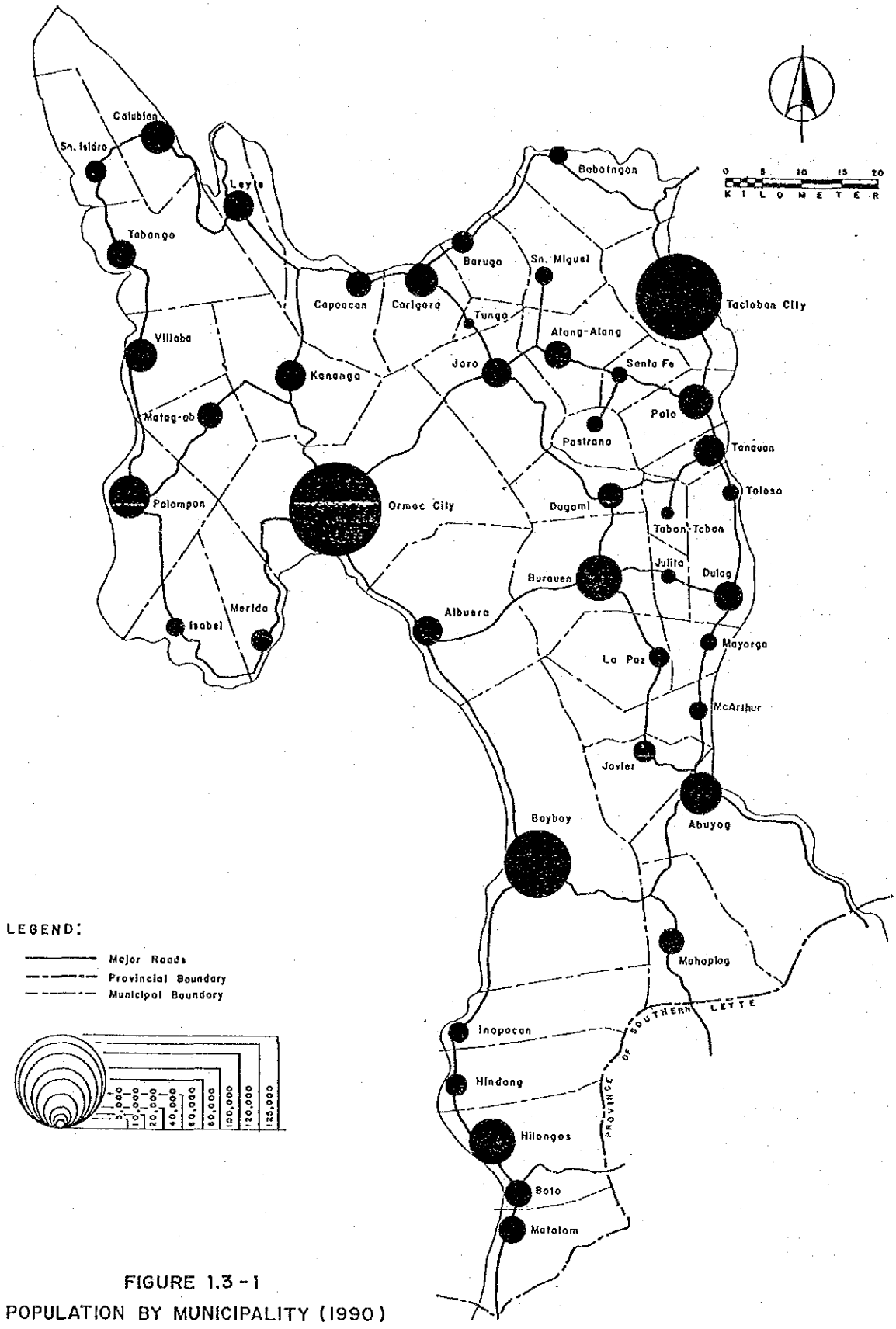

FIGURE 1.3 - 1
POPULATION BY MUNICIPALITY (1990)

1.4 SOCIO-ECONOMIC PROFILE

Table 1.4-1 shows major socio-economic data of the province in comparison with the national value.

Gross Regional Domestic Product which shows economic output of the province shares 1.1% of the total national output. In view of land area and population share of the province to the country, the province's economic output is in the lower level than the national average.

Per capita income of the province is low and only 62% of the national average. Incidence of poverty is much higher than the national average. Unemployment rate is lower, but underemployment rate is higher than the national average.

Agriculture is the predominant industry of the province and shares 68% in terms of number of workers.

Table 1.4-1
MAJOR SOCIO-ECONOMIC DATA OF PROVINCE OF LEYTE

	Leyte (A)	Philippines (B)	(A)/(B)
1. Total Land Area (sq.km.)	5,633	300,000	0.019
2. Population in 1990 (1000 persons)	1,420	61,483	0.023
3. Population Density (persons/sq.km.)	252	205	1.23
4. GRDP (Million ₱ at 1000 prices)	7,007	623,051	0.011
5. Per Capita Income in 1985 (₱/person)	3,456	5,593	0.62
6. Number of Workers by Industrial Sector in 1980 (1000 persons)			
* Agricultural	254.3 (68%)	7,303 (51%)	0.035
* Industry	30.1 (8%)	2,177 (15%)	0.014
* Service	84.8 (23%)	4,552 (32%)	0.019
* Total 1/	373.7 (100%)	14,197 (100%)	0.026
7. Incidence of Poverty in 1985 (%)	68.0	59.3	-
8. Unemployment Rate in 1988 (%)	5.5	8.3	-
9. Underemployment Rate in 1988 (%)	17.3	11.6	-

Note: 1/ Includes other workers who cannot be classified as any one of three (3) sectors.

1.5 AGRICULTURAL LAND USE AND MAJOR CROPS

Leyte has a total land area of 5,633 square kilometers, representing 1.9% of the total land area of the Philippines. Table 1.5-1 shows general land use of the province. About 61% of the province are occupied by agricultural land and about 27% by forest land.

Figure 1.5-1 illustrates the agricultural land use of the province. Table 1.5-2 shows major crops produced in the province. Five (5) major crops of the province are corn, palay, coconut, abaca and camote. The province substantially accounts for Region VIII's output of corn (60%), palay (61%), coconut (80%) and abaca (65%).

Table 1.5-1
LAND USE OF LEYTE

Land Use	Area in sq.km.	%
Agricultural Area	3,430.5	60.9
Forest	1,526.5	27.1
Brushland	168.8	3.0
Cogon/Openland	169.2	3.0
Marsh/Swamp	78.9	1.4
Built-up Area	259.1	4.6
Total	5,633.0	100.0

Source: Socio-Economic Profile of Leyte

Table 1.5-2
MAJOR CROPS OF PROVINCE OF LEYTE

Major Crops	Area Utilized (ha.)		Production (M.T.)	
	1985	1986	1985	1986
Corn	160,810	164,950	163,760	142,040
Palay	120,990	123,750	289,320	284,810
Coconut	-	155,546	-	100,547
Abaca	16,800	16,808	13,856	13,871
Camote	15,777	16,107	56,655	57,148

Source: Bureau of Agricultural Statistics

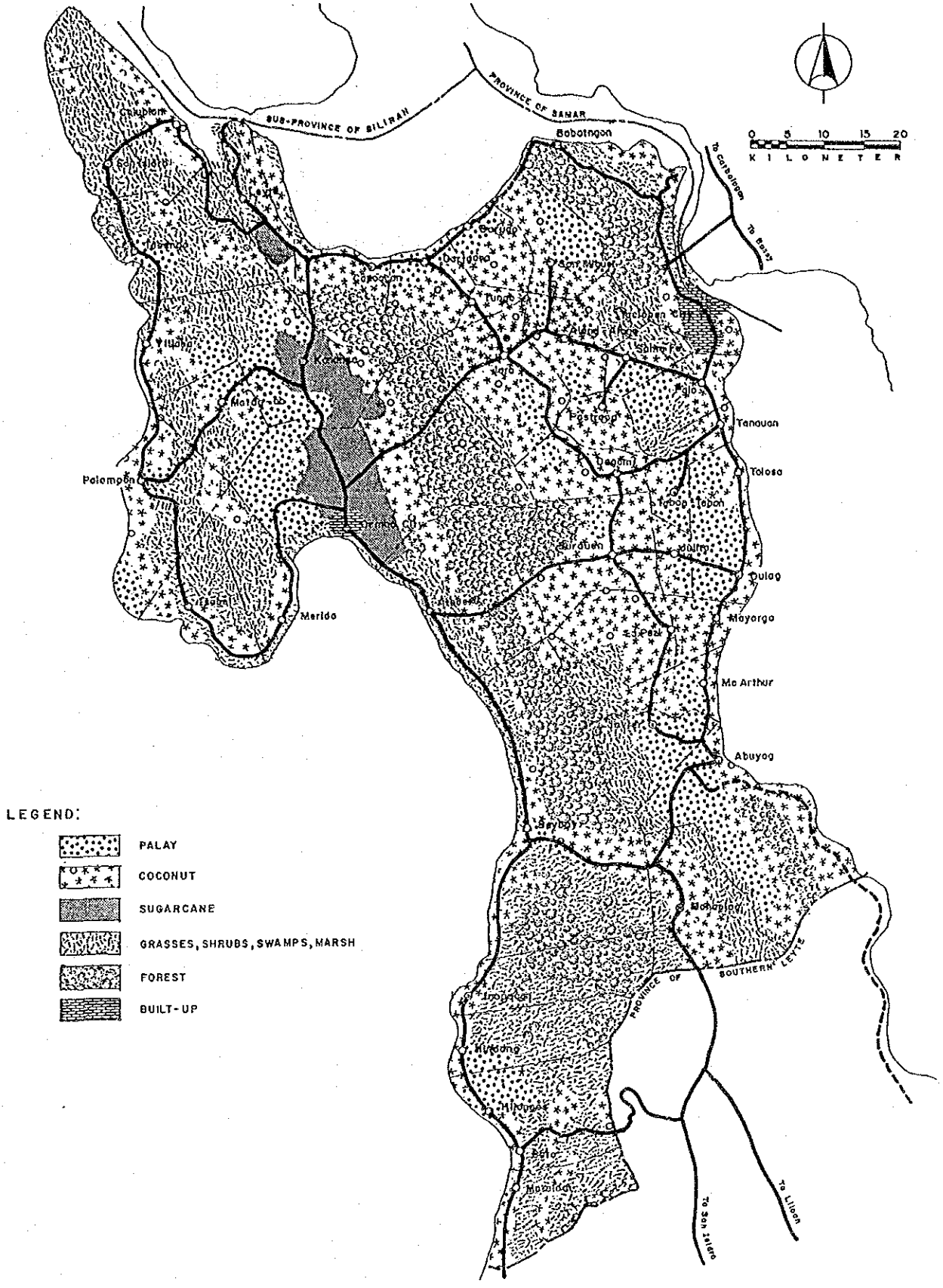

FIGURE 1.5 - 1 AGRICULTURAL LAND USE

CHAPTER 2
ROAD NETWORK OF THE PROVINCE

2.1 GENERAL

The province was classified as one of the provinces of which road network development represents the average level in the Philippines. In this Chapter, present level of road network development is assessed more in details, then general direction of the future road network development is established. Based on the said assessment and the functional road classification criteria, the major road network for the Province is proposed.

2.2 PRESENT LEVEL OF ROAD NETWORK DEVELOPMENT

Present level of the road network development level is assessed in terms of road extension (quantity of roads), surface type and conditions (quality of roads) and road network pattern.

2.2.1 Present Level of Road Development in terms of Road Extension

Leyte has a total of 3,804.7 kms. of roads, comprising 959.0 kms. of National, 520.6 kms. of Provincial, 60.5 kms. of City, 351.5 kms. of Municipal and 1,913.1 kms. of Barangay Roads in 1987.

Table 2.2-1 shows road density by class of road which is compared with national average. In comparison with the national average, road development level of the province in terms of road extension is summarized as follows:

National roads	higher by 1.58 times
Provincial roads	low at 77% of the national average
Barangay roads	almost same as the national average
All roads	almost same as the national average

In terms of road extension, national and provincial roads are in high level, however, barangay roads are in low level.

2.2.2 Present level of Road development in terms of surface type and surface condition

The Study Team conducted an extensive field survey on the existing road conditions of which results are summarized in Table 2.2-2.

TABLE 2.2-1
EXISTING ROAD LENGTH AND ROAD DENSITY
Province of Leyte

Road Class	Road Length In 1987 (kms.)	Road Density (L/ PA)		
		Leyte	Philippines	Leyte /Phils
National Rd.	959.0 (25.2)	0.3151	0.1994	1.58
Prov'l. Rd.	520.6 (13.7)	0.1710	0.2211	0.77
Sub-Total	1,479.6 (38.9)	0.4861	0.4205	1.16
City Rd.	60.5 (1.6)	0.0199	0.0304	0.65
Municipal Rd	351.5 (9.2)	0.1155	0.0981	0.18
Barangay Rd.	1,913.1 (50.3)	0.6285	0.6536	0.96
TOTAL	3,804.7(100.0)	1.2500	1.2026	1.04

*SOURCE: DPWH Infrastructure Atlas, 1989

TABLE 2.2-2
EXISTING SURFACE CONDITION (SURVEYED ROADS ONLY)
Province of Leyte

Road Class	Pavement Type	Surface Condition 1/			% of Pavement Type 2/	
		Good/Fair	Bad/Very Bad	Total (%)	Leyte	Phils.
National Road	PCC	345.6 (92.5)	28.2 (7.5)	373.8 (100.0)	50.2	23.6
	Bituminous	5.9 (79.7)	1.5 (20.3)	7.4 (100.0)	11.3	22.3
	Gravel	117.6 (34.8)	220.6 (65.2)	338.2 (100.0)	38.5	51.3
	Earth	- -	10.3 (100.0)	10.3 (100.0)	-	2.8
	Total:	469.1 (64.3)	260.6 (35.7)	729.7 (100.0)	100.0	100.0
Provincial Road	PCC	12.5(100.0)	- -	12.5 (100.0)	0.7	2.5
	Bituminous	- -	- -	- (100.0)	29.5	8.9
	Gravel	49.0 (23.3)	161.0 (76.7)	210.0 (100.0)	49.4	70.6
	Earth	- -	10.8 (100.0)	10.8 (100.0)	20.4	18.0
	Total:	61.5 (26.4)	171.8 (73.6)	233.3 (100.0)	100.0	100.0
National and Provincial Road	PCC	358.1 (92.7)	28.2 (7.3)	386.3 (100.0)	25.8	12.5
	Bituminous	5.9 (79.7)	1.5 (20.3)	7.4 (100.0)	20.2	15.3
	Gravel	166.6 (30.4)	381.6 (69.6)	548.2 (100.0)	43.9	61.4
	Earth	- -	21.1 (100.0)	21.1 (100.0)	10.1	10.8
	Total:	530.6 (55.1)	432.4 (44.9)	963.0 (100.0)	100.0	100.0

SOURCE: 1/ Survey by Study Team in 1989
2/ DPWH Infrastructure Atlas, 1989

Present level of road development in terms of surface condition (quality of roads) could be summarized as follows:

National Roads

- About 37% of national roads in the province are paved with PCC or bituminous surfaces, which is lower than the national average of 46%.
- About 64% of national roads were rated good/fair condition.
- In consideration of extensive length of national roads in the Province, quality of roads is considered in the standard level.

Provincial Roads

- Only 7% of provincial roads are paved with PCC or bituminous surfaces, which is in slightly lower than the national average of 11%.
- About 74% are assessed in bad/very bad condition.
- Quality of provincial roads is still in very low standard.

2.2.3 Present Road Network Pattern

Present road network is presented in Figure 2.2-1, which shows all existing national and provincial roads. Present road network of the Province is assessed as follows:

- In the eastern area, relatively fine mesh type network is formed.
- In the north-western area, mesh type network is formed.
- The rest of the area (the south-western area) is a comb type network pattern.
- Pan-Philippine Highway in the east and West Leyte Road in the west are two (2) north-south axis.
- Palo-Jaro-Capoocan Road and Mahaplag-Baybay Road are the two (2) east-west axis.
- All municipal towns are connected with a national or provincial road.

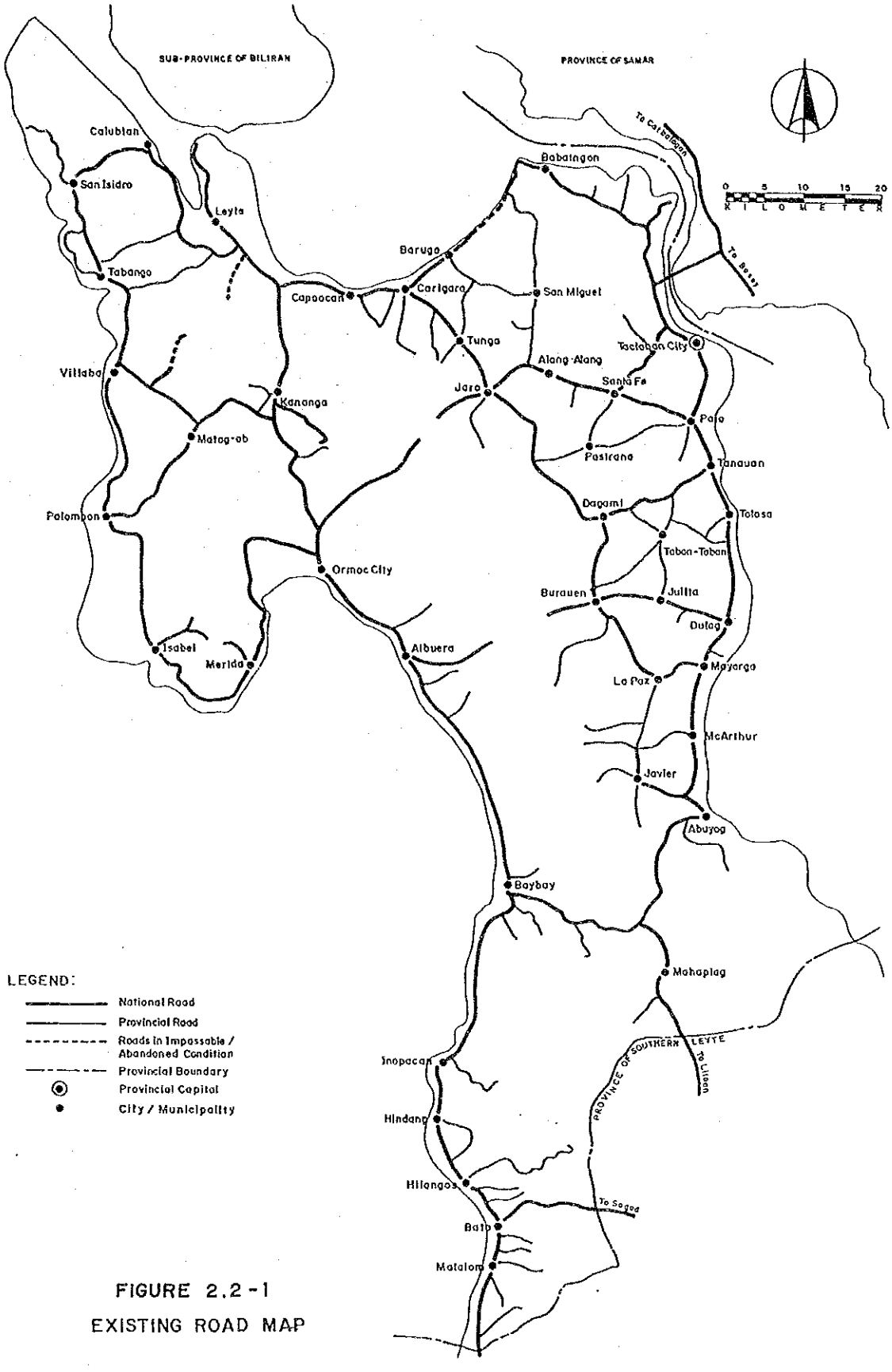

FIGURE 2.2-1
EXISTING ROAD MAP

2.3 GENERAL DIRECTION OF ROAD NETWORK DEVELOPMENT

Results of assessment of present road network development level are summarized as follows:

- In terms of road extension, the province is in the standard level of the country.
- Quality of national roads is in the standard level, but quality of provincial roads is still in very poor level.
- Basic road network is formed.

Based on the above assessment, general direction of road network development of the Province will be as follows:

(1) Major national roads such as West Leyte Road and North-West Leyte Roads are being and will be soon improved, therefore, next step will be improvement of existing provincial and barangay roads.

(2) Efforts should be made to complete one (1) or two (2) more east-south links to realize more efficient and flexible road network.

2.4 PROPOSED MAJOR ROAD NETWORK

2.4.1 Procedure

To identify major roads, all existing roads are firstly classified in accordance with the functional road classification criteria which is shown in Table 2.4-1. Functional classification groups roads according to importance and quality of services they are intended to provide. Individual road links of similar importance and quality of services are organized into systems so that a road network in accordance with the hierarchy of functions can be planned and formed. They can be efficiently managed with consistent policies, design and operation.

After identification of existing major roads, necessity of additional new links is assessed. For example, if a certain municipal town has no access, a new major road is added to the existing major road network. Thus, the initial major road network is proposed and subjected to evaluation whether the proposed one is well-balanced or not. Evaluation is made by two (2) indicators as follows:

a) Network Value

$$Nv = \frac{L}{\sqrt{PA}}$$

Where: Nv = Network Value
L = Road length delineating a block
P = Population in a block
A = Land Area in a block
Block= Area delineated by major roads

b) Accessibility

Accessibility $AC = \sum pl$

Average Accessibility $A\ ave = \frac{\sum pl}{P}$

Where
p = Population of a Barangay
l = Distance from a barangay center to respective major road
P = Total population in a block

If indicators of some blocks show imbalanced value, additions or deletions of major road links are made until indicators show almost balanced values. After these adjustment, the major road network is finally proposed.

Table 2.4-1 Proposed Functional Road Classification Criteria for Rural Road Network

Functional Classification		General Definition	General Characteristics and Services Provided	Relationship with Administrative Classification				
				National Road	Provincial Road	City Road	Municipal Road	Barangay Road
Major Road	Primary Major Road	. Major inter-provincial roads. . Intra-provincial roads linking two (2) or more municipal towns to the Provincial Capital . Intra-provincial roads which form a skelton road network of a province	. Provides the highest level of service at the high speed for the long uninterrupted distance . Serves for long distance trips . Mobility is given the highest consideration	●				
	Secondary Major Road	. Roads linking municipal towns each other . Roads linking a municipal town to the Provincial Capital . Roads linking one (1) or more municipal towns to the primary major road network	. Provides high level of service . Serves for medium distance trips . Mobility is given high consideration	●	●	●		
Minor Road	Collector Road	. Roads linking secondary major roads each other or a primary road with a secondary road . Roads linking two (2) or more barangays to the municipal town or to the higher level network	. Provides rather low level of mobility . Serves for short distance trips . Collects traffic from feeder roads and connects them with major roads . Mobility and land access		●	●		●
	Feeder Road	. Roads linking one or more barangays centers to the higher level network . Roads linking farm areas to their respective barangay centers or to the higher level network	. Primarily provides access to abutting land with little or no through traffic . Serves for local traffic . Land access is given high			●		●
Street		. Roads within built-up population centers (Poblacion) with essentially urban rather than rural rural functions	. Primarily provides access to abutting land in urban areas . Through traffic usage discouraged			●	●	

NOTE: Relationship between functional classification and administrative classification gives only general guideline, therefore, some national roads may be classified as minor roads, or some barangay roads may be classified as major roads.

2.4.2 Proposed Major Road Network

The major road network for the Province of Leyte was proposed as shown in Figure 2.4-1. For establishing the major road network, the following were taken into consideration:

- Based on the existing network pattern the major road network was proposed.
- New links of the following were proposed to strengthen the existing network:
  - Barugo-Batbatngon Road (currently impassable). Upon completion, mesh type network will be completed in the north-eastern area.
  - Burauen-Albuena Road (currently missing road). Upon completion, mesh type network will be completed in the central area.
  - The Coastal Road in the south-east area (currently impassable barangay road). Intended to provide basic access to the area.

Network value and accessibility of each block were computed to evaluate whether the proposed major road network is a balanced one. Based on these values, addition or deletion of road links was made and finally the major road network was proposed as shown in Figure 2.4-1.

Network value and accessibility of the proposed major road network are presented in Table 2.4-2.

Proposed major road network has a total length of 841.0 kms. and composed of the following roads.

National Road	759.2 kms.	(79% of all national roads)
Provincial Road	41.8 kms.	(8% of all provincial roads)
Total	841.0	

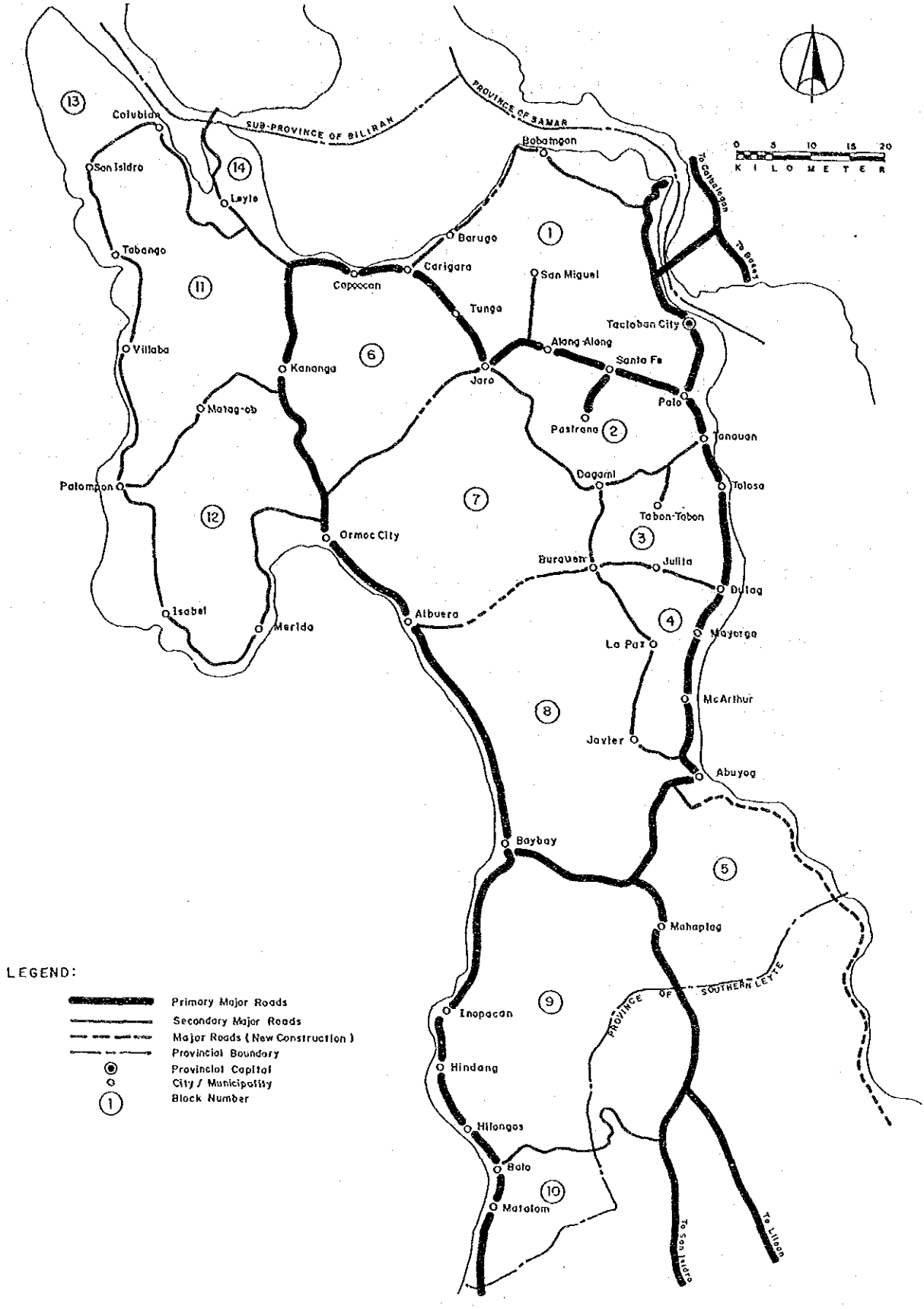

FIGURE 2.4-1 PROPOSED MAJOR ROAD NETWORK

Table 2.4-2

NETWORK VALUE/ACCESSIBILITY
Province of Leyte

Block No.	Population (1990)	Land Area (km^2)	Road Length (km)	Network Value	Access (p.km)	Average Access. (km.)
1	137,836	578.15	126.6	0.445	139,148	1.010
2	85,895	233.11	85.0	0.601	145,720	1.696
3	96,436	194.18	69.4	0.507	57,855	0.600
4	48,464	188.50	70.3	0.736	53,095	1.096
5	35,886	389.71	71.9	0.608	107,394	2.993
6	73,824	445.86	96.7	0.533	110,152	1.492
7	52,744	601.77	110.6	0.621	81,357	1.542
8	91,837	728.69	99.2	0.383	119,623	1.303
9	206,166	727.96	106.7	0.275	267,284	1.296
10	36,195	138.89	32.2	0.454	105,656	2.919
11	109,552	591.64	138.4	0.544	198,144	1.809
12	102,744	505.75	177.0	0.513	184,899	1.800
13	36,828	152.21	13.9	0.186	228,951	6.217
14	19,279	85.00	28.0	0.692	42,811	2.221
Ave.	80,978	397.89	83.3	0.464	131,578	1.625

CHAPTER 3
TRAFFIC

3.1 TRAFFIC SURVEY RESULTS

Roadside traffic count survey was conducted on selected roads. Traffic counts were carried out on two (2) consecutive days for 12 hours from 6:00 AM to 6:00 PM each day. Traffic volume was counted by direction and by vehicle type every hour. The vehicle type was classified as follows:

- Car
- Jeep
- Van
- Jeepney
- Bus (mini bus & large bus)
- Truck (including trailer)
- Motor-tricycle
- Motorcycle
- Animal drawn
- Pedestrian
- Others

Figure 3.1-1 shows the location of traffic count stations. Traffic survey results are summarized in Table 3.1-1.

Survey results were converted to Average Daily Traffic (ADT) by using the hourly factors based on the data from the Nationwide Traffic Counts Program (NTCP). Considering other factors such as market days, harvest season, rainy season, etc., AADT were estimated by vehicle type.

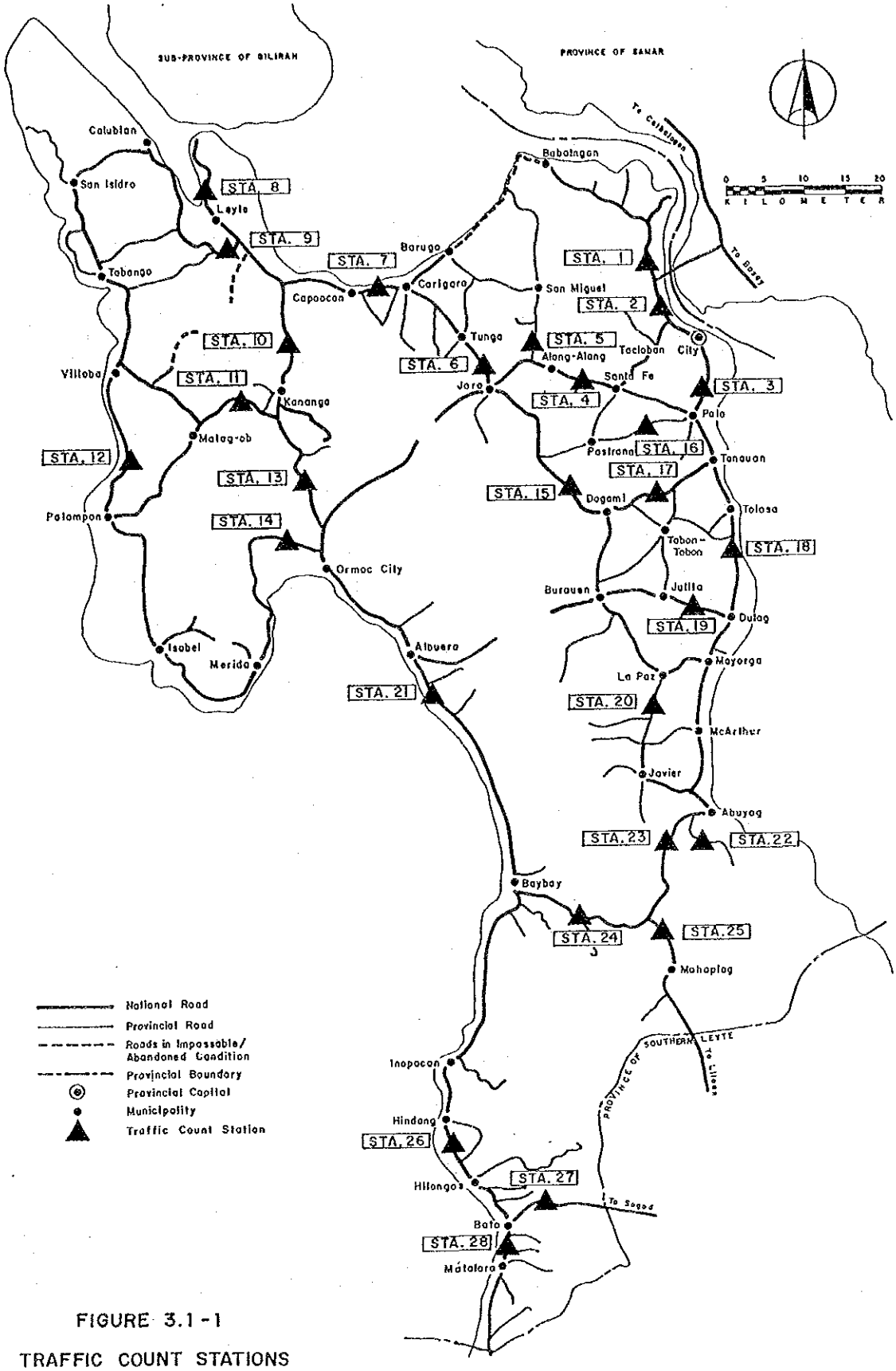

FIGURE 3.1-1

TRAFFIC COUNT STATIONS

TABLE 3.1-1 SUMMARY OF TRAFFIC SURVEY RESULTS
- LEYTE -

(ADT as of May, 1990)

Station No.	Car	Jeep	Pickup /Van	Jeepney	Bus	Truck	Sub-Total	Tri-cycle	Motor-cycle	Animal Drawn	Total
1	10	48	12	77	28	33	207	29	69	1	306
2	71	109	161	314	150	162	967	65	150	0	1182
3	473	754	910	2236	340	479	5190	226	850	0	6266
4	98	246	188	656	132	152	1472	30	239	0	1741
5	4	22	31	117	4	19	196	215	147	0	558
6	113	130	98	281	119	78	819	40	144	0	1003
7	36	99	106	78	111	69	500	376	113	0	989
8	0	16	19	7	17	18	76	0	17	0	92
9	13	20	14	18	22	12	100	58	0	0	158
10	28	73	88	52	81	49	371	3	43	0	417
11	19	72	52	135	20	43	341	111	142	0	594
12	11	31	37	61	3	19	162	487	311	0	960
13	67	253	211	316	112	224	1183	25	249	0	1457
14	83	181	133	166	76	81	718	446	359	4	1527
15	0	4	12	42	0	11	68	2	494	0	565
16	0	14	30	2	0	8	54	2	598	0	655
17	74	228	44	157	53	35	592	133	446	0	1171
18	60	110	178	151	139	246	884	17	189	0	1090
19	2	107	67	98	356	55	686	52	1352	0	2089
20	0	48	0	2	4	66	121	1	471	46	639
21	8	150	32	181	41	38	450	88	47	0	585
22	0	5	1	7	0	0	13	73	39	0	124
23	13	67	49	55	42	67	294	147	123	2	567
24	7	27	57	65	34	51	240	2	122	0	364
25	38	172	91	127	68	172	668	59	615	0	1343
26	8	35	46	48	41	73	251	195	85	0	530
27	2	10	12	64	12	90	190	175	141	0	506
28	12	13	53	50	42	147	317	275	191	0	783

Source: Traffic Survey by Study Team (May, 1990)

3.2 TRAFFIC ANALYSIS AND FORECAST: TRAFFIC PROJECTS.

3.2.1 Analysis of Present Traffic

1) General Procedure

Present traffic on each major road network was analyzed according to the procedure shown in Figure 3.2-1.

The analysis is divided into three major steps:

Step I : Analysis of Traffic Survey Results

The number of passengers and commodity tonnage were obtained from the results of the traffic survey. These data are, however, available only on the surveyed road links and used for calibration purposes for the traffic model described below.

Step II : Analysis by Traffic Model

Traffic generation and attraction, in terms of passengers and commodity tons, were estimated based on population and per capita traffic generation factors; traffic distribution (OD distribution) was estimated by the gravity model; then, OD distribution was assigned to the major road network expressed by the node and link system. In the analysis, since only traffic generation factors were unknown, assumed values were used in the first step.

Step III : Comparison of Both Figures

The number of passengers and commodity tonnage estimated by the traffic model were compared with those derived from the traffic survey. On the basis of the comparison, traffic generation factors were appropriately adjusted and the traffic model analysis was reiterated until the traffic model reflected the actual people and freight movements with a high accuracy.

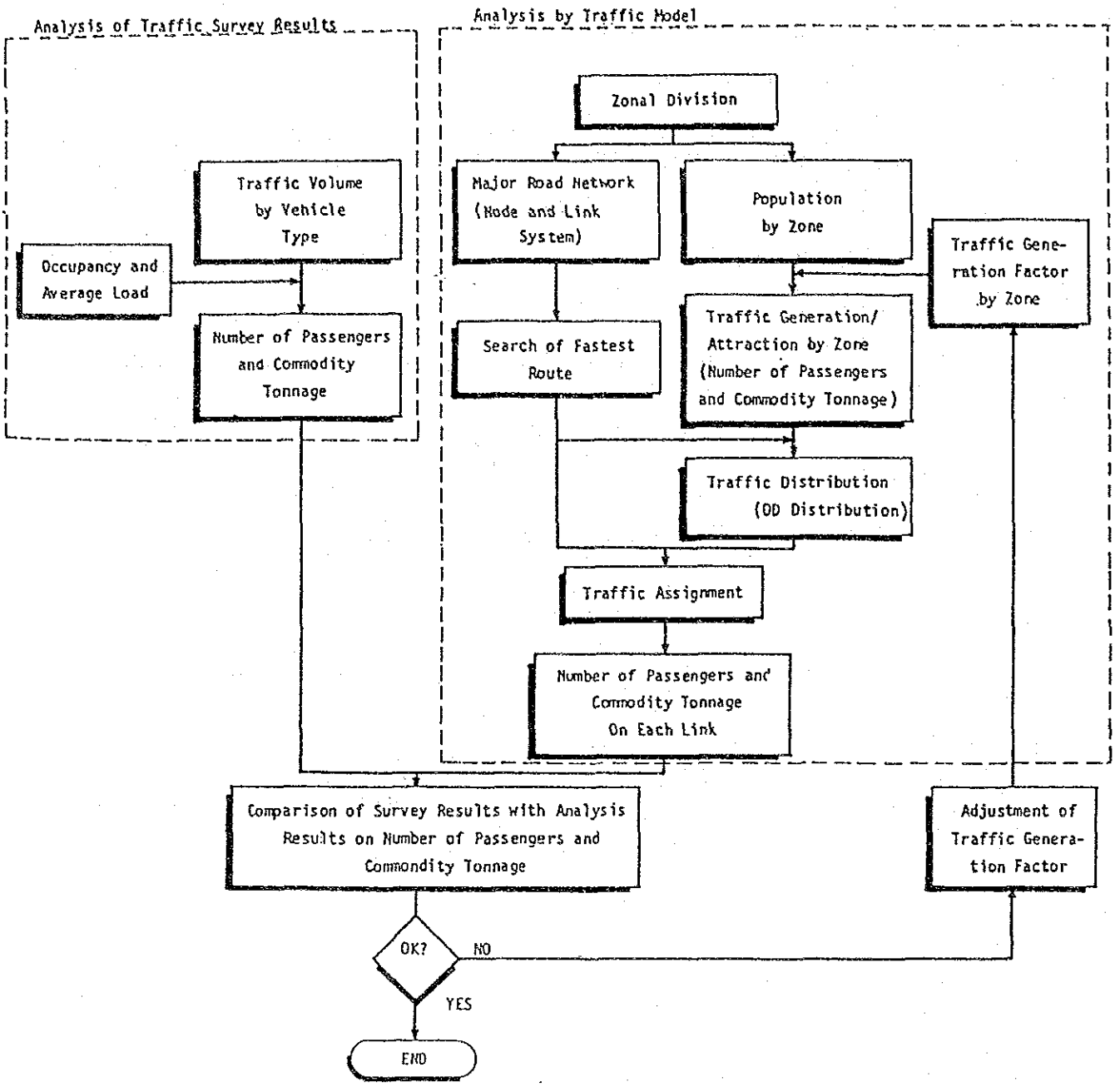

FIGURE 3.2-1
PROCEDURE OF ANALYSIS OF PRESENT TRAFFIC ON MAJOR ROAD NETWORK

2) Analysis of Traffic Survey Results

Traffic volume by vehicle type counted in the traffic survey was converted to number of passengers and commodity tonnage using the occupancy and average load shown in Table 3.2-1.

Table 3.2-1 OCCUPANCY AND AVERAGE LOAD
Province of Leyte

	Average Number of Passenger per vehicle	Average Load (ton per vehicle)
Car/Taxi	4.00	0.50
Jeep	3.40	0.80
Van/Pickup	4.00	1.00
Jeepney	15.00	1.00
Bus	40.00	1.00
Truck	5.00	4.00
Motor-tricycle	4.00	0.30
Motorcycle	3.00	0.10
Animal Drawn	3.00	0.15

3) Analysis by Traffic Model

i) Zonal Division:
The province was divided into traffic zones corresponding to municipal divisions in principle.

ii) Major Road Network:
The major road network was expressed by a node and link system. Each link was given length and average speed according to the actual road condition. A node and link system of the Province is presented in Figure 3.2-2.

iii) Search for the Fastest Route:
The fastest route for each zone pair was calculated by Moore's Method.

iv) Traffic Generation Factor:
Per capita traffic generation factors (trip/person/day and ton/person/day) vary between zones even in the same province with many factors such as:

- Economic Activity
- Size of Population
- Distance from Provincial Capital
- Road Condition
- Other Physical Conditions

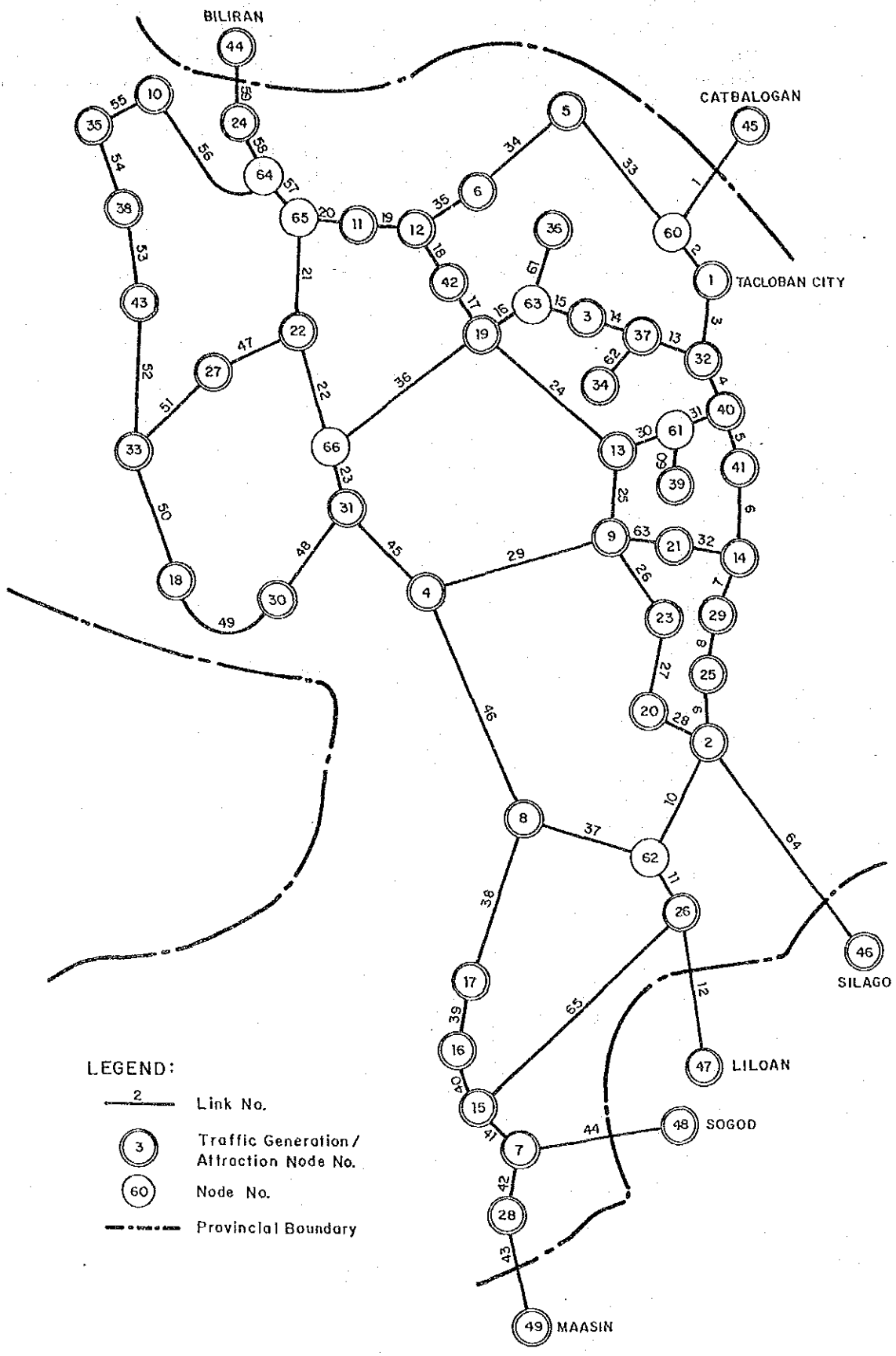

FIGURE 3.2-2 LINK / NODE SYSTEM
PROVINCE OF LEYTE

The generation factors which best illustrate the observed people and freight movement were estimated by the iterative method. The traffic generation factors thus estimated are summarized in Table 3.2-2.

TABLE 3.2-2 PER CAPITA TRAFFIC GENERATION FACTORS (MAJOR ROAD, 1990 W/O) Province of Leyte

	Passenger Movement (trip/person/day)	Commodity (kg/person/day)
Range	0.045 - 0.301	3.9 - 25.9
Mean Value	0.121	10.7

v) Traffic Generation and Attraction by Zone:

Traffic generation and attraction were obtained in terms of passengers and commodity tonnage as the product by generation factors.

vi) Traffic Distribution:

Traffic distribution (OD distribution) was estimated by the gravity model:

$$Xij = k\frac{Gi.Aj}{tiJ^2}$$

Where, Xij = Traffic from zone i to zone j
k = Parameter
Gi = Traffic generation in zone i
Aj = Traffic attraction in zone j
tij = Travel time from zone i to zone j along the fastest route

OD distribution was adjusted so as to satisfy the following conditions by the Frator Method:

$$Gi = \sum_{j+1}^{n} Xj$$

$$Aj = \sum_{i+1}^{n} Xj$$

Where, n = Number of zones

vii) Traffic Assignment:

Each OD traffic was assigned to the major road network expressed by the node and link system on an all-or-nothing basis. Thus, the number of passengers and commodity tonnage for each link were calculated.

3.2.2 Traffic Forecast

Figure 3.2-3 illustrates the procedure of traffic forecast.

The traffic model prepared for the analysis of present traffic was basically used for forecasting future traffic on the major road network with the following additions/ modifications:

1) Major Road Network and Fastest Route Search

The node and link system for the "with" case was prepared by changing the characteristics of the links included under this feasibility study as well as the links committed to be improved.

The fastest route search was carried out both in the "w/o" and "with" case networks.

2) Traffic Generation/Attraction and Distribution

The future population was based on the NCSO 1980 Census of Population and Housing.

Per capita traffic generation factors in the "with" case were estimated referring to the generated transport demand/transport cost reduction elasticity shown in "Highway Planning Manual, Volume 3, MPWH" and also based on the results of the analysis of present traffic. For instance, a zone showing a small generation factor at present due to poor road conditions is expected to increase the factor to some extent by road improvement, and the degree of increase can be estimated referring to other zones in similar situations but with better road conditions.

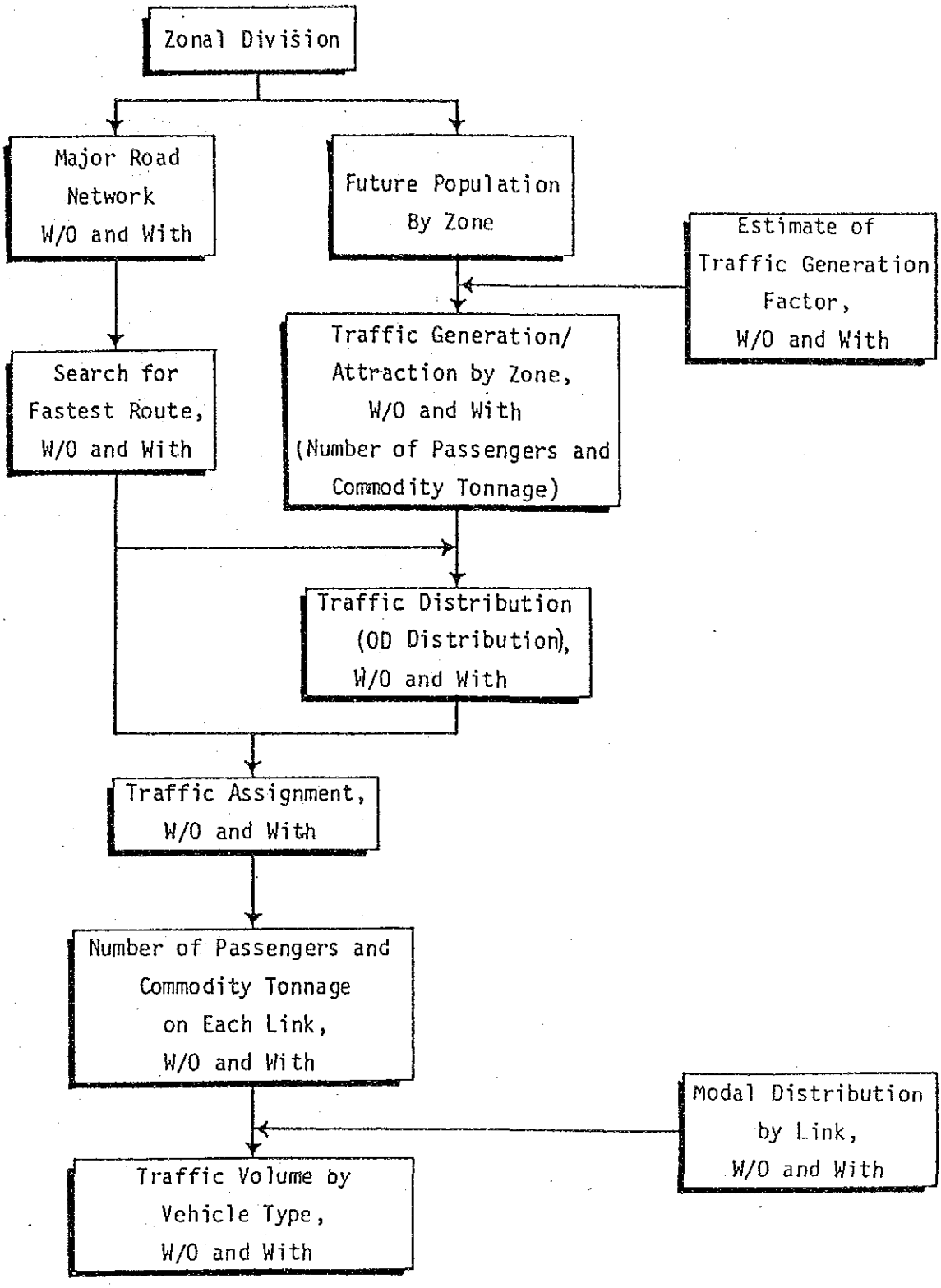

FIGURE 3.2-3
PROCEDURE OF FORECASTING TRAFFIC ON MAJOR ROAD NETWORK

The traffic generation factors thus estimated are summarized in Table 3.2-3.

TABLE 3.2-3 PER CAPITA TRAFFIC GENERATION FACTORS (MAJOR ROAD, 1990 WITH)
Province of Leyte

	Passenger Movement (trip/person/day)	Commodity (kg/person/day)
Range	0.045 - 0.301	3.9 - 25.9
Mean Value	0.124	11.0

The transition period, i.e., the period which will elapse after opening of the improved road before the full impact on generation will take place, was assumed to be three years.

Traffic distribution for the "with" case was estimated by the same method as used in the analysis of present traffic.

3) Traffic Assignment

The number of passengers and commodity tonnage on each link in the "with" case was estimated by assigning OD traffic to the major road network in the "with" case. They were converted to the number of vehicles using the modal distribution in the "with" case. Changes in modal distribution with changes in road condition were estimated reffering to the present distribution in other road links in a similar situation but in the road condition. The transition period of a complete change in modal distribution was assumed to be three years.

The traffic in the "with" case was broken down into following four categories for convenience of traffic benefit estimation:

Normal Traffic: Flow of passengers and freight which will occur even without road improvement. However, changes in the number of vehicles is possible due to changes in modal distribution.

Diverted Traffic-1: Traffic which diverts to a certain road from other routes as a consequence of road improvement. This is usually called simply diverted traffic.

Diverted Traffic-2: Traffic which changes destination as a consequence of road improvement but for the same trip purpose as in the "w/o" case. This is possible in the case of improvement of the access road to the nearest town which is at present barely accessible due to poor conditions. This traffic is called "Diverted Traffic-2" in this Study, distinguished from Diverted Traffic-1.

Generated Traffic: Increased traffic brought about by road improvement.

3.2.3 Estimated Present and Future Traffic

Estimated present and future traffic on the major road is illustrated in Figure 3.2-4 and Figure 3.2-5, respectively.

Estimated present and future movements of passengers and commodity by link are presented in Table 3.2-4, and estimated traffic volumes are presented in Table 3.2-5.

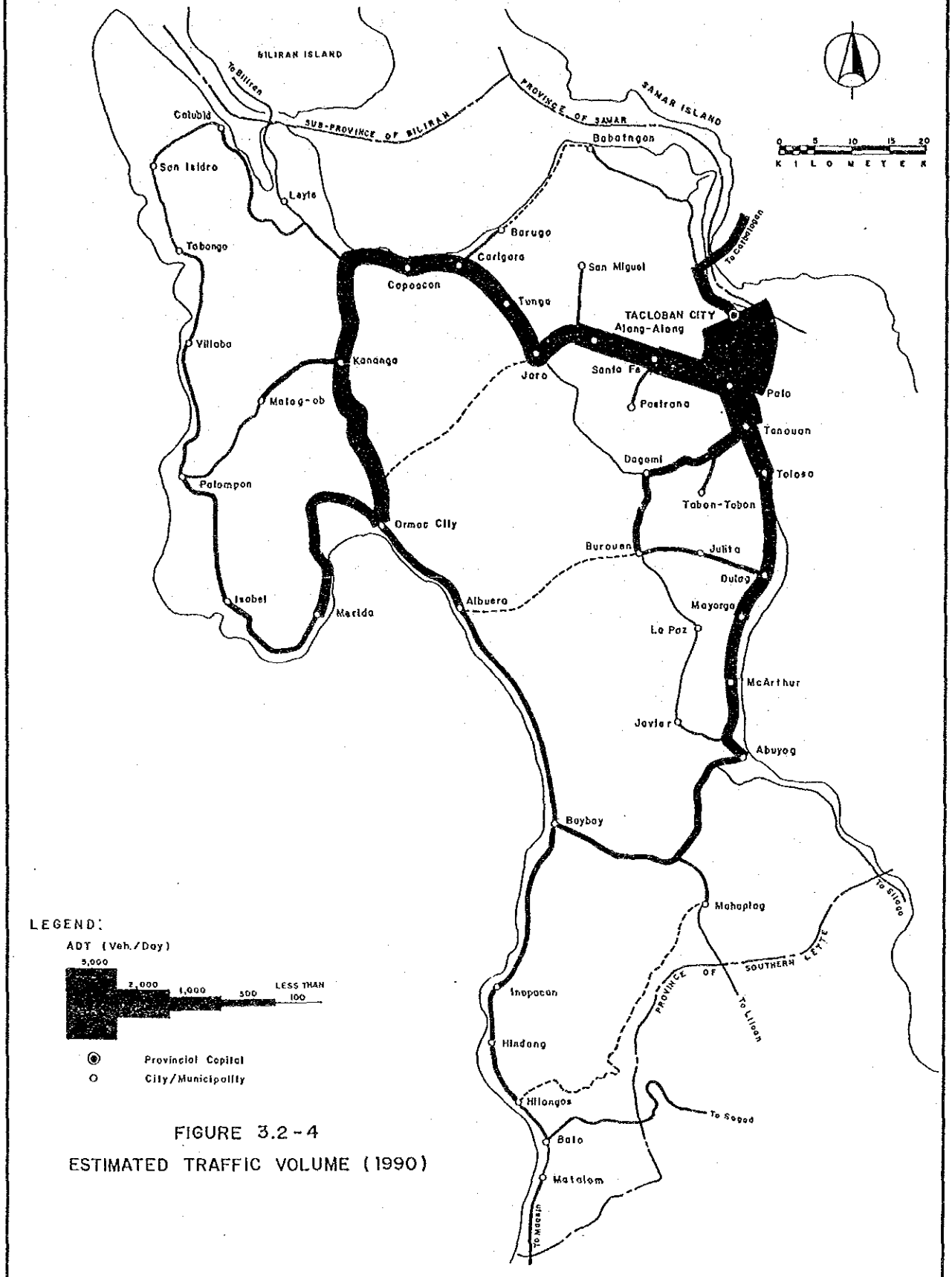

FIGURE 3.2-4

ESTIMATED TRAFFIC VOLUME (1990)

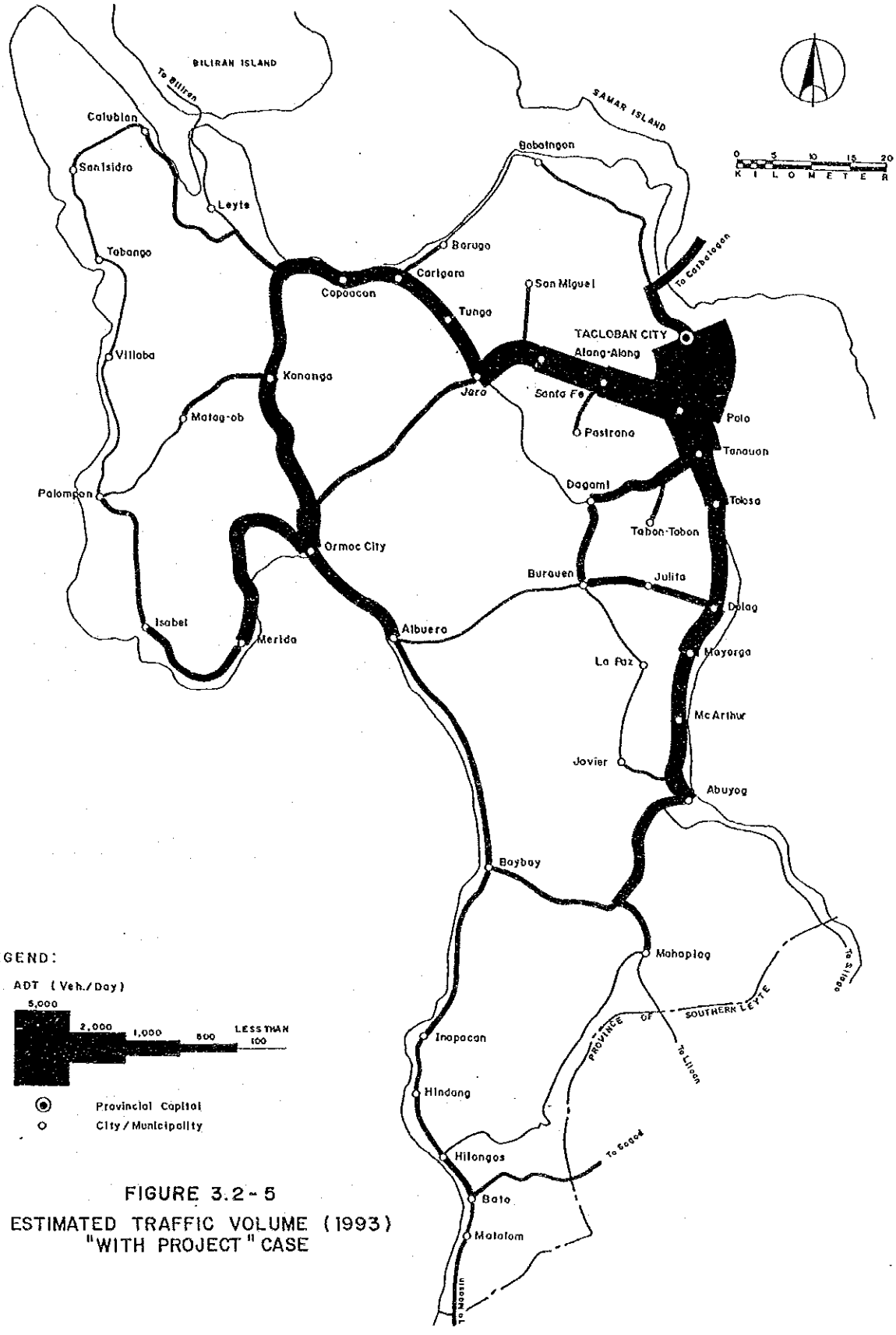

FIGURE 3.2-5
ESTIMATED TRAFFIC VOLUME (1993)
"WITH PROJECT" CASE

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (1)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diverted-1	Diverted-2	Generated	Total	Normal	Diverted-1	Diverted-2	Generated	Total
1	1990	5684				5684	501.94				501.94
	1993	6594	-	-4	-	6590	565.65	-	-.11	-	565.55
	1997	8040	-	-5	-	8035	663.36	-	-.12	-	663.24
	2007	12843	-	-8	-	12835	961.65	-	-.18	-	961.47
	2017	20017	-	-13	-	20004	1360.09	-	-.24	-	1359.84
2	1990	7158				7158	629.08				629.08
	1993	8275	-483	-135	78	7734	706.43	-39.72	-10.92	5.23	661.03
	1997	10041	-590	-162	277	9566	824.63	-46.73	-12.59	18.06	783.37
	2007	15875	-951	-250	422	15095	1183.37	-68.58	-17.59	25.45	1122.65
	2017	24539	-1500	-380	636	23295	1660.26	-98.47	-24.19	35.05	1572.65
3	1990	38502				38502	3337.82				3337.82
	1993	44667	-483	98	78	44360	3761.08	-39.72	6.83	5.23	3733.42
	1997	54452	-590	120	277	54260	4410.27	-46.73	7.97	18.06	4389.56
	2007	86871	-951	196	422	86538	6384.85	-68.58	11.40	25.45	6353.13
	2017	135080	-1500	311	636	134527	9009.53	-98.47	15.93	35.05	8962.04
4	1990	22273				22273	1983.13				1983.13
	1993	25617	-343	-106	185	25353	2215.92	-30.14	-8.82	16.60	2193.57
	1997	30869	-415	-128	690	31016	2569.38	-35.14	-10.26	59.64	2583.62
	2007	48018	-654	-198	1145	48312	3629.43	-50.32	-14.55	92.62	3657.17
	2017	73186	-1007	-299	1849	73729	5022.62	-70.53	-20.12	136.07	5068.04
5	1990	11563				11563	1083.20				1083.20
	1993	13371	-311	77	158	13295	1216.21	-27.56	6.18	15.06	1209.88
	1997	16228	-377	92	597	16540	1419.32	-32.22	7.08	54.59	1448.77
	2007	25641	-597	141	1021	26205	2033.33	-46.41	9.73	86.63	2083.28
	2017	39566	-925	211	1683	40535	2845.49	-65.37	13.16	128.70	2921.97
6	1990	9843				9843	945.08				945.08
	1993	11378	-309	65	158	11291	1060.74	-27.42	5.43	15.06	1053.80
	1997	13802	-375	78	597	14102	1237.25	-32.05	6.20	54.59	1265.99
	2007	21783	-594	118	1021	22329	1770.56	-46.15	8.48	86.63	1819.52
	2017	33586	-919	176	1683	34526	2475.71	-64.99	11.40	128.70	2550.82
7	1990	9606				9606	924.65				924.65
	1993	11177	85	122	593	11976	1044.23	13.95	10.94	52.94	1122.06
	1997	13677	109	147	2180	16113	1228.09	16.71	12.71	187.09	1444.60
	2007	22001	192	230	3511	25935	1789.48	25.29	18.03	275.04	2107.84
	2017	34435	319	352	5503	40610	2538.12	36.89	25.02	390.97	2991.02
8	1990	7893				7893	773.55				773.55
	1993	9168	84	123	593	9969	872.24	13.86	11.22	52.94	950.25
	1997	11196	108	149	2180	13633	1023.72	16.61	13.03	187.09	1240.45
	2007	17933	189	233	3511	21866	1485.31	25.13	18.48	275.04	1803.96
	2017	27978	315	356	5503	34152	2100.02	36.65	25.65	390.97	2553.28

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (2)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diverted-1	Diverted-2	Generated	Total	Normal	Diverted-1	Diverted-2	Generated	Total
	1990	8059				8059	801.79				801.79
	1993	9381	82	112	593	10168	905.75	13.71	10.25	52.94	982.64
9	1997	11486	105	134	2180	13906	1065.62	16.42	11.87	187.09	1281.00
	2007	18501	186	208	3511	22406	1553.95	24.87	16.68	275.04	1870.53
	2017	28985	310	315	5503	35112	2205.40	36.27	22.97	390.97	2655.61
	1990	4460				4460	468.75				468.75
	1993	5194	-114	154	641	5875	529.50	-3.30	14.82	58.81	599.84
10	1997	6364	-135	186	2383	8798	622.95	-3.59	17.21	209.71	846.27
	2007	10272	-201	289	3931	14291	908.66	-4.27	24.36	315.66	1244.41
	2017	16123	-293	440	6284	22553	1290.29	-4.89	33.73	456.55	1775.67
	1990	2050				2050	248.53				248.53
	1993	2408	440	113	641	3601	282.28	54.95	12.46	58.81	408.50
11	1997	2985	537	136	2383	6040	334.53	64.32	14.51	209.71	623.06
	2007	4939	860	215	3931	9944	496.04	92.77	20.68	315.66	925.14
	2017	7907	1341	330	6284	15862	713.87	130.61	28.80	456.55	1329.82
	1990	589				589	136.47				136.47
	1993	683	-	-	-	683	153.79	-	-.01	-	153.78
12	1997	833	-	-	-	833	180.35	-	-.01	-	180.34
	2007	1330	-	-	-	1330	261.43	-	-.02	-	261.42
	2017	2073	-	-	-	2073	369.74	-	-.02	-	369.72
	1990	16306				16306	1396.77				1396.77
	1993	18913	-884	408	108	18546	1573.81	-74.90	34.08	11.37	1544.37
13	1997	23050	-1077	500	413	22885	1845.25	-87.89	40.05	41.58	1838.99
	2007	36739	-1723	804	724	36543	2670.30	-127.95	58.24	67.17	2667.75
	2017	57076	-2698	1258	1214	56851	3766.43	-182.15	82.41	101.02	3767.71
	1990	13520				13520	1156.69				1156.69
	1993	15658	-884	519	108	15401	1301.30	-74.90	43.45	11.37	1281.23
14	1997	19043	-1077	636	413	19016	1522.60	-87.89	51.19	41.58	1527.48
	2007	30216	-1723	1028	724	30244	2193.59	-127.95	74.80	67.16	2207.61
	2017	46776	-2698	1614	1214	46907	3083.30	-182.15	106.26	101.02	3108.43
	1990	12260				12260	1047.67				1047.67
	1993	14186	-755	614	108	14153	1177.67	-64.25	51.37	11.37	1176.16
15	1997	17234	-921	753	413	17479	1376.45	-75.51	60.54	41.58	1403.07
	2007	27283	-1479	1217	724	27745	1978.58	-110.34	88.55	67.16	2023.96
	2017	42164	-2322	1910	1214	42966	2776.50	-157.66	125.85	101.02	2845.71
	1990	11390				11390	972.27				972.27
	1993	13174	-662	708	108	13328	1092.50	-56.67	59.27	11.37	1106.47
16	1997	15997	-809	869	413	16469	1276.29	-66.69	69.84	41.58	1321.02
	2007	25298	-1304	1403	724	26121	1832.84	-97.80	102.10	67.16	1904.31
	2017	39068	-2054	2202	1214	40429	2570.30	-140.18	145.02	101.02	2676.15

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (3)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total	Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total
	1990	11424				11424	973.88				973.88
	1993	13217	-4402	13	202	9031	1094.58	-360.33	.35	19.50	754.09
17	1997	16054	-5337	15	742	11473	1279.17	-420.24	.24	69.12	928.29
	2007	25407	-8404	17	1201	18221	1838.55	-600.37	-.16	102.08	1340.09
	2017	39260	-12915	20	1894	28259	2580.27	-837.15	-.79	146.17	1888.50
	1990	11394				11394	971.28				971.28
	1993	13181	-4448	15	202	8950	1091.56	-364.02	.46	19.50	747.51
18	1997	16008	-5394	17	742	11373	1275.51	-424.57	.37	69.12	920.43
	2007	25320	-8494	20	1201	18056	1832.90	-606.66	-.01	102.08	1328.31
	2017	39134	-13056	24	1894	27997	2571.96	-846.01	-.60	146.17	1871.51
	1990	11295				11295	962.68				962.68
	1993	13071	-4023	31	-	9079	1082.30	-330.12	2.57	-	754.76
19	1997	15881	-4873	38	-	11046	1265.33	-384.54	3.00	-	883.79
	2007	25153	-7651	63	-	17565	1820.37	-547.44	4.33	-	1277.25
	2017	38895	-11719	101	-	27278	2556.81	-760.41	6.16	-	1802.56
	1990	10762				10762	916.59				916.59
	1993	12462	-4023	-31	-	8408	1031.21	-330.12	-1.87	-	699.22
20	1997	15155	-4873	-36	-	10245	1206.75	-384.54	-2.09	-	820.12
	2007	24049	-7651	-49	-	16348	1739.78	-547.44	-2.59	-	1189.75
	2017	37245	-11719	-64	-	25463	2447.94	-760.41	-3.02	-	1684.50
	1990	10302				10302	877.23				877.23
	1993	11929	-4002	-60	-	7868	987.00	-327.66	-2.80	-	656.55
21	1997	14506	-4845	-67	-	9594	1155.13	-381.48	-2.91	-	770.74
	2007	23018	-7597	-86	-	15336	1665.71	-542.40	-2.94	-	1120.37
	2017	35645	-11622	-103	-	23920	2344.12	-752.58	-2.55	-	1588.99
	1990	11283				11283	963.74				963.74
	1993	13129	-3400	-320	-	9409	1089.88	-262.81	-27.16	-	799.91
22	1997	16072	-4105	-398	-	11569	1284.66	-304.77	-32.63	-	947.26
	2007	25915	-6390	-668	-	18858	1884.09	-429.19	-49.87	-	1405.03
	2017	40699	-9710	-1082	-	29907	2690.79	-590.24	-73.54	-	2027.01
	1990	11283				11283	963.74				963.74
	1993	13129	-7	548	-	13670	1089.88	12.26	46.06	-	1148.20
23	1997	16072	7	663	-	16742	1284.66	15.71	53.43	-	1353.80
	2007	25915	67	1035	-	27017	1884.09	26.96	75.26	-	1986.31
	2017	40699	176	1576	-	42451	2690.79	42.75	103.50	-	2837.04
	1990	796				796	67.38				67.38
	1993	913	-269	60	121	825	75.13	-22.00	5.15	9.10	67.37
24	1997	1098	-323	72	420	1266	86.89	-25.42	5.92	30.60	97.99
	2007	1698	-499	110	599	1908	122.13	-35.65	8.24	38.74	133.46
	2017	2578	-756	166	848	2836	168.48	-49.04	11.29	50.17	180.89

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (4)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diverted-1	Diverted-2	Generated	Total	Normal	Diverted-1	Diverted-2	Generated	Total
	1990	4139				4139	349.25				349.25
	1993	4740	-141	-167	149	4581	388.60	-11.22	-12.04	10.64	375.99
25	1997	5679	-168	-200	513	5825	448.02	-12.89	-13.86	35.66	456.93
	2007	8722	-255	-306	723	8884	624.77	-17.86	-19.25	44.72	632.38
	2017	13153	-383	-459	1015	13326	855.48	-24.39	-26.27	57.54	862.37
	1990	773				773	86.03				86.03
	1993	884	24	9	31	948	95.53	2.90	1.32	4.84	104.59
26	1997	1056	30	11	110	1207	109.85	3.38	1.57	16.51	131.30
	2007	1614	47	19	164	1844	152.23	4.84	2.37	22.19	181.64
	2017	2425	72	31	241	2768	207.45	6.78	3.43	29.48	247.14
	1990	279				279	35.16				35.16
	1993	322	24	11	4	361	39.35	2.82	1.35	.89	44.42
27	1997	389	29	14	17	448	45.73	3.29	1.59	3.29	53.90
	2007	609	45	21	31	706	64.91	4.71	2.28	5.57	77.48
	2017	933	70	33	53	1089	90.17	6.59	3.21	8.52	108.49
	1990	1250				1250	160.58				160.58
	1993	1451	-24	-8	4	1423	181.12	-2.90	-1.10	.89	178.01
28	1997	1771	-30	-10	17	1748	212.65	-3.38	-1.32	3.29	211.23
	2007	2833	-47	-17	31	2800	308.58	-4.84	-2.00	5.57	307.31
	2017	4413	-72	-28	53	4366	436.10	-6.78	-2.91	8.52	434.93
	1990	-				-	-				-
	1993	-	1025	995	-	2020	-	93.15	83.67	-	176.81
29	1997	-	1244	1199	-	2444	-	108.78	97.06	-	205.84
	2007	-	1966	1867	-	3833	-	156.20	137.24	-	293.43
	2017	-	3037	2846	-	5883	-	219.15	190.03	-	409.18
	1990	4120				4120	347.17				347.17
	1993	4729	-26	-207	28	4523	387.02	-2.06	-16.37	1.55	370.14
30	1997	5681	-31	-249	93	5494	447.30	-2.33	-18.95	5.05	431.08
	2007	8770	-45	-385	124	8465	626.89	-3.07	-26.62	5.98	603.18
	2017	13277	-65	-583	167	12795	861.40	-3.99	-36.63	7.37	828.16
	1990	5543				5543	470.17				470.17
	1993	6381	-28	-190	28	6191	525.75	-2.21	-14.97	1.55	510.12
31	1997	7697	-33	-228	93	7530	610.15	-2.50	-17.31	5.05	595.40
	2007	11994	-49	-351	124	11719	863.14	-3.33	-24.27	5.98	841.52
	2017	18296	-71	-531	167	17861	1195.16	-4.36	-33.34	7.37	1164.83
	1990	3747				3747	338.48				338.48
	1993	4276	348	35	435	5094	375.09	37.66	3.64	37.88	454.28
32	1997	5099	429	44	1583	7156	430.18	44.51	4.45	132.51	611.64
	2007	7757	702	77	2491	11027	593.43	65.58	7.01	188.40	854.43
	2017	11619	1114	129	3821	16682	806.15	93.92	10.55	262.28	1172.90

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (5)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total	Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total
	1990	1667				1667	143.45				143.45
	1993	1901	228	-129	78	2079	158.92	18.64	-11.07	5.23	171.73
33	1997	2266	286	-153	277	2676	182.18	22.49	-12.66	18.05	210.08
	2007	3440	485	-230	422	4116	250.98	34.90	-17.36	25.45	293.98
	2017	5142	798	-343	636	6233	340.45	52.40	-23.45	35.05	404.45
	1990	-				-	-				-
	1993	-	483	146	130	759	-	39.72	12.16	9.92	61.80
34	1997	-	590	175	466	1231	-	46.73	14.04	34.08	94.84
	2007	-	951	270	707	1928	-	68.58	19.67	46.31	134.56
	2017	-	1500	410	1051	2961	-	98.47	27.13	62.29	187.88
	1990	1595				1595	137.31				137.31
	1993	1850	423	51	202	2526	154.67	34.80	4.35	19.50	213.32
35	1997	2254	516	61	742	3573	181.29	40.91	4.95	69.12	296.27
	2007	3592	831	91	1201	5715	262.12	59.98	6.78	102.08	430.96
	2017	5578	1310	137	1894	8918	369.39	86.14	9.24	146.17	610.94
	1990	-				-	-				-
	1993	-	3393	868	-	4261	-	275.07	73.22	-	348.29
36	1997	-	4112	1061	-	5173	-	320.48	86.06	-	406.54
	2007	-	6457	1703	-	8160	-	456.14	125.13	-	581.27
	2017	-	9885	2658	-	12544	-	632.99	177.04	-	810.03
	1990	3577				3577	365.51				365.51
	1993	4157	-928	62	-	3291	412.23	-108.93	4.01	-	307.31
37	1997	5079	-1136	75	-	4018	483.93	-127.86	4.61	-	360.69
	2007	8146	-1826	114	-	6434	702.47	-185.59	6.32	-	523.20
	2017	12721	-2858	170	-	10033	993.54	-262.59	8.46	-	739.41
	1990	2925				2925	335.18				335.18
	1993	3400	-533	-48	-	2819	377.83	-70.83	-6.64	-	300.36
38	1997	4157	-653	-58	-	3445	443.26	-83.13	-7.70	-	352.43
	2007	6674	-1054	-92	-	5528	642.73	-120.70	-10.89	-	511.15
	2017	10432	-1654	-142	-	8636	908.56	-170.87	-15.04	-	722.65
	1990	2833				2833	332.23				332.23
	1993	3298	-517	-60	-	2721	374.77	-68.99	-7.57	-	298.22
39	1997	4039	-633	-73	-	3333	440.10	-80.96	-8.79	-	350.35
	2007	6508	-1021	-115	-	5372	639.47	-117.50	-12.43	-	509.53
	2017	10204	-1602	-178	-	8424	905.45	-166.31	-17.20	-	721.94
	1990	3002				3002	347.67				347.67
	1993	3503	-415	-63	-	3025	392.83	-59.94	-7.70	-	325.19
40	1997	4304	-509	-77	-	3718	462.32	-70.32	-8.96	-	383.05
	2007	6986	-822	-123	-	6042	675.07	-102.01	-12.73	-	560.32
	2017	11016	-1291	-191	-	9534	959.63	-144.35	-17.68	-	797.60

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (6)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diverted-1	Diverted-2	Generated	Total	Normal	Diverted-1	Diverted-2	Generated	Total
41	1990	3095				3095	399.01				399.01
	1993	3611	-	30	-	3641	451.15	-	6.08	-	457.22
	1997	4435	-	36	-	4471	531.43	-	7.08	-	538.51
	2007	7193	-	56	-	7249	777.58	-	10.13	-	787.70
	2017	11337	-	85	-	11422	1107.30	-	14.17	-	1121.48
42	1990	2158				2158	180.42				180.42
	1993	2506	-	13	-	2518	202.93	-	.38	-	203.31
	1997	3058	-	15	-	3073	237.38	-	.45	-	237.84
	2007	4894	-	24	-	4918	342.02	-	.66	-	342.68
	2017	7634	-	37	-	7671	481.05	-	.94	-	481.99
43	1990	2233				2233	131.04				131.04
	1993	2591	-	1	-	2592	147.67	-	-	-	147.67
	1997	3159	-	1	-	3160	173.17	-	-	-	173.17
	2007	5047	-	1	-	5048	251.03	-	-	-	251.03
	2017	7865	-	2	-	7867	355.02	-	-	-	355.02
44	1990	1230				1230	356.93				356.93
	1993	1427	-	-	-	1427	402.23	-	-	-	402.23
	1997	1740	-	-	-	1739	471.70	-	-	-	471.69
	2007	2779	-	-	-	2779	683.75	-	-	-	683.75
	2017	4331	-	-	-	4330	967.01	-	-	-	967.00
45	1990	5266				5266	473.42				473.42
	1993	6110	591	424	-	7126	533.43	50.29	36.11	-	619.83
	1997	7450	713	510	-	8674	625.39	58.41	41.88	-	725.68
	2007	11883	1112	792	-	13787	904.62	82.88	59.36	-	1046.85
	2017	18461	1701	1210	-	21371	1275.00	115.24	82.59	-	1472.83
46	1990	3457				3457	319.62				319.62
	1993	4009	-110	-208	-	3692	359.95	-16.85	-17.67	-	325.43
	1997	4886	-139	-251	-	4496	421.72	-20.09	-20.40	-	381.23
	2007	7782	-239	-387	-	7156	609.14	-30.14	-28.40	-	550.61
	2017	12076	-391	-583	-	11102	857.65	-43.67	-38.61	-	775.37
47	1990	2685				2685	280.17				280.17
	1993	3257	-502	-18	-	2737	329.26	-54.37	-1.71	-	273.19
	1997	4221	-611	-25	-	3585	409.00	-63.64	-2.33	-	343.04
	2007	7739	-969	-52	-	6718	675.52	-91.50	-4.50	-	579.52
	2017	13508	-1495	-98	-	11915	1063.90	-127.97	-7.73	-	928.19
48	1990	5422				5422	483.73				483.73
	1993	6249	222	-213	-	6258	541.53	32.46	-17.79	-	556.20
	1997	7548	268	-254	-	7562	629.29	37.87	-20.43	-	646.73
	2007	11783	418	-384	-	11817	891.63	54.01	-28.08	-	917.56
	2017	17982	636	-570	-	18049	1234.44	74.95	-37.76	-	1271.64

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (7)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total	Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total
	1990	3120				3120	296.17				296.17
	1993	3592	215	-101	-	3706	331.48	31.88	-9.02	-	354.34
49	1997	4334	260	-122	-	4472	385.03	37.22	-10.46	-	411.80
	2007	6747	407	-189	-	6965	544.70	53.16	-14.70	-	583.16
	2017	10267	620	-284	-	10603	752.59	73.84	-20.16	-	806.27
	1990	2330				2330	262.38				262.38
	1993	2698	215	-60	-	2852	294.74	31.88	-6.00	-	320.62
50	1997	3278	260	-74	-	3465	343.97	37.22	-7.11	-	374.09
	2007	5184	407	-119	-	5472	491.44	53.16	-10.51	-	534.08
	2017	7984	620	-186	-	8418	684.02	73.84	-15.03	-	742.83
	1990	1264				1264	150.10				150.10
	1993	1489	-510	37	-	1016	172.21	-55.12	4.25	-	121.34
51	1997	1857	-621	48	-	1283	207.09	-64.58	5.23	-	147.73
	2007	3124	-987	85	-	2222	318.19	-93.04	8.39	-	233.54
	2017	5091	-1527	145	-	3709	472.88	-130.38	12.80	-	355.30
	1990	1423				1423	134.04				134.04
	1993	1653	-295	-21	-	1337	151.19	-23.25	-1.59	-	126.36
52	1997	2017	-361	-25	-	1631	177.53	-27.36	-1.85	-	148.33
	2007	3227	-581	-38	-	2609	257.83	-39.89	-2.66	-	215.29
	2017	5031	-907	-57	-	4067	364.79	-56.54	-3.74	-	304.51
	1990	1130				1130	99.73				99.73
	1993	1320	56	6	-	1383	113.15	3.83	-.20	-	116.77
53	1997	1624	64	7	-	1695	133.92	4.15	-.31	-	137.77
	2007	2648	86	8	-	2742	198.08	4.95	-.68	-	202.35
	2017	4192	115	7	-	4314	284.53	5.79	-1.24	-	289.07
	1990	1034				1034	90.08				90.08
	1993	1195	281	35	-	1511	101.09	21.91	2.51	-	125.50
54	1997	1451	343	43	-	1837	117.91	25.77	3.01	-	146.69
	2007	2294	551	72	-	2917	168.84	37.49	4.62	-	210.95
	2017	3546	859	116	-	4521	236.28	53.02	6.83	-	296.12
	1990	1248				1248	106.85				106.85
	1993	1423	295	70	-	1788	118.33	23.25	5.40	-	146.98
55	1997	1697	361	86	-	2144	135.68	27.36	6.43	-	169.46
	2007	2587	581	140	-	3308	187.49	39.89	9.60	-	236.98
	2017	3887	907	222	-	5071	253.53	56.54	15.99	-	326.06
	1990	1485				1485	125.16				125.16
	1993	1700	295	236	-	2232	139.13	23.25	19.42	-	181.79
56	1997	2036	361	282	-	2680	160.25	27.36	22.35	-	209.95
	2007	3129	581	433	-	4142	223.28	39.89	31.13	-	294.29
	2017	4726	907	654	-	6286	305.93	56.54	42.70	-	405.16

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (8)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total	Normal	Diver-ted-1	Diver-ted-2	Gene-rated	Total
57	1990	2373				2373	194.58				194.58
	1993	2731	295	105	-	3132	217.46	23.25	8.53	-	249.24
	1997	3296	361	126	-	3783	252.26	27.36	9.76	-	289.38
	2007	5144	581	192	-	5916	356.89	39.89	13.50	-	410.28
	2017	7864	907	291	-	9061	494.77	56.54	18.52	-	569.83
58	1990	1104				1104	86.00				86.00
	1993	1280	-	-53	-	1227	96.80	-	-5.74	-	91.06
	1997	1558	-	-64	-	1494	113.35	-	-6.72	-	106.63
	2007	2477	-	-102	-	2375	163.49	-	-9.66	-	153.84
	2017	3838	-	-157	-	3681	229.93	-	-13.52	-	216.42
59	1990	753				753	88.66				88.66
	1993	873	-	1	-	874	99.91	-	.29	-	100.20
	1997	1065	-	1	-	1066	117.17	-	.34	-	117.51
	2007	1701	-	2	-	1703	169.86	-	.48	-	170.34
	2017	2652	-	2	-	2654	240.24	-	.67	-	240.91
60	1990	1863				1863	160.38				160.38
	1993	2161	-	-1	-	2160	180.66	-	-.02	-	180.65
	1997	2633	-	-1	-	2632	211.76	-	-.02	-	211.73
	2007	4196	-	-3	-	4194	306.21	-	-.03	-	306.18
	2017	6517	-	-4	-	6513	431.55	-	-.05	-	431.50
61	1990	1689				1689	145.35				145.35
	1993	1959	-	-1	-	1958	163.74	-	-.02	-	163.71
	1997	2387	-	-1	-	2386	191.92	-	-.03	-	191.89
	2007	3803	-	-2	-	3801	277.49	-	-.04	-	277.45
	2017	5905	-	-3	-	5903	391.06	-	-.06	-	391.00
62	1990	1955				1955	168.23				168.23
	1993	2267	-	-1	-	2266	189.51	-	-.03	-	189.48
	1997	2762	-	-2	-	2761	222.12	-	-.03	-	222.09
	2007	4401	-	-3	-	4399	321.17	-	-.05	-	321.12
	2017	6835	-	-4	-	6831	452.61	-	-.07	-	452.54
63	1990	2771				2771	248.21				248.21
	1993	3167	396	25	435	4024	275.56	41.51	3.42	37.88	358.37
	1997	3785	486	34	1583	5888	316.80	48.93	4.25	132.51	502.49
	2007	5785	789	55	2491	9130	439.40	71.70	6.92	188.40	706.42
	2017	8700	1244	113	3821	13877	599.52	102.26	10.61	262.28	974.66
64	1990	12				12	1.18				1.18
	1993	14	-	-	136	150	1.36	-	-	11.37	12.73
	1997	18	-	-	513	531	1.65	-	-	41.30	42.95
	2007	30	-	-	878	908	2.55	-	-	63.87	66.42
	2017	50	-	-	1454	1504	3.84	-	-	96.23	100.07

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 4 (9)

Movement of Passengers and Commodity

Link	Year	Number of Passengers					Commodity Tonnage				
		Normal	Diverted-1	Diverted-2	Generated	Total	Normal	Diverted-1	Diverted-2	Generated	Total
	1990	-				-	-				-
	1993	-	533	211	641	1385	-	70.83	25.71	58.81	155.35
65	1997	-	653	259	2383	3295	-	83.13	30.27	209.71	323.11
	2007	-	1054	421	3931	5406	-	120.70	44.26	315.66	480.61
	2017	-	1654	665	6284	8603	-	170.87	62.98	456.56	690.39

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (1)

Traffic Volume

Link	Year	w/o									with							
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
1	1990	216	151	102	94	563	-	-	-	563									
	1993	247	173	118	106	644	-	-	-	644	267	186	113	106	652	-	7	-	660
	1997	295	209	143	125	772	-	-	-	772	369	183	127	124	804	-	27	-	831
	2007	449	325	227	183	1183	-	-	-	1183	569	288	202	180	1240	-	43	-	1282
	2017	668	493	351	262	1774	-	-	-	1774	859	441	314	255	1869	-	67	-	1935
2	1990	254	236	114	119	723	-	12	-	735									
	1993	290	271	131	134	826	-	14	-	839	301	228	122	125	776	-	17	-	793
	1997	345	325	158	157	985	-	17	-	1002	438	218	151	147	954	-	32	-	986
	2007	521	501	248	228	1497	-	26	-	1524	668	338	238	210	1454	-	50	-	1504
	2017	771	755	380	323	2230	-	41	-	2270	998	513	365	295	2171	-	78	-	2249
3	1990	2072	2157	326	470	5026	-	77	-	5103									
	1993	2369	2481	377	531	5758	-	89	-	5848	2253	1980	484	585	5302	-	108	-	5410
	1997	2833	2900	458	625	6906	-	109	-	7015	2475	1232	858	823	5388	-	181	-	5569
	2007	4316	4641	724	915	10596	-	174	-	10770	3813	1933	1362	1191	8298	-	288	-	8587
	2017	6424	7034	1117	1306	15881	-	270	-	16151	5737	2959	2108	1680	12484	-	448	-	12933
4	1990	1077	792	287	374	2531	-	74	-	2605									
	1993	1223	905	330	420	2877	-	85	-	2962	1202	791	352	414	2759	-	85	-	2843
	1997	1449	1080	396	489	3414	-	103	-	3517	1430	708	491	484	3114	-	103	-	3217
	2007	2162	1643	613	699	5118	-	160	-	5278	2151	1085	761	686	4683	-	161	-	4844
	2017	3170	2454	928	981	7533	-	244	-	7777	3177	1630	1157	950	6913	-	246	-	7159
5	1990	572	417	150	203	1342	-	39	-	1381									
	1993	653	478	173	229	1533	-	45	-	1577	644	420	185	227	1477	-	44	-	1521
	1997	778	575	209	268	1831	-	54	-	1885	777	381	263	272	1693	-	55	-	1748
	2007	1178	887	328	389	2783	-	85	-	2868	1188	593	414	391	2585	-	87	-	2673
	2017	1746	1340	503	552	4141	-	132	-	4273	1775	903	637	548	3863	-	135	-	3998
6	1990	373	180	178	221	951	-	26	-	978									
	1993	426	207	205	249	1086	-	30	-	1117	463	225	196	231	1114	-	33	-	1147
	1997	508	249	248	292	1297	-	37	-	1334	669	327	224	237	1457	-	47	-	1504
	2007	771	385	390	425	1971	-	58	-	2029	1021	508	353	341	2223	-	74	-	2298
	2017	1147	583	598	605	2933	-	90	-	3022	1524	772	543	478	3318	-	115	-	3433
7	1990	417	216	153	215	1002	-	32	-	1034									
	1993	479	250	178	244	1152	-	37	-	1189	535	272	191	245	1243	-	40	-	1283
	1997	578	304	217	289	1389	-	46	-	1434	764	373	256	271	1564	-	54	-	1718
	2007	898	481	348	428	2155	-	73	-	2228	1185	590	410	395	2580	-	86	-	2666
	2017	1359	741	542	618	3261	-	115	-	3375	1791	908	639	561	3899	-	135	-	4034
8	1990	345	178	126	180	829	-	26	-	855									
	1993	396	206	146	203	952	-	31	-	982	449	227	159	207	1042	-	33	-	1075
	1997	476	250	178	240	1145	-	37	-	1182	650	317	217	233	1416	-	45	-	1462
	2007	736	393	284	354	1768	-	60	-	1827	1005	498	346	338	2187	-	73	-	2260
	2017	1111	604	441	510	2665	-	93	-	2759	1514	765	538	479	3296	-	114	-	3410

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (2)

Traffic Volume

Link	Year	w/o									with								
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
	1990	354	183	129	186	851	-	27	-	878									
	1993	407	211	150	211	979	-	31	-	1011	460	232	162	214	1069	-	34	-	1103
9	1997	491	257	183	250	1181	-	38	-	1219	667	324	221	240	1452	-	46	-	1498
	2007	763	407	293	370	1833	-	62	-	1894	1034	512	355	351	2251	-	75	-	2326
	2017	1156	627	457	534	2774	-	97	-	2871	1563	788	553	498	3402	-	117	-	3520
	1990	234	109	64	108	514	-	59	-	574									
	1993	269	126	74	122	591	-	69	-	661	301	141	87	130	660	-	59	-	718
10	1997	325	153	90	145	713	-	85	-	798	429	207	140	159	935	-	29	-	964
	2007	506	242	145	215	1108	-	137	-	1245	670	329	227	233	1459	-	48	-	1507
	2017	768	374	226	311	1680	-	215	-	1895	1019	510	356	333	2217	-	75	-	2292
	1990	105	46	36	52	238	-	10	-	249									
	1993	121	53	42	59	275	-	12	-	288	181	82	61	83	407	-	16	-	423
11	1997	146	65	52	71	334	-	15	-	349	303	144	97	117	661	-	20	-	681
	2007	230	105	85	106	527	-	25	-	551	479	232	158	173	1042	-	33	-	1075
	2017	351	165	135	155	806	-	40	-	845	733	363	251	249	1596	-	53	-	1649
	1990	50	-	12	31	93	-	18	-	111									
	1993	57	-	14	35	106	-	21	-	127	55	7	13	33	108	-	15	-	123
12	1997	68	-	17	41	126	-	26	-	152	61	25	14	34	134	-	3	-	137
	2007	104	-	27	60	191	-	41	-	232	93	38	23	49	202	-	4	-	206
	2017	155	-	41	86	282	-	64	-	346	136	57	35	69	298	-	7	-	305
	1990	718	823	177	226	1944	-	54	-	1999									
	1993	820	945	205	256	2227	-	63	-	2290	821	759	232	264	2077	-	62	-	2138
13	1997	980	1137	249	302	2669	-	77	-	2746	1041	519	362	345	2267	-	76	-	2343
	2007	1491	1759	394	444	4088	-	122	-	4210	1607	816	575	500	3497	-	122	-	3619
	2017	2215	2656	608	637	6116	-	190	-	6306	2420	1250	890	706	5267	-	190	-	5456
	1990	592	715	141	176	1623	-	23	-	1646									
	1993	675	820	163	198	1856	-	26	-	1883	680	655	188	210	1733	-	34	-	1767
14	1997	805	986	197	233	2221	-	32	-	2253	865	431	301	286	1883	-	63	-	1947
	2007	1218	1520	310	339	3387	-	50	-	3437	1330	675	476	414	2894	-	101	-	2995
	2017	1803	2291	475	482	5051	-	78	-	5129	1997	1031	735	583	4346	-	156	-	4502
	1990	570	556	159	170	1455	-	20	-	1476									
	1993	650	638	183	192	1662	-	24	-	1686	650	532	197	201	1579	-	31	-	1611
15	1997	774	765	221	225	1986	-	29	-	2015	795	396	276	263	1731	-	58	-	1789
	2007	1170	1175	347	329	3020	-	45	-	3066	1220	619	436	379	2655	-	92	-	2747
	2017	1729	1765	530	470	4493	-	70	-	4564	1829	944	673	534	3980	-	143	-	4123
	1990	529	517	148	158	1351	-	19	-	1370									
	1993	603	592	170	178	1543	-	22	-	1565	612	501	185	189	1487	-	30	-	1516
16	1997	718	710	205	209	1843	-	27	-	1869	749	373	260	248	1630	-	55	-	1685
	2007	1084	1089	321	305	2799	-	42	-	2841	1148	583	411	357	2499	-	87	-	2586
	2017	1602	1635	491	435	4162	-	65	-	4227	1721	888	633	502	3744	-	135	-	3879

TABLE 3.2 - 5 (3)

Traffic Volume

Link	Year	w/o Car /Van	Jeep-ney	Bus	Truck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	with Car /Van	Jeep-ney	Bus	Truck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
	1990	558	442	175	147	1323	-	19	-	1342									
	1993	637	506	202	166	1511	-	22	-	1533	430	300	140	123	993	-	20	-	1013
17	1997	759	607	244	194	1804	-	27	-	1831	523	261	181	174	1139	-	38	-	1178
	2007	1148	929	381	282	2740	-	42	-	2783	803	407	287	261	1748	-	61	-	1809
	2017	1699	1391	583	399	4073	-	65	-	4139	1206	622	443	354	2625	-	94	-	2719
	1990	539	450	162	155	1305	-	19	-	1324									
	1993	614	515	187	174	1490	-	22	-	1512	417	302	132	126	977	-	20	-	997
18	1997	732	618	226	204	1780	-	27	-	1807	519	258	180	173	1129	-	38	-	1167
	2007	1107	950	353	296	2707	-	42	-	2749	796	403	284	249	1733	-	60	-	1793
	2017	1640	1429	541	418	4028	-	65	-	4093	1195	616	439	351	2601	-	93	-	2694
	1990	534	446	160	153	1293	-	19	-	1312									
	1993	609	511	185	173	1478	-	22	-	1499	422	306	134	127	989	-	20	-	1009
19	1997	726	613	224	203	1766	-	26	-	1792	502	250	175	166	1092	-	37	-	1129
	2007	1100	944	351	294	2688	-	42	-	2730	771	392	276	239	1679	-	59	-	1737
	2017	1630	1421	537	416	4004	-	65	-	4069	1160	599	427	338	2525	-	91	-	2616
	1990	508	424	153	146	1232	-	18	-	1250									
	1993	580	487	176	165	1408	-	21	-	1429	391	283	124	118	916	-	19	-	935
20	1997	693	585	214	193	1685	-	25	-	1710	465	232	162	154	1013	-	34	-	1048
	2007	1051	902	335	281	2570	-	40	-	2610	718	365	257	223	1563	-	54	-	1617
	2017	1561	1360	515	398	3834	-	62	-	3896	1083	560	399	316	2358	-	85	-	2442
	1990	487	406	146	140	1179	-	17	-	1196									
	1993	556	466	169	158	1348	-	20	-	1368	366	265	116	111	858	-	17	-	875
21	1997	663	560	204	185	1613	-	24	-	1637	436	218	152	145	950	-	32	-	982
	2007	1006	864	321	269	2460	-	38	-	2498	675	342	241	210	1468	-	51	-	1519
	2017	1494	1302	492	381	3670	-	59	-	3729	1019	526	375	298	2218	-	80	-	2297
	1990	566	373	144	196	1279	-	34	-	1313									
	1993	651	431	167	223	1472	-	39	-	1512	460	279	130	159	1027	-	29	-	1056
22	1997	785	524	205	264	1777	-	48	-	1826	530	263	183	178	1154	-	39	-	1193
	2007	1220	830	328	393	2771	-	78	-	2849	835	422	297	263	1818	-	63	-	1881
	2017	1851	1282	512	571	4216	-	122	-	4338	1283	660	469	380	2791	-	100	-	2891
	1990	544	378	145	189	1256	-	38	-	1294									
	1993	625	437	168	214	1445	-	44	-	1489	647	408	189	222	1467	-	46	-	1512
23	1997	753	531	206	254	1744	-	54	-	1797	763	380	265	254	1662	-	56	-	1718
	2007	1167	842	330	377	2715	-	86	-	2802	1191	604	425	372	2592	-	90	-	2682
	2017	1765	1301	515	546	4127	-	136	-	4262	1812	934	665	532	3944	-	142	-	4085
	1990	19	52	-	12	82	-	63	-	146									
	1993	21	59	-	14	93	-	73	-	166	26	47	4	12	89	-	45	-	133
24	1997	25	70	-	16	111	-	87	-	198	62	51	17	17	146	-	4	-	150
	2007	36	106	-	23	164	-	135	-	300	90	75	25	23	212	-	6	-	218
	2017	52	157	-	31	241	-	205	-	446	128	109	36	32	304	-	9	-	314

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (4)

Traffic Volume

Link	Year	w/o									with								
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
	1990	268	49	36	131	484	-	462	-	947									
	1993	306	55	41	148	550	-	529	-	1079	274	97	47	117	535	-	346	-	881
25	1997	364	64	50	174	652	-	634	-	1286	288	234	76	78	676	-	19	-	696
	2007	552	92	76	254	974	-	974	-	1948	420	349	114	109	993	-	30	-	1023
	2017	821	129	115	366	1432	-	1469	-	2900	605	512	169	152	1438	-	44	-	1482
	1990	53	11	7	29	99	-	86	-	186									
	1993	60	12	8	32	112	-	99	-	211	62	23	10	29	124	-	72	-	195
26	1997	71	15	9	38	132	-	118	-	250	71	53	17	21	162	-	4	-	166
	2007	107	21	14	54	196	-	180	-	376	102	79	25	30	236	-	6	-	242
	2017	158	29	21	77	285	-	271	-	556	146	115	37	41	340	-	9	-	349
	1990	19	1	2	12	35	-	31	.7	67									
	1993	22	1	3	14	40	-	36	.8	77	24	6	4	13	47	-	27	.6	75
27	1997	26	1	3	17	48	-	43	.9	92	28	20	6	9	63	-	1	-	65
	2007	41	2	5	25	73	-	68	1	142	41	31	10	13	95	-	2	-	98
	2017	62	3	8	35	108	-	104	2	214	61	47	15	18	140	-	4	-	144
	1990	88	20	11	50	170	-	140	-	309									
	1993	102	23	13	58	195	-	162	-	357	96	37	15	47	196	-	108	-	303
28	1997	123	27	16	69	234	-	198	-	432	108	80	25	34	248	-	6	-	253
	2007	193	40	25	103	361	-	316	-	678	164	124	39	50	378	-	9	-	387
	2017	294	58	39	152	544	-	493	-	1036	243	188	60	72	563	-	15	-	577
	1990	-	-	-	-	-	-	-	-	-									
	1993	-	-	-	-	-	-	-	-	-	95	47	32	33	207	-	7	-	213
29	1997	-	-	-	-	-	-	-	-	-	113	56	39	39	246	-	8	-	255
	2007	-	-	-	-	-	-	-	-	-	171	86	60	55	373	-	13	-	386
	2017	-	-	-	-	-	-	-	-	-	254	130	92	77	554	-	20	-	573
	1990	351	153	53	44	601	-	27	-	629									
	1993	397	173	61	50	681	-	32	-	713	329	172	59	53	613	-	25	-	638
30	1997	469	206	73	58	805	-	38	-	843	272	221	72	73	638	-	18	-	656
	2007	692	308	111	83	1194	-	58	-	1252	401	332	109	104	947	-	28	-	975
	2017	1004	452	167	116	1739	-	89	-	1827	581	492	162	146	1381	-	43	-	1423
	1990	478	211	68	53	811	-	57	-	868									
	1993	543	240	78	60	921	-	66	-	987	456	239	78	67	840	-	50	-	890
31	1997	643	286	94	69	1092	-	80	-	1172	374	303	99	101	877	-	25	-	902
	2007	958	432	145	99	1634	-	124	-	1758	557	461	151	145	1314	-	39	-	1353
	2017	1400	640	219	138	2398	-	189	-	2587	814	687	227	205	1933	-	60	-	1992
	1990	115	46	117	49	327	-	35	-	362									
	1993	128	52	132	54	366	-	40	-	406	193	112	128	69	502	-	37	-	539
32	1997	148	60	156	62	426	-	48	-	474	359	294	95	103	861	-	24	-	885
	2007	208	87	231	86	611	-	72	-	684	542	442	144	146	1274	-	37	-	1311
	2017	288	123	337	118	865	-	108	-	974	785	653	215	203	1856	-	56	-	1912

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (5)

Traffic Volume

Link	Year	w/o									with							
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
33	1990	58	64	23	27	174	-	6	-	180								
	1993	66	73	27	30	196	-	7	-	202	79	69	30	33	211	-	7	-	219
	1997	77	86	32	35	229	-	8	-	238	121	60	42	39	263	-	9	-	272
	2007	112	127	48	49	335	-	13	-	348	180	92	65	55	391	-	14	-	405
	2017	160	185	71	67	483	-	19	-	502	264	137	98	76	574	-	21	-	594
34	1990	-	-	-	-	-	-	-	-	-									
	1993	-	-	-	-	-	-	-	-	-	35	17	12	12	76	-	3	-	78
	1997	-	-	-	-	-	-	-	-	-	55	28	19	18	120	-	4	-	124
	2007	-	-	-	-	-	-	-	-	-	83	43	30	25	182	-	6	-	188
	2017	-	-	-	-	-	-	-	-	-	124	65	46	35	271	-	10	-	280
35	1990	49	102	8	27	186	-	11	-	196									
	1993	56	117	9	30	213	-	12	-	225	90	126	22	41	280	-	14	-	294
	1997	67	141	11	36	256	-	15	-	271	164	82	57	56	358	-	12	-	370
	2007	104	220	18	52	394	-	24	-	418	254	128	90	81	553	-	19	-	572
	2017	156	334	28	75	593	-	37	-	631	384	197	140	115	835	-	30	-	865
36	1990	-	-	-	-	-	-	-	-	-									
	1993	-	-	-	-	-	-	-	-	-	195	97	67	65	425	-	14	-	439
	1997	-	-	-	-	-	-	-	-	-	233	117	82	76	508	-	17	-	525
	2007	-	-	-	-	-	-	-	-	-	356	181	128	109	774	-	27	-	802
	2017	-	-	-	-	-	-	-	-	-	530	275	196	152	1152	-	42	-	1194
37	1990	139	105	57	74	375	-	20	-	395									
	1993	159	121	66	83	429	-	24	-	453	134	89	52	61	336	-	16	-	352
	1997	190	146	80	98	515	-	29	-	544	191	93	64	68	415	-	13	-	429
	2007	289	229	127	145	791	-	46	-	837	294	146	102	98	640	-	21	-	662
	2017	430	350	198	208	1186	-	72	-	1258	443	224	158	139	963	-	33	-	997
38	1990	103	60	54	77	293	-	12	-	305									
	1993	117	69	62	87	336	-	14	-	350	111	60	49	65	286	-	11	-	297
	1997	141	84	76	103	403	-	17	-	420	172	82	55	66	376	-	11	-	387
	2007	215	131	121	151	619	-	27	-	645	265	129	88	96	578	-	18	-	596
	2017	322	201	188	217	928	-	42	-	969	399	197	137	135	868	-	29	-	897
39	1990	100	58	52	76	287	-	11	-	298									
	1993	115	67	61	86	329	-	13	-	342	109	59	48	65	280	-	10	-	290
	1997	138	82	74	102	395	-	16	-	412	169	80	53	66	368	-	11	-	379
	2007	212	128	118	150	609	-	26	-	635	261	126	86	96	568	-	18	-	585
	2017	317	197	184	216	914	-	41	-	955	393	193	134	135	855	-	28	-	883
40	1990	106	62	55	80	302	-	12	-	314									
	1993	121	71	64	91	348	-	14	-	362	120	65	53	71	309	-	11	-	320
	1997	146	87	79	107	419	-	17	-	436	187	89	60	72	407	-	12	-	419
	2007	226	137	127	159	649	-	28	-	676	290	141	96	105	633	-	20	-	653
	2017	340	212	198	230	980	-	44	-	1024	440	218	151	150	959	-	32	-	990

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (6)

Traffic Volume

Link	Year	w/o								with							
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
41	1990	111	67	55	98	332	-	21	-	352									
	1993	127	78	65	112	381	-	24	-	405	152	83	63	104	402	-	20	-	422
	1997	152	94	79	133	458	-	30	-	488	241	110	72	101	524	-	15	-	539
	2007	234	149	127	199	709	-	48	-	757	372	175	117	148	811	-	24	-	836
	2017	350	230	199	290	1069	-	76	-	1144	562	269	183	210	1224	-	38	-	1262
42	1990	44	36	36	54	169	19	17	-	206									
	1993	50	42	42	61	194	22	20	-	237	72	47	41	53	213	15	16	-	245
	1997	60	51	51	72	234	27	24	-	285	138	69	48	45	300	-	10	-	311
	2007	94	81	81	106	362	42	39	-	443	213	109	77	64	463	-	16	-	480
	2017	142	125	126	154	547	65	61	-	673	321	167	120	90	699	-	26	-	724
43	1990	92	52	41	17	202	-	17	-	219									
	1993	105	60	47	19	232	-	20	-	251	105	58	45	22	231	-	16	-	247
	1997	126	72	57	23	278	-	24	-	302	127	68	49	32	276	-	11	-	287
	2007	190	112	91	33	427	-	39	-	465	198	107	78	47	430	-	17	-	446
	2017	282	170	141	48	641	-	60	-	701	300	165	122	67	653	-	26	-	679
44	1990	24	64	12	90	190	-	14	-	204									
	1993	27	74	14	102	217	-	16	-	233	60	65	18	93	235	-	12	-	248
	1997	33	89	17	120	258	-	20	-	278	148	56	31	88	323	-	6	-	329
	2007	50	138	26	176	390	-	31	-	422	222	86	49	128	485	-	9	-	494
	2017	74	210	41	252	576	-	49	-	625	325	129	75	181	711	-	14	-	725
45	1990	164	169	90	93	516	-	18	-	534									
	1993	187	193	105	106	591	-	20	-	611	257	205	119	121	701	-	24	-	725
	1997	225	232	127	124	708	-	25	-	733	401	198	137	136	872	-	29	-	901
	2007	344	355	202	182	1083	-	40	-	1123	615	310	217	196	1338	-	46	-	1384
	2017	515	530	313	260	1618	-	62	-	1679	922	473	335	276	2006	-	71	-	2077
46	1990	109	112	59	63	343	-	12	-	355									
	1993	124	128	69	71	393	-	13	-	406	134	107	62	63	365	-	12	-	378
	1997	149	154	84	84	470	-	16	-	486	209	103	71	71	454	-	15	-	469
	2007	228	235	133	122	718	-	26	-	744	321	161	113	103	698	-	24	-	722
	2017	340	351	205	174	1070	-	40	-	1110	481	246	174	145	1047	-	37	-	1084
47	1990	154	147	22	46	369	-	15	-	384									
	1993	184	176	26	54	441	-	18	-	459	153	138	27	45	363	-	13	-	377
	1997	233	226	34	68	561	-	24	-	585	196	152	49	57	453	-	12	-	465
	2007	407	402	62	113	984	-	44	-	1028	348	277	90	97	812	-	22	-	834
	2017	678	684	107	180	1650	-	77	-	1727	587	478	156	158	1380	-	40	-	1420
48	1990	385	163	76	77	701	-	36	-	737									
	1993	438	187	87	86	798	-	42	-	840	405	212	86	90	794	-	35	-	829
	1997	520	223	105	100	948	-	50	-	999	390	311	101	109	910	-	25	-	936
	2007	778	339	163	144	1424	-	79	-	1503	582	474	155	157	1367	-	39	-	1406
	2017	1140	506	246	202	2095	-	120	-	2215	850	707	232	220	2010	-	60	-	2070

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (7)

Traffic Volume

Link	Year	w/o									with								
		Car /Van	Jeep-ney	Bus	Truck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Truck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
49	1990	228	96	44	47	414	-	21	-	435									
	1993	259	109	51	52	471	-	24	-	495	249	128	52	57	485	-	21	-	506
	1997	307	130	61	61	559	-	29	-	588	239	188	60	69	556	-	15	-	571
	2007	458	198	94	87	837	-	45	-	882	355	285	92	98	831	-	23	-	854
	2017	669	293	141	122	1226	-	68	-	1294	517	423	138	138	1216	-	35	-	1251
50	1990	186	75	33	41	335	-	16	-	351									
	1993	212	86	39	46	382	-	18	-	400	208	104	41	50	403	-	16	-	419
	1997	252	104	47	54	456	-	22	-	478	202	153	48	61	464	-	12	-	475
	2007	379	159	73	77	688	-	35	-	723	302	234	75	88	698	-	18	-	717
	2017	557	238	111	109	1015	-	53	-	1068	441	349	113	125	1027	-	28	-	1055
51	1990	78	72	10	24	184	-	7	-	191									
	1993	90	84	12	28	214	-	8	-	223	63	54	10	20	147	-	5	-	152
	1997	110	103	15	34	263	-	11	-	273	77	58	18	24	177	-	4	-	182
	2007	177	169	25	52	424	-	18	-	442	127	97	31	38	294	-	7	-	301
	2017	276	269	41	79	664	-	29	-	693	202	157	51	59	469	-	12	-	482
52	1990	98	81	4	21	204	-	45	-	249									
	1993	112	93	5	24	234	-	52	-	286	85	70	9	20	184	-	29	-	213
	1997	134	113	6	28	281	-	63	-	345	87	68	22	25	202	-	5	-	207
	2007	206	177	9	42	434	-	101	-	535	132	106	35	36	309	-	9	-	318
	2017	309	271	14	60	653	-	158	-	811	197	162	53	52	464	-	14	-	477
53	1990	63	46	13	18	140	-	11	-	151									
	1993	73	53	15	20	161	-	13	-	175	74	56	17	21	167	-	11	-	178
	1997	88	65	18	24	195	-	16	-	212	85	69	22	23	200	-	6	-	205
	2007	138	104	29	36	307	-	26	-	334	132	109	36	35	311	-	9	-	320
	2017	209	163	45	53	470	-	42	-	512	199	167	55	51	471	-	14	-	486
54	1990	58	42	12	16	127	-	10	-	137									
	1993	66	48	13	18	145	-	12	-	157	80	61	18	22	181	-	12	-	193
	1997	78	58	16	21	174	-	15	-	188	92	74	24	25	215	-	6	-	221
	2007	118	90	25	31	265	-	23	-	287	139	115	38	36	328	-	10	-	338
	2017	176	137	38	44	395	-	35	-	430	206	174	57	52	490	-	15	-	505
55	1990	69	50	14	19	152	-	12	-	165									
	1993	78	57	16	21	172	-	14	-	186	95	72	21	26	214	-	14	-	228
	1997	91	67	19	25	202	-	17	-	219	108	86	28	29	250	-	7	-	257
	2007	133	101	28	34	297	-	26	-	323	157	130	43	41	371	-	11	-	382
	2017	192	150	42	48	431	-	39	-	470	228	193	64	57	542	-	17	-	559
56	1990	73	27	31	21	153	-	-	-	153									
	1993	83	31	35	24	173	-	-	-	173	110	57	41	31	239	-	2	-	241
	1997	97	36	42	27	203	-	-	-	203	132	108	35	36	311	-	9	-	320
	2007	143	54	64	39	299	-	-	-	299	196	163	53	51	463	-	14	-	476
	2017	206	79	96	53	434	-	-	-	434	285	241	80	71	677	-	21	-	698

TRAFFIC PROJECTION LEYTE .

TABLE 3.2 - 5 (8)

Traffic Volume

Link	Year	w/o									with							
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
57	1990	98	32	51	36	217	-	4	-	221								
	1993	111	36	58	41	246	-	5	-	251	137	70	58	45	310	-	7	-	317
	1997	131	43	70	47	292	-	5	-	297	185	151	49	50	435	-	13	-	448
	2007	195	66	109	68	437	-	9	-	446	277	231	76	71	655	-	20	-	675
	2017	285	98	165	94	642	-	13	-	656	407	346	114	101	968	-	30	-	998
58	1990	41	9	24	18	93	-	3	-	96								
	1993	46	11	28	21	106	-	3	-	109	49	23	23	18	114	-	4	-	117
	1997	55	13	34	25	127	-	4	-	131	71	59	19	18	167	-	5	-	172
	2007	84	20	54	36	194	-	7	-	200	108	91	30	27	256	-	8	-	264
	2017	125	31	83	51	289	-	10	-	300	161	139	46	39	384	-	12	-	396
59	1990	35	7	17	18	77	-	2	-	79								
	1993	40	8	20	20	88	-	2	-	90	44	18	17	19	99	-	3	-	102
	1997	48	10	24	24	105	-	3	-	108	63	47	15	19	144	-	4	-	148
	2007	72	15	38	35	160	-	5	-	165	95	73	23	28	220	-	6	-	226
	2017	106	23	59	50	238	-	7	-	245	141	111	36	40	328	-	9	-	337
60	1990	115	112	18	20	260	-	12	-	272								
	1993	131	129	14	23	297	-	14	-	312	124	115	19	26	284	-	12	-	296
	1997	156	156	17	27	356	-	18	-	373	132	106	35	36	309	-	9	-	318
	2007	232	243	27	40	543	-	28	-	571	201	166	54	53	473	-	14	-	487
	2017	339	371	41	58	809	-	43	-	853	299	251	83	76	709	-	22	-	730
61	1990	63	129	4	20	217	-	17	-	234								
	1993	71	149	5	23	248	-	20	-	268	81	126	12	25	243	-	15	-	258
	1997	85	179	6	27	298	-	24	-	321	119	97	31	33	280	-	8	-	288
	2007	129	278	10	40	456	-	38	-	494	182	150	49	48	429	-	13	-	442
	2017	190	421	15	57	683	-	59	-	742	271	228	75	68	642	-	20	-	662
62	1990	60	125	10	33	228	-	13	-	241								
	1993	69	144	11	37	261	-	15	-	276	84	127	18	35	264	-	13	-	277
	1997	83	173	14	44	314	-	18	-	332	138	112	36	38	324	-	9	-	333
	2007	127	270	22	64	483	-	29	-	513	211	174	57	55	497	-	15	-	511
	2017	192	409	34	92	727	-	46	-	773	313	264	87	79	743	-	23	-	766
63	1990	124	163	26	40	353	-	18	-	372								
	1993	139	185	30	45	399	-	21	-	420	190	213	43	59	506	-	22	-	528
	1997	163	219	35	52	469	-	25	-	494	303	242	78	85	708	-	20	-	728
	2007	236	329	51	73	690	-	39	-	728	449	366	119	121	1054	-	30	-	1085
	2017	338	487	73	101	1000	-	58	-	1058	653	543	178	169	1543	-	46	-	1590
64	1990	.6	.3	.2	.2	1	-	.0	-	1								
	1993	.7	.3	.2	.3	1	-	.0	-	2	7	3	2	2	15	-	.5	-	16
	1997	.8	.4	.3	.3	2	-	.1	-	2	24	12	8	8	53	-	2	-	54
	2007	1	.7	.5	.5	3	-	.1	-	3	40	20	14	12	87	-	3	-	90
	2017	2	1	.8	.7	5	-	.2	-	5	64	33	24	19	139	-	5	-	145

TRAFFIC PROJECTION LEYTE

TABLE 3.2 - 5 (9)

Traffic Volume

Link	Year	w/o									with								
		Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total	Car /Van	Jeep-ney	Bus	Tru-ck	Sub-Total	Tri-cycl	Mot. cycl	Ani-mal	Total
	1990	-	-	-	-	-	-	-	-	-									
	1993	-	-	-	-	-	-	-	-	-	72	34	22	29	157	-	5	-	162
65	1997	-	-	-	-	-	-	-	-	-	162	78	53	61	353	-	11	-	364
	2007	-	-	-	-	-	-	-	-	-	256	125	86	90	556	-	18	-	574
	2017	-	-	-	-	-	-	-	-	-	391	195	136	129	852	-	29	-	880

3.3 TRAFFIC ANALYSIS AND FORECAST: DEVELOPMENT PROJECT

Traffic on development project roads was forecasted separately for passenger traffic, non-agricultural traffic and agricultural traffic. The number of passengers and commodity tonnage were estimated first, and then they were converted to the number of vehicles assuming modal distribution and occupancy/average load. Figure 3.3.-1 shows the schematic diagram of traffic forecast for development project.

3.3.1 Passenger Traffic and Non-Agricultural Traffic

The population residing within the road influence area, which is defined as the area from which local existing or potential traffic using the road derives, was obtained mainly from distribution of barangays shown in 1:50,000 topographical maps and the NCSO 1980 Census of Population and Housing, and supplemented by information obtained from barangay interviews. The population forecasts were prepared using the NCSO report.

The number of passengers and non-agricultural commodity tonnage were obtained as the product of population by the per capita generation factor. Table 3.3-1 shows the generation factors commodity used in the analysis, which was derived mainly based on the traffic survey and referring to previous studies. In the case of particular roads where the common values were deemed inapplicale, specific values were used.

TABLE 3.3-1 PER CAPITA TRAFFIC GENERATION FACTORS (MINOR ROAD) : Province of Leyte

Existing Road Condition	Passenger Movement (trip/person/day)		Non-Agricultural Commodity (kg/person/day)	
	w/o	with	w/o	with
Paved/Gravel				
Good/Fair	0.12	0.12	2.0	2.0
Bad	0.10	0.11	1.6	1.8
Very Bad	0.08	0.11	0.6	1.0
Earth Road	0.03	0.06	0.5	1.0
Impassable to motoried vehicle	0.01	0.03	0.4	1.0

The modal distribution and the occupancy/average load used in the conversion to traffic volume by vehicle type were estimated individually for each road based on the road

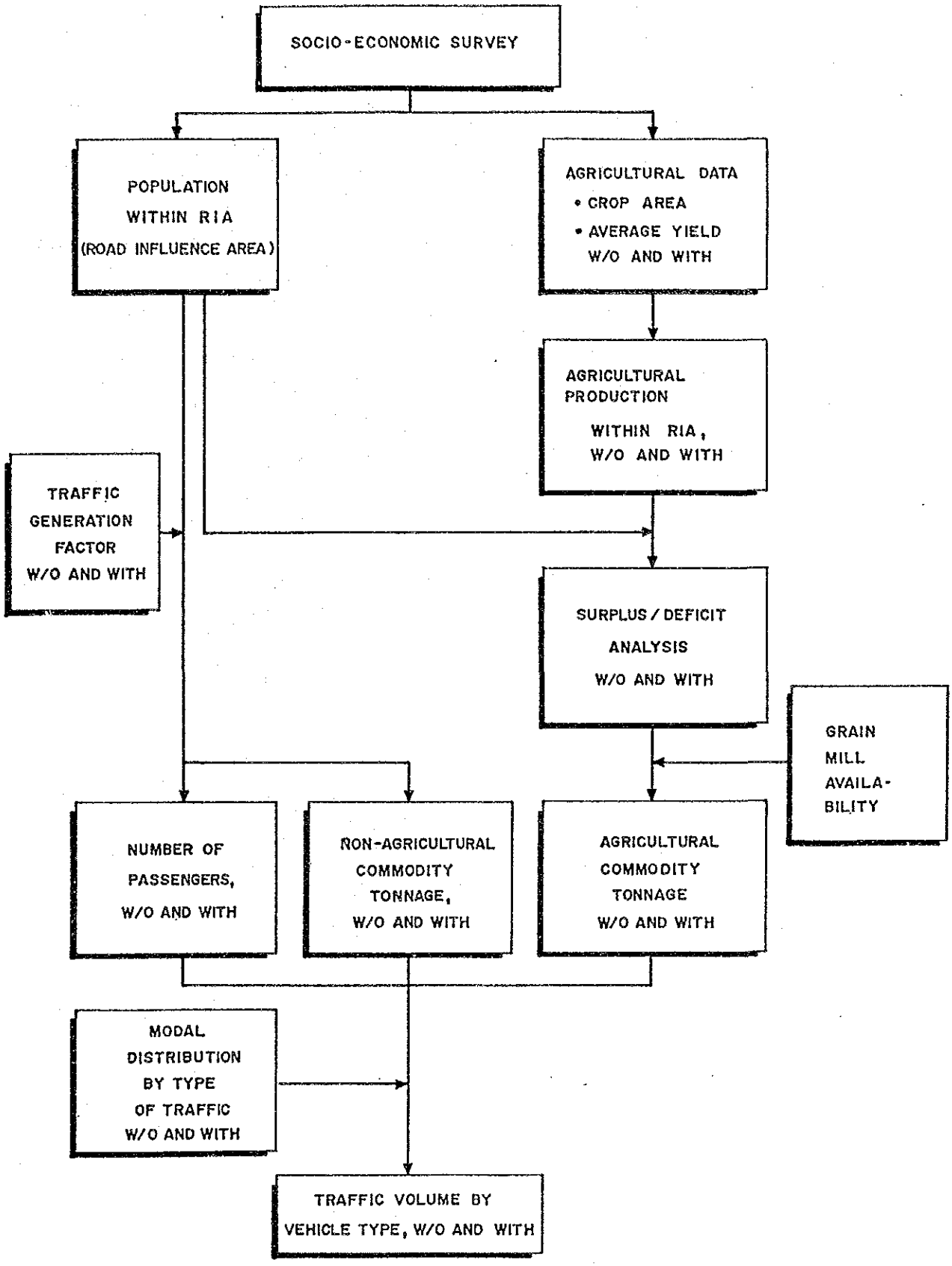

FIGURE 3.3-1
PROCEDURE OF TRAFFIC FORECAST FOR DEVELOPMENT PROJECTS

inventory survey and the traffic survey.

3.3.2 Agricultural Traffic

Agricultural commodity tonnage was estimated based on the agricultural production within the road influence area, taking into consideration i) home consuption and surplus/deficit and ii) availability of grain mill(s) in the road influence area, as regards food grain.

i) Home consumption of food grain was calculated as population times per capita grain consumption (assumed to be 130 kg in a milled form), and the surplus or deficit production was calculated based thereupon.

ii) In case of no mill in the road influence area, all net production is assumed to move out in the form of palay/unmilled corn. Milled grain products for home comsumption are then transported back. An eventual deficit moves into the road influence area in the form of milled products.

Provided one or more mills exist in the road influence area, the transport flows are assumed as follows:

- Home consumption remains in the road influence area (no transport movement assumed).
- Surplus production would be transported out, traditionally in the form of unmilled food grains.
- Deficit production would be moved into the road influence area in milled form.

Agricultural commodity tonnage was cnverted to number of vehicles using the modal distribution and average load, which were estimated individually for each road considering the transport circumstances.

3.3.3 Estimated Present and Future Traffic

Estimated present and future traffic is presented in Table 3.4-1 in the next Section.

3.4 SUMMARY OF TRAFFIC VOLUME ON STUDIED ROADS

Estimated present and future traffic volumes of the studied roads comprising of traffic and development projects are presented by each road project in Table 3.4-1.

TABLE 3.4 - 1 (1)

Traffic Volume by Vehicle Type LEYTE

Class of Road	Type of Impr't	Road Number	w/o Car	Jeep -ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk -ing	Boat	with Car	Jeep -ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk -ing	Boat
Second'y	Rehab/	N10	-	-	-	-	-	-	-	-	-	-	195	97	67	65	425	0	14	-	-	-
Major	Imp-1	P42-1	86	71	-	7	164	69	173	-	-	-	130	7	32	7	176	-	179	-	-	-
		N4-2	102	23	13	58	195	0	162	-	-	-	96	37	15	47	196	0	108	-	-	-
		N3-4	60	12	8	32	112	0	99	-	-	-	62	23	10	29	124	0	72	-	-	-
		N24-2	83	31	35	24	173	0	-	-	-	-	110	57	41	31	239	0	2	-	-	-
		N9-2	-	-	-	-	-	-	-	119	386	-	39	4	10	4	57	-	53	-	-	-
		N21-2	73	53	15	20	161	0	13	-	-	-	74	56	17	21	167	0	11	-	-	-
		N20-1	90	84	12	28	214	0	8	-	-	-	63	54	10	20	147	0	5	-	-	-
		N22-1	66	48	13	18	145	0	12	-	-	-	80	61	18	22	181	0	12	-	-	-
		N3-1	21	59	-	14	93	0	73	-	-	-	26	47	4	12	89	0	45	-	-	-
		N3-2	21	59	-	14	93	0	73	-	-	-	26	47	4	12	89	0	45	-	-	-
		P25-1	22	1	3	14	40	0	36	1	-	-	24	6	4	13	47	0	27	1	-	-
	Imp-2/	N7-1	128	52	132	54	366	0	40	-	-	-	193	112	128	69	502	0	37	-	-	-
	Widen	P24-1	139	185	30	45	399	0	21	-	-	-	190	213	43	59	506	0	22	-	-	-
		P55-1	131	129	14	23	297	0	14	-	-	-	124	115	19	26	284	0	12	-	-	-
		N9-3	56	117	9	30	213	0	12	-	-	-	90	126	22	41	280	0	14	-	-	-
		P20-2	131	129	14	23	297	0	14	-	-	-	124	115	19	26	284	0	12	-	-	-
		N24-1	83	31	35	24	173	0	-	-	-	-	110	57	41	31	239	0	2	-	-	-
		P14-1	69	144	11	37	261	0	15	-	-	-	84	127	18	35	264	0	13	-	-	-
		N9-1	66	73	27	30	196	0	7	-	-	-	79	69	30	33	211	0	7	-	-	-
		N23-1	78	57	16	21	172	0	14	-	-	-	95	72	21	26	214	0	14	-	-	-
		N4-1	22	1	3	14	40	0	36	1	-	-	24	6	4	13	47	0	27	1	-	-
	New	B01-1	-	-	-	-	-	-	-	164	247	-	29	6	9	6	50	-	37	-	-	-
	Const.	N5	-	-	-	-	-	-	-	-	-	-	95	47	32	33	207	0	7	-	-	-

TABLE 3.4 - 1 (2)

Traffic Volume by Vehicle Type LEYTE

Class of Road	Type of Impr't	Road Number	w/o										with									
			Car	Jeep-ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk-ing	Boat	Car	Jeep-ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk-ing	Boat
Minor (Nat'l/ Prov'l)	Rehab/ Imp-1	P4-1	58	29	18	6	110	-	58	-	-	-	85	6	21	6	117	-	117	-	-	-
		P28-1	13	12	-	2	26	10	25	-	-	-	19	2	5	2	28	-	25	-	-	-
		P30-1	36	32	-	4	72	32	71	-	-	-	54	31	-	4	89	-	74	-	-	-
		P15-1	29	-	-	15	43	45	33	-	-	-	27	17	-	3	47	-	36	-	-	-
		P63-1	-	-	-	-	-	-	83	56	238	-	37	21	-	2	60	-	51	-	-	-
		P84-1	-	-	-	-	-	-	69	56	190	-	26	2	7	2	37	-	35	-	-	-
		P70-1	15	13	-	2	29	13	29	-	-	-	22	13	-	2	36	-	30	-	-	-
		N8-1	43	41	-	7	90	44	83	-	-	-	64	7	17	7	94	-	86	-	-	-
		P0-1	17	-	-	9	26	28	19	-	-	-	18	11	-	2	30	-	24	-	-	-
		P53-1	51	42	-	4	97	36	104	-	-	-	75	5	19	5	103	-	104	-	-	-
		P2-1	13	13	-	2	28	14	26	-	-	-	21	13	-	2	35	-	28	-	-	-
		P3-1	19	17	-	3	39	18	37	-	-	-	28	3	7	3	40	-	37	-	-	-
		N30-1	49	48	-	9	106	54	91	-	-	-	76	10	21	10	116	-	101	-	-	-
		N90-1	-	-	-	-	-	-	79	62	219	-	32	18	-	2	52	-	43	-	-	-
		P36-1	19	17	-	2	38	18	37	-	-	-	28	2	7	2	41	-	39	-	-	-
		P17-1	50	-	-	26	76	84	55	-	-	-	48	29	-	5	82	-	65	-	-	-
		P45-1	13	10	-	1	24	9	26	-	-	-	19	10	-	1	31	-	26	-	-	-
		P27-1	-	-	-	-	-	-	120	93	333	-	48	4	12	4	67	-	66	-	-	-
		N11-1	38	-	-	20	58	64	43	-	-	-	36	4	10	4	54	-	48	-	-	-
		P72-1	15	15	-	3	33	17	28	-	-	-	22	3	6	3	34	-	29	-	-	-
		P26-1	73	59	-	4	137	50	150	-	-	-	112	61	-	5	178	-	155	-	-	-
		P59-1	28	-	-	13	41	45	25	-	-	-	28	15	-	1	44	-	38	-	-	-
		N26-1	14	15	-	3	32	17	26	-	-	-	22	3	6	3	35	-	29	-	-	-
		P73-1	11	9	-	1	21	8	23	-	-	-	17	9	-	1	27	-	23	-	-	-
		P77-1	10	-	-	5	14	15	10	-	-	-	10	5	-	1	16	-	13	-	-	-
		P66-1	16	-	-	10	25	30	30	-	-	-	12	12	-	5	29	-	14	-	-	-
		P23-1	36	-	-	18	54	60	38	-	-	-	36	3	9	3	52	-	48	-	-	-
		P56-1	19	18	-	3	40	19	37	-	-	-	30	3	8	3	44	-	41	-	-	-
		P31-1	21	18	-	2	41	18	41	-	-	-	33	2	8	2	45	-	44	-	-	-
		P7-1	26	13	8	3	50	-	26	-	-	-	39	2	10	2	53	-	54	-	-	-
		P16-2	32	27	-	3	61	23	65	-	-	-	49	3	12	3	67	-	67	-	-	-
		P35-1	50	41	-	3	94	35	102	-	-	-	76	4	19	4	103	-	105	-	-	-
		P75-1	30	25	-	2	57	21	60	-	-	-	44	3	11	3	61	-	60	-	-	-
		N26-3	19	16	-	2	37	14	39	-	-	-	28	2	7	2	40	-	39	-	-	-
		P16-1	47	40	-	4	91	39	95	-	-	-	72	4	18	4	97	-	99	-	-	-
		N27-1	23	19	-	2	44	19	45	-	-	-	35	2	9	2	48	-	47	-	-	-
	Imp-2/ Widen	N17-1	53	33	19	13	119	-	49	-	-	-	76	13	22	13	125	-	98	-	-	-
	New Const.	N12	-	-	-	-	-	-	-	-	-	-	72	34	22	29	157	0	5	-	-	-

TABLE 3.4 - 1 (3)
Traffic Volume by Vehicle Type LEYTE

Class of Road	Type of Impr't	Road Number	w/o										with									
			Car	Jeep-ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk-ing	Boat	Car	Jeep-ney	Bus	Truck	Total	Tri-cycle	Motor cycle	Ani-mal	Walk-ing	Boat
Minor (Barangay)	Rehab/Imp-l	B38-5	-	-	-	-	-	-	-	175	766	-	72	41	-	5	119	-	99	-	-	-
		B38-12	18	23	-	7	49	31	29	-	-	-	26	21	-	7	55	-	31	-	-	-
		B38-13	45	45	-	9	100	42	85	-	-	-	67	46	-	11	125	-	88	-	-	-
		B14-2	14	-	-	8	22	24	17	-	-	-	14	9	-	2	25	-	19	-	-	-
		B40-1	-	-	-	-	-	-	-	110	180	-	16	13	-	4	33	-	21	-	-	-
		B47-4	-	-	-	-	-	-	19	33	40	-	4	3	-	1	8	-	4	-	-	-
		B08-4	16	16	-	3	35	18	31	-	-	-	26	16	-	3	45	-	35	-	-	-
		B07-2	-	-	-	-	-	-	12	19	26	-	3	2	-	1	6	-	4	-	-	-
		B13-1	-	-	-	-	-	-	81	70	220	-	33	20	-	3	56	-	45	-	-	-
		B33-1	16	16	-	3	35	17	30	-	-	-	28	17	-	3	49	-	38	-	-	-
		B45-1	11	10	-	1	22	10	23	-	-	-	19	10	-	1	30	-	26	-	-	-
		B22-2	4	4	-	1	8	4	7	-	-	-	6	4	-	1	10	-	8	-	-	-
		B50-5	18	-	-	9	28	30	18	-	-	-	19	11	-	1	31	-	26	-	-	-
	New Const.	B14-1	-	-	-	-	-	-	-	44	77	-	10	7	-	2	18	-	12	-	-	-
		B00-1	-	-	-	-	-	-	-	51	101	-	9	2	3	2	15	-	12	-	-	-
		B42-3	-	-	-	-	-	-	-	18	28	-	3	2	-	1	6	-	4	-	-	-
		B34-2	-	-	-	-	-	-	-	18	22	-	2	2	-	1	5	-	3	-	-	-

CHAPTER 4
PROJECT IDENTIFICATION AND SCREENING

4.1 PROJECT IDENTIFICATION

4.1.1 Field Surveys

Field survey was conducted by the Study Team to assess present condition of all major roads and some other typical minor roads (these are referred to as "Surveyed Roads").

Road projects (mostly minor roads) proposed by the local officials were also collected and road conditions of these roads were obtained by the interview survey (these are referred to as " Road Projects proposed by local officials").

Road projects surveyed by the Study Team and proposed by the local officials were combined and integrated, because some road projects were both surveyed by the Study Team and also proposed by the local officials, and a list of Studied Roads was prepared.

Summaries of "Surveyed Roads", "Road Projects proposed by Local officials "and" Studied Roads" are shown in Table 4.1-1.

TABLE 4.1-1 SUMMARY OF SURVEYED ROADS
Road Projects Proposed by Local Officials and Studied Roads
Province of Leyte

	Road Class	National Roads	Prov'l/City Roads	Barangay Roads	Total
Surveyed Road	Major Rd.	659.3	27.2	-	686.5
	Minor Rd.	70.4	206.1	-	276.5
	Total	729.7	233.3	-	963.0
Rd. Proj. Proposed by Local Officials	Major Rd.	-	41.8	40.0	81.8
	Minor Rd.	-	440.7	665.0	1,105.7
	Total	-	482.5	705.0	1,187.5
Studied Road	Major Rd.	759.2	41.8	40.0	841.0
	Minor Rd.	184.1	440.7	665.0	1,289.8
	Total	943.3	482.5	705.0	2,130.8

4.1.2 Project Identification

1) Project Identification Criteria

Project identification criteria are shown in Table 4.1-2.

TABLE 4.1-2 PROJECT IDENTIFICATION CRITERIA

Item	Condition of Identification	
	Major Roads	Minor Roads
(1) Existing Links		
* Carriageway Width	Less than 6.0 meter	Less than 4.0 meters
* Pavement Type	Inferior to recommended type in the engineering Standards	Inferior to gravel
* Surface Condition	Bad or very bad 1/	Bad or very bad2/
(2) New Links	Impassable Abandoned Non-existing	
(3) Bridges	Ford crossing Spillway Timber bridge Bailey bridge	Ford crossing Spillway in structurally unsound condition Bailey bridge for AADT more than 300

Notes: 1/ Gravel road which is proposed for improvement by local officials shall be identified, even though surface condition is "fair".

2/ Gravel road of which surface condition is "fair" shall be identified, as the surface condition of gravel minor roads is easily deteriorated.

2) Identified Road Projects

All studied Roads, except those of the national primary roads and committed roads, were evaluated in accordance with the identification criteria. Road projects identified are summarized in Table 4.1-3.

TABLE 4.1-3 SUMMARY OF IDENTIFIED ROAD PROJECTS
Province of Leyte

Road Class		National Road	Prov'l/City Road	Barangay Road	Total
Major Road	Length (kms.)	243.8	33.1	40.0	316.9
	(% to Studied Roads)	(32.7%)	(79%)	(100%)	(38%)
Minor Road	Length (kms.)	138.9	439.2	665.0	1,243.1
	(% to Studied Roads)	(75%)	(99%)	(100%)	(96%)
Total	Length (kms.)	382.7	472.3	705.0	1,560.0
	(% to Studied Roads)	(41%)	(91%)	(100%)	(73%)

4.2 PROJECT SCREENING

4.2.1 Categorization

Road projects are categorized by the following factors in order to establish comprehensive prioritization criteria:

(1) Class of Roads

Major Roads	Minor Roads
* Primary major roads	*National/provincial/city roads
* Secondary major roads	* Barangay roads

(2) Urgency of work

Improvement criteria for roads and bridges are established as shown in Tables 4.2-1 and 4.2-2, respectively. Improvement works are classified into five (5) types as shown in Table 4.2-3. In view of the urgency of work to be implemented, the types of improvement are grouped into two (2) as follows:

Type A (Urgent Projects)

* Rehabilitation: Improvement of deteriorated road surface, but standard or superior class pavement, to acceptable condition.
* Improvement -1: Improvement of deteriorated road surface and substandard class pavement, to acceptable and standard pavement.
* New Construction: Construction of new road including re-construction of abandoned road.

Type B (Less Urgent Projects)

* Improvement -2: Upgrading of substandard pavement class to standard pavement class, though existing road surface condition is acceptable.
* Widening : Widening of roads with substandard carriageway width, other conditions meet engineering standards.

Note: Road projects which include only improvement of bridges are classified as "Rehabilitation".

(3) Economic Viability

Major Roads

Simplified economic evaluation is conducted for major roads. Internal Rate of Return (IRR) is calculated based on roughly estimated construction cost and traffic cost savings. Categorization is made as follows:

Improvment Type A:

* IRR of 7.5% or more
* IRR of less than 7.5%

Improvement Type B:

* IRR of 15% or more
* IRR of less than 15.0%

Minor Roads

Minor road Pre-evaluation Indicator (MPI) is developed based on Phase-1 Study results. Categorization of minor roads is made based on calculated MPI as follows:

* MPI of 7.5 or more
* MPI of less than 7.5

TABLE 4.2-1 IMPROVEMENT CRITERIA FOR ROAD

Road Class	Major Road		Minor Road	
	Standard/ Superior	Substandard	Standard/ Superior	Substandard
Good/Fair	No improvement or widening (widening)	Upgrading of pavement type (improvement-2)	No improvement	No improvement
Bad/Very bad	Improvement of surface condition (Rehabilitation)	Upgrading of pavement type (improvement-1)	Improvement surface condition (Rehabilitation)	Upgrading of pavement type (Improvement-1)
Abandoned/ Non-existing	Construction of new road (New Construction)			

Note: 1) In case of carriageway width less than 6.0 meters.

TABLE 4.2-2 IMPROVEMENT CRITERIA FOR BRIDGES

Existing Bridge Type	Proposed Improvement		
	Major Road	Minor Road	
Ford Crossing	2-lane permanent bridge	Carriageway width 4.0 m: 1-lane spillway Carriageway width 6.0 m: 2-lane spillway	
Spillway	2-lane permanent bridge	No improvement	
Timber Bridge	2-lane permanent bridge	AADT less than 200	1-lane permanent bridge
		AADT more than 200	2-lane permanent bridge
Bailey Brridge	2-lane permanent bridge	AADT less than 300	No improvement
		AADT more than 300	2-lane permannet bridge

Note: 1) Where the site condition is not favorable for a spillway, a permanent bridge should be planned in accordance with the criteria for a timber bridge.

2) When the existing spillway is structurally sound and traffic disturbance is estimated less, the existing one can be utilized. Under other conditions, a permanent bridge should be planned in accordance with the criteria for a timber bridge.

TABLE 4.2-3 TYPES OF IMPROVEMENT

Type	Existing Pavement Type	Existing Surface Condition	Proposed Improvement Work
Rehabilitation	Standard or superior	Bad/ very bad	Improvement of surface condition
Improvement-1	Substandard	Bad/ very bad	Upgrading of surface type
Improvement-2	Substandard	Good/Fair	Upgrading of surface type
Widening	Standard (carriageway is narrowed than standard)	Good/Fair	Widening of existing road
New Construction	Impassable/abandoned non-existing		Construction of new road

Note: Improvement-2 and widening are not applied to minor roads.

4.2.2 Prioritization and Selection Criteria

Prioritization and selection criteria of road projects for feasibility studies are established as shown in Tables 4.2-4 and 4.2-5.

TABLE 4.2-4 PRIORITIZATION AND SELECTION OF ROAD PROJECTS
- Major Roads -

Category	Road Class	Type of Improvement	IRR	Priority Criteria	Selection Criteria
1	Primary	A	7.5 ≦ IRR	MA-1	↑
2	Secondary	A	7.5 ≦ IRR	MA-1	
3	Primary	B	15.0 ≦ IRR	MA-2	To be selected for F/S
4	Secondary	B	15.0 ≦ IRR	MA-2	
5	Primary	A	IRR < 7.5	MA-2	
6	Secondary	A	IRR < 7.5	MA-2	↓
7	Primary	B	IRR < 15.0	MA-3	
8	Secondary	B	IRR < 15.0	MA-3	

TABLE 4.2-5 PRIORITIZATION AND SELECTION OF ROAD PROJECTS
- Minor Roads -

Category	Road Class	Type of Improvement	MPI	Priority Criteria	Selection Criteria
1	National/Provincial/ City	A	7.5 ≦ MPI	MI-1	↑
2	Barangay	A	7.5 ≦ MPI	MI-1	To be selected for F/S
3	National/Provincial/ City	A	MPI < 7.5	MI-2	
4	Barangay	A	MPI < 7.5	MI-2	↓

Note: Improvement Type A: Rehabilitation, Improvement-1, New Construction
Improvement Type B: Improvement-2, Widening

4.2.3 Priority of Identified Road Projects

Identified projects were evaluated and prioritized in accordance with criteria discussed and summarized in Tables 4.2-6 and 4.2-7.

TABLE 4.2-6 PRIORITY OF IDENTIFIED MAJOR ROADS
Province of Leyte

Category	Road Class	Type of Improvement	IRR	Priority Group	Road Length	No. of Road Links
1	Primary	A	7.5 ≤ IRR	MA-1	-	-
2	Secondary	A	7.5 ≤ IRR	MA-1	76.1	9
3	Primary	B	15.0 ≤ IRR	MA-2	-	-
4	Secondary	B	15.0 ≤ IRR	MA-2	-	-
5	Primary	A	IRR<7.5	MA-2	-	-
6	Secondary	A	IRR<7.5	MA-2	238.5	17
7	Primary	B	IRR<15.0	MA-3	-	-
8	Secondary	B	IRR<15.0	MA-3	2.3	1
	Total				316.9	27

Table 4.2-7 PRIORITY OF IDENTIFIED MINOR ROADS
Province of Leyte

Category	Road Class	Type of Improvement	MPI	Priority Group	Road Length	No. of Rd.Links
1	Nat'l/Provi/ City	A	7.5 ≤ MPI	MI-1	251.5	37
2	Barangay	A	7.5 ≤ MPI	MI-1	187.7	34
3	Nat'l/Provi/	A	MPI < 7.5	MI-2	326.6	65
4	Barangay	A	MPI < 7.5	MI-2	477.3	102
	Total				1,243.1	238

4.2.4 Selection of Road Projects For Feasibility Studies

In accordance with selection criteria discussed above, road projects under priority groups MA-1 and MA-2 for major roads and priority groups MI-1 for minor roads were initially selected, and these were plotted on 1:100,000 map to evaluate the following:

- Distribution of initially selected road projects (when these are concentrated in certain area, some minor roads were deleted, and where road projects are scarce, some minor roads were added.)

- Linkage of road projects
  (There is a case that a selected lower class road is connected with a higher class road, however, the latter is not selected due to lower priority. Such a case, a higher class road is also selected to maintain similar condition of road after implementation.)

After adjustment mentioned above, road projects were finally selected and summarized as follows:

Major Road	299.8 kms.	(24 projects)
Minor Road	461.2 kms.	(55 projects)
Total	761.0 kms.	(79 projects)

CHARTER 5
PROJECT EVALUATION

5.1 PRELIMINARY DESIGN AND COST ESTIMATE

5.1.1 Preliminary Design

1) Design Concept

There are two options in design concept for rural road improvement, as follows :

* Designing rural roads with optimum standards aimed at improving all aspects including horizontal and vertical alignments, which sometimes require massive earth works and is costly.

* Designing rural roads by basically concentrating on improving surface conditions, thus improving horizontal and vertical alignments is limited to the required minimum.

Rural roads are extensive in the number of road links as well as in length, and their present conditions are still at a poor level. Thus, requirements for rural road improvement are quite huge, while financial resources are limited. Under these circumstances, the Study Team placed priority on improving surface conditions of more roads. The preliminary design was undertaken in line with the concept of the second option.

2) Preliminary Design

On the basis of the findings of the road inventory survey, the type of improvement was determined for each subsection of road in accordance with the engineering standards and the improvement criteria.

Typical road sections for each type of improvement/rehabilitation are summarized as shown in Table 5.1-1.

Special considerations were given to steep gradient sections and flood section.

"PCC pavement for steep gradient section" was applied to sections with steep gradients where otherwise gravel surfacing might be applied, as a countermeasure against excessive gravel losses during heavy rains and impossibility for vehicles to climb. "Grade raising in flood area", was applied to sections located in flood areas.

Table 5.1-2 shows the proposed improvement for each road project subjected to the feasibility study.

TABLE 5.1-1 EXISTING CONDITION VS PROPOSED IMPROVEMENT/REHABILITATION

Type of Improvement	Road Section Type	Existing Pavement Type	Existing Pavement Condition	Proposed Pavement Type	Pavement Structure (cm) Surface Course	Base	Subbase
Rehabilitation	1 - 1	PCC	Bad/Very Bad	PCC	20 - 23	-	10
	1 - 2	PCC	Bad/Very Bad	AC Overlay	5	-	-
	1 - 3	Bituminous	- do -	AC	5	20	10
	1 - 4	Bituminous	- do -	AC Overlay	5	-	-
	1 - 5	Bituminous	- do -	BMP/DBST	5.5/1.6	15	5
	1 - 6	Gravel	- do -	Gravel	15	-	10
Improvement - 1	2 - 1	Bituminous	Bad/Very Bad	PCC	20 - 23	-	10
	2 - 2	Gravel	- do -	PCC	20 - 23	-	20
	2 - 3	Gravel	- do -	AC	5	20	20
	2 - 4	Gravel	- do -	BMP/DBST	5.5/1.6	15	15
	2 - 5	Earth	Any Condition	PCC	20 - 23	-	20
	2 - 6	Earth	- do -	AC	5	20	20
	2 - 7	Earth	- do -	BMP/DBST	5.5/1.6	15	15
	2 - 8	Earth	- do -	Gravel	15	-	10
Improvement - 2	3 - 1	Bituminous	Good/fair	PCC	20 - 23	-	10
	3 - 2	Gravel	- do -	PCC	20 - 23	-	10
	3 - 3	Gravel	- do -	AC	5	20	10
	3 - 4	Gravel	- do -	BMP/DBST	5.5/1.6	15	5
Widening	4 - 1	PCC	Good/fair	Widening w/PCC	20 - 23	-	20
	4 - 2	Bituminous	- do -	Widening w/AC	5	20	20
	4 - 3	Bituminous	- do -	Widening w/BMP/DBST	5.5/1.6	15	15
	4 - 4	Gravel	- do -	Widening w/Gravel	15	-	10
New Construction	5 - 1	-	-	PCC	20 - 23	-	20
	5 - 2	-	-	AC	5	20	20
	5 - 3	-	-	BMP/DBST	5.5/1.6	15	15
	5 - 4	-	-	Gravel	15	-	10
Special Treatment	6	PCC pavement for steep gradient section					
	7	Grade raising in flood area					

TABLE 5.1 - 2 (1)

Summary of Proposed Improvement LEYTE

Secondary Major

Type of Impr't	Road Number	Length (km)	1993 AADT w/o	1993 AADT with	Existing Condition L	Existing Condition Width	Existing Condition Type Condition	Proposed Improvement	Proposed Bridge (Number/Total Length)	Cost (Million Peso) Road	Cost (Million Peso) Bridge	Cost (Million Peso) Total	IRR (%)
Rehab/ Imp-1	N10	31.4	0	425	8.7	6.1	PCC Good	-		69.90	.00	69.90	26.9 (T)
					18.4	4.0-6.0	GRV Bad/V.Bad	Imp-1(6.0-AC)					
					1.5	3.2	EAR V.Bad	Imp-1(6.0-AC)					
					2.8		None	New-C(6.0-AC)					
	P42-1	6.3	164	176	2.9	4.5-5.0	GRV Fair	Widen(6.0-GRV)		4.23	.00	4.23	22.2 (D)
					1.7	4.5-6.0	GRV Bad	Rehab(6.0-GRV)					
					1.7	3.0	EAR Bad/V.Bad	Imp-1(6.0-GRV)					
	N4-2	5.8	195	196	.2	6.1	PCC Good	-	2-lane Br (n= 2,L= 22m)	3.51	2.49	5.99	22.0 (T)
					5.6	6.0	GRV Fair/Bad	Rehab(6.0-GRV)					
	N3-4	12.4	112	124	6.4	5.5-6.0	GRV Fair/Bad	Rehab(6.0-GRV)	2-lane Br (n= 1,L= 30m)	6.60	2.47	9.07	16.3 (T)
					5.9	5.5	GRV Fair	Widen(6.0-GRV)					
					.1	6.1	PCC Fair	-					
	N24-2	8.9	173	239	7.7	4.5-6.0	GRV Bad	Imp-1(6.0-BMP)	2-lane Br (n= 1,L= 42m)	19.04	3.04	22.08	10.2 (T)
					1.2	6.0	GRV Fair	Imp-2(6.0-BMP)					
	N9-2	19.9	0	57	.4	7.4	PCC Good	-	2-lane Br (n=10,L=492m)	19.60	36.40	56.00	8.0 (D)
					13.7	1.6-6.0	GRV Fair/Impas	Rehab(6.0-GRV)	2-cell BC (n= 2,L= 12m)				
					5.8		None	New-C(6.0-GRV)					
	N21-2	15.6	161	167	14.6	6.0	GRV Fair/Bad	Rehab(6.0-GRV)	2-lane Br (n= 5,L=105m)	14.60	8.95	23.54	8.0 (T)
					1.0	5.7	BT Bad	Rehab(6.0-Ovl)					
	N20-1	21.5	214	147	.5	6.1	PCC Good/Fair	-	2-lane Br (n= 4,L= 55m)	17.45	5.55	23.00	6.0 (T)
					21.0	6.0	GRV Fair/Bad	Rehab(6.0-GRV)					
	N22-1	13.9	145	181	.4	6.0	PCC Bad	Rehab(6.0-Ovl)	2-lane Br (n= 8,L=111m)	11.79	12.73	24.52	4.6 (T)
					13.5	4.5-6.0	GRV Fair/Bad	Rehab(6.0-GRV)	2-cell BC (n= 1,L= 6m)				
									1-cell BC (n= 2,L= 8m)				
	N3-1	10.7	93	89	10.7	4.0-6.0	GRV Fair/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 4,L=319m)	8.78	21.32	30.11	4.0 (T)
	N3-2	13.0	93	89	12.0	5.5-6.0	GRV Fair/Bad	Rehab(6.0-GRV)	2-lane Br (n= 3,L=294m)	8.71	19.38	28.09	3.3 (T)
					1.0	5.5	GRV Fair	Widen(6.0-GRV)					
	P25-1	8.7	40	47	.3	4.0	PCC Bad	Rehab(6.0-PCC)	2-lane Br (n= 3,L= 59m)	7.04	5.54	12.58	.0 (T)
					.3	4.0	PCC Good	Widen(6.0-PCC)	2-cell BC (n= 1,L= 7m)				
					2.0	5.0-5.5	GRV Fair	Widen(6.0-GRV)					
					6.1	4.0-6.0	GRV Fair/V.Bad	Rehab(6.0-GRV)					
Imp-2/ Widen	N7-1	7.6	366	502	4.4	6.0	GRV Fair	Imp-2(6.0-AC)		15.03	.00	15.03	26.3 (T)
					1.8	6.0	GRV Bad	Imp-1(6.0-AC)					
					1.4	6.1	PCC Good	-					
	P24-1	7.6	399	506	1.3	6.1	PCC Good	-		15.05	.00	15.05	23.9 (T)
					6.3	6.0	GRV Fair	Imp-2(6.0-AC)					
	P55-1	1.5	297	284	1.0	6.0	GRV Fair	Imp-2(6.0-PCC)		3.40	.00	3.40	12.7 (T)
					.5	4.0	PCC Fair	Widen(6.0-PCC)					
	N9-3	6.0	213	280	2.6	6.1	PCC Good	-	2-lane Br (n= 4,L=217m)	7.00	15.48	22.48	12.7 (T)
					1.8	6.0	GRV Fair	Imp-2(6.0-PCC)					
					1.6	4.0	PCC Good	Widen(6.0-PCC)					

	P20-2	3.2	297	284	3.2	6.0	GRV Fair	Imp-2(6.0-BMP)	1-cell BC (n= 1,L= 4m)	5.20	.42	5.61	11.4 (T)
	N24-1	14.0	173	239	5.6	6.0	GRV Bad	Imp-1(6.0-BMP)	2-lane Br (n= 5,L= 83m)	26.91	8.85	35.76	8.5 (T)
					7.8	6.0	GRV Fair	Imp-2(6.0-BMP)	2-cell BC (n= 2,L= 12m)				
					.6	6.1	PCC Fair	-					
	P14-1	6.5	261	264	6.5	5.5-6.0	GRV Fair	Imp-2(6.0-BMP)	2-lane Br (n= 2,L= 26m)	10.60	2.68	13.28	8.0 (T)
	N9-1	14.3	196	211	11.3	5.5-6.0	GRV Fair	Imp-2(6.0-BMP)	2-lane Br (n= 6,L= 74m)	21.74	7.92	29.66	7.3 (T)
					.6	5.5	GRV Bad	Imp-1(6.0-BMP)					
					2.4	6.1	PCC Good	-					
	N23-1	12.8	172	214	9.7	6.0-6.1	GRV Good/Fair	Imp-2(6.0-BMP)	2-lane Br (n= 6,L= 92m)	25.16	9.37	34.53	5.4 (T)
					3.1	6.0	GRV Bad	Imp-1(6.0-BMP)	2-cell BC (n= 1,L= 6m)				
	N4-1	3.6	40	47	3.2	5.0-5.5	GRV Fair	Widen(6.0-GRV)	2-lane Br (n= 1,L= 8m)	1.76	1.11	2.87	.0 (T)
					.4	6.7	PCC Good	-					
New Const.	B01-1	25.2	0	50	25.2		None	New-C(6.0-GRV)	2-cell BC (n= 7,L= 42m)	39.96	4.24	44.20	17.7 (D)
	N5	28.4	0	207	.9	6.1	PCC Good	-	2-lane Br (n= 5,L=124m)	73.77	10.19	83.96	13.3 (T)
					9.0	4.5-6.0	GRV Bad/V.Bad	Imp-1(6.0-BMP)					
					17.1		None	New-C(6.0-BMP)					
					1.4	4.5	EAR,V.Bad	Imp-1(6.0-BMP)					

(T):Traffic Project
(D):Development Project

TABLE 5.1 - 2 (2)

Summary of Proposed Improvement LEYTE

Minor(National/Provincial)

Type of Impr't	Road Number	Length (km)	1993 AADT w/o	1993 AADT with	Existing Condition L	Existing Condition Width	Existing Condition Type Condition	Proposed Improvement	Proposed Bridge (Number/Total Length)	Cost (Million Peso) Road	Cost (Million Peso) Bridge	Cost (Million Peso) Total	IRR (%)
Rehab/ Imp-1	P4-1	10.5	110	117	9.0	6.0	GRV Fair	-	2-lane Br (n= 1,L= 14m)	.56	1.40	1.95	28.0 (D)
					.6	6.1	PCC Good	-					
					.9	6.0	GRV Bad	Rehab(6.0-GRV)					
	P28-1	2.5	26	28	1.8	6.1-9.0	PCC Good/Fair	-		1.88	.00	1.88	27.3 (D)
					.7	6.0	GRV Bad	Imp-1(6.0-PCC)					
	P30-1	3.8	72	89	3.8	3.2-4.0	GRV Bad/V.Bad	Rehab(6.0-GRV)		3.79	.00	3.79	25.1 (D)
	P15-1	5.1	43	47	2.5	5.5	GRV Fair	Widen(6.0-GRV)		5.24	.00	5.24	21.5 (D)
					2.6	4.5-5.0	GRV Bad	Rehab(6.0-GRV)					
	P63-1	3.6	0	60	3.6	3.2-5.5	GRV Bad/Impas	Rehab(6.0-GRV)	2-lane Br (n= 2,L= 25m) 2-lane Sp (n= 1,L= 6m)	3.85	2.76	6.61	20.8 (D)
	P84-1	4.7	0	37	4.4	3.2-4.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 1,L= 7m)	4.19	3.88	8.07	19.8 (D)
					.3		None	New-C(6.0-GRV)	2-lane Sp (n= 2,L=157m)				
	P70-1	2.5	29	36	2.5	4.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Sp (n= 1,L= 10m)	1.78	.18	1.97	19.8 (D)
	N8-1	11.8	90	94	6.9	4.0-6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 5,L= 57m)	9.34	6.88	16.23	18.3 (D)
					3.0	6.0	GRV Fair	-	2-cell BC (n= 1,L= 5m)				
					.9	6.1	PCC Good	-					
					1.0	5.0	GRV Fair	Widen(6.0-GRV)					
	P9-1	7.9	26	30	7.9	3.6-6.0	GRV V.Bad	Rehab(6.0-GRV)		5.36	.00	5.36	16.7 (D)
	P53-1	7.7	97	103	.2	6.1	PCC Good	-	2-lane Br (n= 1,L= 7m)	3.88	1.04	4.92	15.6 (D)
					7.2	6.0	GRV Fair	Rehab(6.0-GRV)					
					.3	5.5	GRV Fair	Widen(6.0-GRV)					
	P2-1	4.7	28	35	4.7	5.0-6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)		3.81	.00	3.81	15.1 (D)
	P3-1	12.0	39	40	7.6	6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)		5.66	.00	5.66	14.9 (D)
					4.4	6.0	GRV Fair	-					
	N30-1	24.8	106	116	11.3	3.2-5.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 4,L= 36m)	26.57	7.74	34.32	14.9 (D)
					3.0	3.2-6.0	EAR V.Bad	Imp-1(6.0-GRV)	2-lane Sp (n= 9,L=171m)				
					8.9		None	New-C(6.0-GRV)					
					1.6	5.5	GRV Fair	Widen(6.0-GRV)					
	N90-1	8.2	0	52	7.2	5.0-5.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 3,L= 90m)	6.19	7.11	13.31	13.6 (D)
					1.0		None	New-C(6.0-GRV)					
	P36-1	5.5	38	41	.8	4.5	GRV Fair	Widen(6.0-GRV)		4.95	.00	4.95	13.4 (D)
					2.7	4.0-4.5	GRV Bad	Rehab(6.0-GRV)					
					2.0	4.0	EAR Bad	Imp-1(6.0-GRV)					
	P17-1	5.0	76	82	.3	6.1	PCC Good	-	2-lane Br (n= 2,L= 27m)	8.16	2.72	10.89	13.1 (D)
					4.7	4.5-6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)					

(T):Traffic Project
(D):Development Project

TABLE 5.1 - 2 (3)

Summary of Proposed Improvement LEYTE

Minor(National/Provincial)(Continued)

Type of Impr't	Road Number	Length (Km)	1993 AADT w/o	1993 AADT with	Existing Condition L	Width	Type Condition	Proposed Improvement	Proposed Bridge (Number/Total Length)	Cost (Million Peso) Road	Bridge	Total	IRR (%)
Rehab/ Imp-1	P45-1	1.2	24	31	.7	6.0	GRV Fair	Rehab(6.0-GRV)		.73	.00	.73	12.9 (D)
					.3	5.5	GRV Fair	Widen(6.0-GRV)					
					.2	4.0	PCC Good	Widen(6.0-PCC)					
	P27-1	13.0	0	67	6.5	4.0-4.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 3,L= 32m)	18.49	3.91	22.39	12.2 (D)
					6.5	2.8-3.2	EAR V.Bad/Impa	Imp-1(6.0-GRV)	2-lane Sp (n= 1,L= 12m)				
	N11-1	16.2	58	54	6.1	6.0	GRV Fair	-		9.23	.00	9.23	11.1 (D)
					6.0	2.8-6.0	GRV Fair/V.Bad	Rehab(6.0-GRV)					
					4.1	5.0-5.5	GRV Fair	Widen(6.0-GRV)					
	P72-1	5.8	33	34	2.7	4.5	GRV Fair	Widen(6.0-GRV)	2-lane Br (n= 3,L= 26m)	4.57	4.05	8.62	10.5 (D)
					2.2	4.0-4.5	GRV Bad	Rehab(6.0-GRV)	2-cell BC (n= 1,L= 4m)				
					.9	3.6-4.0	EAR Bad	Imp-1(6.0-GRV)					
	P26-1	9.3	137	178	7.4	4.5	GRV Bad	Rehab(6.0-GRV)	1-cell BC (n= 2,L= 8m)	7.70	11.18	18.87	10.2 (D)
					1.9	4.5	GRV Fair	Widen(6.0-GRV)	2-lane Br (n= 8,L= 96m)				
	P59-1	4.6	41	44	1.3	4.0-4.5	GRV Fair	Widen(6.0-GRV)		4.52	.00	4.52	9.9 (D)
					3.3	3.2-3.6	GRV Bad/V.Bad	Rehab(6.0-GRV)					
	N26-1	11.7	32	35	4.6	3.6-4.0	GRV Bad	Rehab(6.0-GRV)	2-lane Br (n= 3,L= 30m)	14.45	3.62	18.08	9.8 (D)
					2.0	4.0	EAR V.Bad/Impa	Imp-1(6.0-GRV)					
					5.1		None	New-C(6.0-GRV)					
	P73-1	.8	21	27	.3	4.5	GRV Fair	Widen(6.0-GRV)		.53	.00	.53	8.9 (D)
					.5	4.5	GRV Bad	Rehab(6.0-GRV)					
	P77-1	2.2	14	16	2.2	4.5-6.0	GRV Bad	Rehab(6.0-GRV)		1.47	.00	1.47	8.6 (D)
	P66-1	15.8	25	29	5.1	4.0-5.5	GRV Fair	Widen(6.0-GRV)	1-cell BC (n= 1,L= 2m)	16.78	1.48	18.27	8.4 (D)
					8.2	3.2-5.5	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-cell BC (n= 1,L= 6m)				
					2.5		None	New-C(6.0-GRV)	2-lane Sp (n= 1,L= 30m)				
	P23-1	10.4	54	52	.6	4.5	GRV Fair	Widen(6.0-GRV)		12.35	.00	12.35	8.1 (D)
					9.8	3.6-5.5	GRV Bad/V.Bad	Rehab(6.0-GRV)					
	P56-1	9.2	40	44	.2	5.4	PCC Fair	Rehab(6.0-PCC)		11.41	.00	11.41	8.1 (D)
					3.2	4.5	GRV Bad	Rehab(6.0-GRV)					
					.1	4.5	GRV Fair	Widen(6.0-GRV)					
					5.7	4.0-4.5	EAR Bad/V.Bad	Imp-1(6.0-GRV)					
	P31-1	8.2	41	45	.4	3.0-5.5	PCC Fair	Rehab(6.0-PCC)	2-lane Sp (n= 5,L=262m)	8.81	4.76	13.57	7.5 (D)
					5.9	3.2-4.5	GRV Bad/V.Bad	Rehab(6.0-GRV)					
					1.9	3.2-4.0	EAR V.Bad	Imp-1(6.0-GRV)					
	P7-1	7.6	50	53	5.5	4.5-6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)	2-lane Br (n= 1,L= 40m)	4.56	2.95	7.51	6.6 (D)
					1.4	6.0	GRV Fair	-					
					.7	4.2	PCC Good	Widen(6.0-PCC)					

(T):Traffic Project
(D):Development Project

TABLE 5.1 - 2 (4)

Summary of Proposed Improvement LEYTE

Minor(National/Provincial)(Continued)

Type of Impr't	Road Number	Length (km)	1993 AADT w/o	1993 AADT with	Existing Condition L	Existing Condition Width	Existing Condition Type Condition	Proposed Improvement	Proposed Bridge (Number/Total Length)	Cost (Million Peso) Road	Cost (Million Peso) Bridge	Cost (Million Peso) Total	IRR (%)
Rehab/ Imp-1	P16-2	6.6	61	67	.3	6.1	PCC Good	-		4.36	.00	4.36	5.8 (D)
					6.3	6.0	GRV Bad	Rehab(6.0-GRV)					
	P35-1	3.9	94	103	1.5	5.0	PCC Fair	Rehab(6.0-PCC)		9.58	.00	9.58	5.5 (D)
					.5	6.0	PCC Good	-					
					1.9	6.0	GRV Bad	Imp-1(6.0-PCC)					
	P75-1	5.8	57	61	1.5	5.5	GRV Fair	Widen(6.0-GRV)	2-lane Br (n= 2,L= 24m)	4.78	2.58	7.36	5.6 (D)
					4.3	4.5-5.5	GRV Bad	Rehab(6.0-GRV)					
	N26-3	4.2	37	40	2.7	4.0	GRV Bad	Rehab(6.0-GRV)	2-lane Br (n= 1,L= 12m)	5.30	1.30	6.60	4.5 (D)
					1.5	4.0	GRV Fair	Widen(6.0-GRV)					
	P16-1	12.1	91	97	.6	6.1	PCC Good	-	1-cell BC (n= 1,L= 2m)	25.05	2.17	27.23	3.7 (D)
					.9	6.0	GRV Fair	-	2-lane Br (n= 1,L= 22m)				
					10.3	5.0-6.0	GRV Bad/V.Bad	Rehab(6.0-GRV)					
					.3	4.0	PCC V.Bad	Rehab(6.0-PCC)					
	N27-1	13.4	44	48	.1	6.0	PCC Bad	Rehab(6.0-Ovl)	2-cell BC (n= 5,L= 31m)	6.09	4.54	10.64	.0 (D)
					5.8	6.0	GRV Fair	-	1-cell BC (n= 1,L= 4m)				
					7.5	4.0-6.0	EAR Bad/Impas	Imp-1(6.0-GRV)	2-lane Br (n= 1,L= 12m)				
Imp-2/ Widen	N17-1	12.0	119	125	9.7	6.0	GRV Fair	-	2-lane Br (n= 1,L= 12m)	1.29	1.30	2.59	45.7 (D)
					.4	6.0	GRV Bad	Rehab(6.0-GRV)					
					1.9	5.5	GRV Fair	Widen(6.0-GRV)					
New Const.	N12	49.3	0	157	1.2	6.0-6.1	PCC Good/Fair	-	2-lane Br (n= 1,L= 17m)	67.35	3.50	70.85	19.5 (T)
					14.8	4.5-6.0	GRV Bad	Rehab(6.0-GRV)	2-lane Sp (n= 5,L=108m)				
					28.3		None	New-C(6.0-GRV)					
					.5	4.5	GRV Fair	Widen(6.0-GRV)					
					4.5	6.0	GRV Fair	-					

(T):Traffic Project
(D):Development Project

TABLE 5.1 - 2 (5)

Summary of Proposed Improvement LEYTE

Minor(Barangay)

Type of Impr't	Road Number	Length (km)	1993 AADT w/o	1993 AADT with	Existing Condition L	Width	Type Condition	Proposed Improvement	Proposed Bridge (Number/Total Length)	Cost (Million Peso) Road	Bridge	Total	IRR (%)
Rehab/ Imp-1	B38-5	5.8	0	119	2.4	6.1-9.0	PCC Good	-	1-lane Br (n= 1,L= 6m)	5.40	5.08	10.49	49.9 (D)
					1.6	6.0	GRV Bad	Imp-1(4.0-PCC)	1-lane Sp (n= 2,L=330m)				
					.3	6.0	GRV Bad	Rehab(4.0-GRV)					
					1.5		None	New-C(4.0-GRV)					
	B38-12	3.3	49	55	3.3	4.0	GRV Bad/V.Bad	Rehab(4.0-GRV)		1.68	.00	1.68	49.4 (D)
	B38-13	6.4	100	125	6.4	4.0-6.0	GRV Bad	Rehab(4.0-GRV)		3.25	.00	3.25	37.0 (D)
	B14-2	3.0	22	25	1.8	3.2-5.0	GRV Bad/V.Bad	Rehab(4.0-GRV)		2.09	.00	2.09	28.5 (D)
					1.2	3.2-3.6	EAR Bad/V.Bad	Imp-1(4.0-GRV)					
	B40-1	10.5	0	33	1.8	3.2-4.0	GRV Bad/V.Bad	Rehab(4.0-GRV)	1-lane Br (n= 1,L= 7m)	6.29	1.02	7.32	24.0 (D)
					3.7	4.0	EAR V.Bad	Imp-1(4.0-GRV)	1-lane Sp (n= 1,L= 20m)				
					5.0		None	New-C(4.0-GRV)					
	B47-4	3.0	0	8	.1	4.0	PCC Fair	-		1.45	.00	1.45	22.7 (D)
					2.9	.4-5.5	GRV V.Bad/Impa	Rehab(4.0-GRV)					
	B08-4	5.6	35	45	.4		None	New-C(4.0-GRV)	1-lane Sp (n= 2,L= 60m)	3.06	.79	3.86	20.0 (D)
					2.3	4.0	GRV Bad	Rehab(4.0-GRV)					
					2.9	4.0-4.5	EAR Bad	Imp-1(4.0-GRV)					
	B07-2	4.0	0	6	4.0	3.6	GRV V.Bad/Impa	Rehab(4.0-GRV)	1-lane Sp (n= 1,L= 25m)	1.88	.33	2.21	17.5 (D)
	B13-1	20.4	0	56	.8	6.0	PCC Good/Fair	-	1-lane Br (n=10,L=103m)	11.63	10.31	21.94	17.5 (D)
					.2	6.0	GRV Bad	Imp-1(4.0-PCC)	2-cell BC (n= 1,L= 6m)				
					20.8	4.5	GRV Bad/Impas	Rehab(4.0-GRV)	1-lane Sp (n= 2,L= 85m)				
					1.6	4.5	EAR Bad	Imp-1(4.0-GRV)					
	B33-1	4.2	35	49	.9	3.2-4.0	GRV V.Bad	Rehab(4.0-GRV)		4.68	.00	4.68	17.4 (D)
					3.3	3.2	EAR V.Bad	Imp-1(4.0-GRV)					
	B45-1	1.4	22	30	1.0	4.0	EAR Bad	Imp-1(4.0-GRV)		1.55	.00	1.55	15.2 (D)
					.4	2.0	PCC Bad	Rehab(6.0-PCC)					
	B22-2	4.8	8	10	1.2	4.0	GRV Bad	Rehab(4.0-GRV)		3.00	.00	3.00	6.6 (D)
					3.6	3.2	EAR V.Bad	Imp-1(4.0-GRV)					
	B50-5	8.0	28	31	5.7	3.2-4.5	GRV Bad/V.Bad	Rehab(4.0-GRV)		4.31	.00	4.31	5.9 (D)
					2.3	3.2-4.0	EAR Bad/V.Bad	Imp-1(4.0-GRV)					
New Const.	B14-1	19.2	0	18	19.2		None	New-C(4.0-GRV)	1-lane Sp (n= 2,L= 18m)	11.94	.24	12.17	9.5 (D)
	B00-1	8.7	0	15	4.3	4.0-5.5	GRV Bad/V.Bad	Rehab(4.0-GRV)	2-cell BC (n= 1,L= 6m)	5.59	.80	6.40	9.3 (D)
					4.4		None	New-C(4.0-GRV)	1-lane Sp (n= 2,L= 24m)				
	B42-3	2.4	0	6	2.4		None	New-C(4.0-GRV)		1.67	.00	1.67	8.8 (D)
	B34-2	3.9	0	5	3.9		None	New-C(4.0-GRV)		2.39	.00	2.39	4.2 (D)

5.1.2 Cost Estimate

1) Unit Cost

Unit prices for construction equipment, materials and labor were obtained from Associated Construction Equipment Lessors, Inc. (ACEL), the Price Monitoring Section of DPWH, market price survey by the Study Team and relevant studies. Based on the data collected, unit prices at April 1990 prices were developed. Exchange rates used were : P22.50 = US$1.00 = Y155.

Unit costs for major construction items are presented in Table 5.1-3.

2) Construction Cost Estimate

Based on the results of the road inventory survey and proposed type of improvement, the quantity of each construction item was computed for each road project. Then the constuction cost was estimated.
Table 5.1-4 presents estimated quantities and construction cost of each road project.

TABLE 5.1-3 UNIT COST OF MAJOR CONSTRUCTION ITEMS

Unit: Pesos at April 1990 Prices

Item No.	Description	Unit	Unit Price
100	Clearing nad Grubbing	sq.m.	2.10
102	Stripping	cu.m.	52.00
106	Roadway and Drainage Excavation	cu.m.	58.00
107	Borrow	cu.m.	110.00
108	Aggregate Subbase	cu.m.	225.00
118-1	Preparation Of Previously Constructed Road (Gravel)	sq.m.	7.00
118-2	Preparation Of Previously Constructed Road (Asphalt)	sq.m.	8.00
118-3	Preparation of Existing Pavement Surface (PCC)	sq.m.	22.50
118-4	Preparation of Existing Pavement Surface (AC)	sq.m.	17.00
200	Crushed Aggregate Base Course	cu.m.	305.00
300	Crushed Aggregate Surface Course	cu.m.	305.00
302	Bituminous Prime Coat	MT	11,100.00
303	Bituminous Tact Coat	MT	11,500.00
306	Bituminous Macadam Pavement	sq.m.	95.00
310	Bituminous Concrete Surface Course	MT	1,350.00
314	Double Bituminous Surface Treatment	sq.m.	45.00
316-1	PCC Pavement (t = 23cm)	sq.m.	320.00
316-2	PCC Pavement (t = 20cm)	sq.m.	280.00
316-3	PCC Pavement (t = 18cm)	sq.m.	250.00
413-1	RCPC (Ø 910mm)	sq.m.	1,550.00
413-2	Headwal T for RCPC (Ø 910mm)	set	2,900.00
500	Grouted Riprap	sq.m.	625.00
517	Side Ditch (Grouted Riprap)	m	360.00
Bridge Cost			
	2-lane Superstructure	m	43,500.00
	Abutment for 2-lane bridge	each	330,000.00
	Pier for 2-lane bridge	each	285,000.00
	1-lane Superstructure	m	32,000.00
	Abutment for 1-lane bridge	each	230,000.00
	Pier for 1-lane bridge	each	200,000.00
Reinforced Concrete Box Culvert			
	1-Cell RCBC	m	20,600.00
	2-Cell RCBC	m	36,000.00
	Wing wall and Apron for 1-Cell RCBC	set	132,000.00
	Wing wall and Apron for 2-Cell RCBC	set	155,000.00
Spillway			
	2-lane Spillway	m	16,500.00
	1-lane Spillway	m	12,000.00
Slope Protection Cost			
	Cut Slope Protection	m	23,000.00
	Embankment Slope Protection	m	25,000.00

TABLE 5.1 - 4 (1)

Quantity and Construction Cost LEYTE

	Unit	N10	P42-1	N4-2	N3-4	N24-2	N9-2	N21-2	N20-1	N22-1	N3-1	N3-2
Total Road Length	km	31.4	6.3	6.8	12.4	8.9	19.9	15.6	21.5	13.9	10.7	13.0
Improvement Length	km	22.7	6.3	6.6	12.3	8.9	19.5	15.6	21.0	13.9	10.7	13.0
Proposed Pavement Type		6.0-AC	6.0-GRV	6.0-GRV	6.0-GRV	6.0-BMP	6.0-GRV	6.0-GRV 6.0-Ovl	6.0-GRV	6.0-Ovl 6.0-GRV	6.0-GRV	6.0-GRV
Quantity												
100 Clearing & Grubbing	m2	70000	-	-	-	-	121800	-	-	-	-	-
Stripping	m3	7560	-	-	-	-	13050	-	-	-	-	-
102 Roadway & Drainage Excavation	m3	181070	4481	6930	13801	31561	34795	11624	20845	7421	8442	11255
104 Borrow	m3	2800	2009	2409	4232	-	33769	21148	6305	4712	15374	12074
200 Aggregate Subbase	m3	56271	2768	396	913	13802	10230	6054	11946	2258	5478	4070
Preparation of Prev.Road(Grvl)	m2	175650	36340	39960	71090	68762	88020	96540	136860	84160	68380	81100
Preparation of Prev.Road(Asph)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	2400	-	-
Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	6000	-	-	-	-
202 Crushed Aggregate Base Course	m3	30645	-	-	-	9002	-	-	-	-	-	-
300 Crushed Aggr. Surface Course	m3	-	5670	5940	11070	-	17550	13140	18900	12060	9630	11700
301 Bituminous Prime Coat	M.T.	163	-	-	-	63	-	7	-	3	-	-
302 Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305 Bituminous Macadam Pavement	m2	-	-	-	-	52800	-	-	-	-	-	-
310 Bitum.Concrete Surface Course	M.T.	14982	-	-	-	-	-	660	-	264	-	-
304 Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1 PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2 PCC Pavement (t=20 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-3 PCC Pavement (t=18 cm)	m2	-	-	-	-	600	-	-	-	600	-	-
500 RCPC (dia.910mm)	m	765	195	195	375	270	735	525	630	420	315	390
Headwall for RCPC (dia.910mm)	Set	51	13	13	25	18	49	35	42	28	21	26
504 Grouted Riprap	m3	-	-	-	-	-	717	2050	-	-	971	324
Side Ditch (Grouted Riprap)	m	15520	1150	-	-	7800	3190	2650	9600	3250	-	-
Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	100	-	-
2-lane Bridge,Superstructure	m	-	-	22	30	42	492	105	55	111	319	294
1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Abutment	Each	-	-	4	2	2	20	10	8	16	8	6
1-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Pier	Each	-	-	-	1	1	14	1	-	1	10	10
1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-cell RCBC	m	-	-	-	-	-	-	-	-	20	-	-
2-cell RCBC	m	-	-	-	-	-	22	-	-	10	-	-
Wingwall for 1-cell RCBC	Set	-	-	-	-	-	-	-	-	2	-	-
Wingwall for 2-cell RCBC	Set	-	-	-	-	-	2	-	-	1	-	-
Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost	M.p.	69.90	4.23	3.51	6.60	19.04	19.60	14.60	17.45	11.79	8.78	8.71
Bridge Construction Cost	M.p.	.00	.00	2.49	2.47	3.04	36.40	8.95	5.55	12.73	21.32	19.38
Total Construction Cost	M.p.	69.90	4.23	5.99	9.07	22.08	56.00	23.55	23.00	24.52	30.11	28.09
Road Construction Cost/Impr't km	M.p.	3.08	.67	.53	.54	2.14	1.00	.94	.83	.85	.82	.67
Total Construction Cost/Total km	M.p.	2.23	.67	.88	.73	2.48	2.81	1.51	1.07	1.76	2.81	2.16

TABLE 5.1 - 4 (2)

Quantity and Construction Cost LEYTE

	Unit	P25-1	N7-1	P24-1	P55-1	N9-3	P20-2	N24-1	P14-1	N9-1	N23-1	N4-1
Total Road Length	km	8.7	7.6	7.6	1.5	6.0	3.2	14.0	6.5	14.3	12.8	3.6
Improvement Length	km	8.7	6.2	6.3	1.5	3.4	3.2	13.4	6.5	11.9	12.8	3.2
Proposed Pavement Type		6.0-PCC 6.0-GRV	6.0-AC	6.0-AC	6.0-PCC	6.0-PCC	6.0-BMP	6.0-BMP	6.0-BMP	6.0-BMP	6.0-BMP	6.0-GRV
Quantity												
100 Clearing & Grubbing	m2	-	-	-	-	-	-	-	-	-	-	-
Stripping	m3	-	-	-	-	-	-	-	-	-	-	-
102 Roadway & Drainage Excavation	m3	8684	8566	10332	3308	8176	4806	37736	9873	35218	30935	3913
104 Borrow	m3	7120	-	-	-	-	-	667	-	1414	768	1104
200 Aggregate Subbase	m3	5355	17541	16726	3700	7752	4781	18233	9821	16766	15835	457
Preparation of Prev.Road(Grvl)	m2	50610	47640	37800	6000	10800	19200	93052	37900	69250	83504	16550
Preparation of Prev.Road(Asph)	m2	1200	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202 Crushed Aggregate Base Course	m3	-	8370	8505	-	-	3274	13708	6650	11877	13094	-
300 Crushed Aggr. Surface Course	m3	7290	-	-	-	-	-	-	-	-	-	2880
301 Bituminous Prime Coat	M.T.	-	45	45	-	-	23	96	47	84	92	-
302 Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305 Bituminous Macadam Pavement	m2	-	-	-	-	-	19200	80400	39000	69660	76800	-
310 Bitum.Concrete Surface Course	M.T.	-	4092	4158	-	-	-	-	-	-	-	-
304 Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1 PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2 PCC Pavement (t=20 cm)	m2	2400	-	-	7000	14000	-	-	-	-	-	-
311-3 PCC Pavement (t=18 cm)	m2	-	-	-	-	-	-	-	-	1740	-	-
500 RCPC (dia.910mm)	m	255	180	195	38	84	90	405	195	360	390	90
Headwall for RCPC (dia.910mm)	Set	17	12	13	3	7	6	27	13	24	26	6
504 Grouted Riprap	m3	324	-	-	-	-	-	-	-	-	-	-
Side Ditch (Grouted Riprap)	m	-	-	-	-	-	-	10700	-	3000	10700	-
Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Superstructure	m	59	-	-	-	217	-	83	26	74	92	8
1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Abutment	Each	6	-	-	-	8	-	10	4	12	12	2
1-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Pier	Each	-	-	-	-	7	-	-	-	-	-	-
1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-cell RCBC	m	-	-	-	-	-	12	-	-	-	-	-
2-cell RCBC	m	10	-	-	-	-	-	23	-	-	11	-
Wingwall for 1-cell RCBC	Set	-	-	-	-	-	1	-	-	-	-	-
Wingwall for 2-cell RCBC	Set	1	-	-	-	-	-	2	-	-	1	-
Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost	M.p.	7.04	15.03	15.05	3.40	7.00	5.20	26.91	10.60	21.74	25.16	1.76
Bridge Construction Cost	M.p.	5.54	.00	.00	.00	15.48	.42	8.85	2.68	7.92	9.37	1.11
Total Construction Cost	M.p.	12.58	15.03	15.05	3.40	22.48	5.61	35.76	13.28	29.66	34.53	2.87
Road Construction Cost/Impr't km	M.p.	.81	2.42	2.39	2.27	2.06	1.62	2.01	1.63	1.83	1.97	.55
Total Construction Cost/Total km	M.p.	1.45	1.98	1.98	2.27	3.75	1.75	2.55	2.04	2.07	2.70	.80

TABLE 5.1 - 4 (3)

Quantity and Construction Cost LEYTE

	Unit	B01-1	N5	P4-1	P28-1	P30-1	P15-1	P63-1	P84-1	P70-1	N8-1	P9-1
Total Road Length	km	25.2	28.4	10.5	2.5	3.8	5.1	3.6	4.7	2.5	11.8	7.9
Improvement Length	km	25.2	27.5	.9	.7	3.8	5.1	3.6	4.7	2.5	7.9	7.9
Proposed Pavement Type		6.0-GRV	6.0-BMP	6.0-GRV	6.0-PCC	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV
Quantity												
100 Clearing & Grubbing	m2	511600	399000	-	-	-	-	-	5400	-	-	-
Stripping	m3	54060	43320	-	-	-	-	-	540	-	-	-
102 Roadway & Drainage Excavation	m3	48000	228530	-	525	13562	4925	19575	11121	1876	10240	5925
104 Borrow	m3	117190	30930	284	-	893	8588	890	4084	1615	25429	3689
200 Aggregate Subbase	m3	16632	47818	594	1904	2508	1991	2376	3102	1650	4714	5214
Preparation of Prev.Road(Grvl)	m2	-	86716	5940	7420	19670	30910	16160	24530	15940	47380	52140
Preparation of Prev.Road(Asph)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202 Crushed Aggregate Base Course	m3	-	27693	-	-	-	-	-	-	-	-	-
300 Crushed Aggr. Surface Course	m3	22680	-	810	-	3330	4590	3240	4230	2250	6390	7110
301 Bituminous Prime Coat	M.T.	-	195	-	-	-	-	-	-	-	-	-
302 Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305 Bituminous Macadam Pavement	m2	-	162420	-	-	-	-	-	-	-	-	-
310 Bitum.Concrete Surface Course	M.T.	-	-	-	-	-	-	-	-	-	-	-
304 Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1 PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2 PCC Pavement (t=20 cm)	m2	-	-	-	4200	-	-	-	-	-	-	-
311-3 PCC Pavement (t=18 cm)	m2	-	2580	-	-	600	-	-	-	-	4800	-
500 RCPC (dia.910mm)	m	1185	1335	30	15	120	240	105	150	75	240	240
Headwall for RCPC (dia.910mm)	Set	79	89	2	1	8	16	7	10	5	16	16
504 Grouted Riprap	m3	-	333	-	-	-	1675	-	-	-	-	-
Side Ditch (Grouted Riprap)	m	11220	18690	-	-	1350	-	1250	710	100	400	-
Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Superstructure	m	-	124	14	-	-	-	25	7	-	57	-
1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Abutment	Each	-	10	2	-	-	-	4	2	-	10	-
1-lane Bridge;Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Pier	Each	-	2	-	-	-	-	-	-	-	-	-
1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Spillway	m	-	-	-	-	-	-	6	157	10	-	-
1-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-cell RCBC	m	-	-	-	-	-	-	-	-	-	-	-
2-cell RCBC	m	77	-	-	-	-	-	-	-	-	9	-
Wingwall for 1-cell RCBC	Set	-	-	-	-	-	-	-	-	-	-	-
Wingwall for 2-cell RCBC	Set	7	-	-	-	-	-	-	-	-	1	-
Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost	M.p.	39.96	73.77	.56	1.88	3.79	5.24	3.85	4.19	1.78	9.34	5.36
Bridge Construction Cost	M.p.	4.24	10.19	1.40	.00	.00	.00	2.76	3.88	.18	6.88	.00
Total Construction Cost	M.p.	44.20	83.96	1.95	1.88	3.79	5.24	6.61	8.07	1.97	16.23	5.36
Road Construction Cost/Impr't km	M.p.	1.59	2.68	.62	2.69	1.00	1.03	1.07	.89	.71	1.18	.68
Total Construction Cost/Total km	M.p.	1.75	2.96	.19	.75	1.00	1.03	1.84	1.72	.79	1.38	.68

TABLE 5.1 - 4 (4)

Quantity and Construction Cost LEYTE

		Unit	P53-1	P2-1	P3-1	N30-1	N90-1	P36-1	P17-1	P45-1	P27-1	N11-1	P72-1
Total Road Length		km	7.7	4.7	12.0	24.8	8.2	5.5	5.0	1.2	13.0	16.2	5.8
Improvement Length		km	7.5	4.7	7.6	24.8	8.2	5.5	4.7	1.2	13.0	10.1	5.8
Proposed Pavement Type			6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV 6.0-PCC	6.0-GRV	6.0-GRV	6.0-GRV
Quantity													
100	Clearing & Grubbing	m2	-	-	-	178000	18000	-	-	-	-	-	-
	Stripping	m3	-	-	-	18690	1800	-	-	-	-	-	-
102	Roadway & Drainage Excavation	m3	8133	6966	7500	75734	5900	10924	2775	1488	79194	45930	11291
104	Borrow	m3	2588	3159	3852	17465	7633	1283	18581	345	13006	2752	4586
200	Aggregate Subbase	m3	33	3102	5016	15488	5412	3270	3102	265	8580	3496	2613
	Preparation of Prev.Road(Grvl)	m2	44850	30900	50160	92640	47520	28320	30720	5850	49920	50680	28680
	Preparation of Prev.Road(Asph)	m2	-	-	-	-	-	-	-	-	-	-	-
	Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	-	-	-
	Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202	Crushed Aggregate Base Course	m3	-	-	-	-	-	-	-	-	-	-	-
300	Crushed Aggr. Surface Course	m3	6750	4230	6732	21690	7380	4950	4230	900	10809	9090	5130
301	Bituminous Prime Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
302	Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305	Bituminous Macadam Pavement	m2	-	-	-	-	-	-	-	-	-	-	-
310	Bitum.Concrete Surface Course	M.T.	-	-	-	-	-	-	-	-	-	-	-
304	Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1	PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2	PCC Pavement (t=20 cm)	m2	-	-	-	-	-	-	-	400	-	-	-
311-3	PCC Pavement (t=18 cm)	m2	-	-	720	4200	-	-	-	-	5940	-	500
500	RCPC (dia.910mm)	m	225	135	225	1020	255	165	330	30	435	300	180
	Headwall for RCPC (dia.910mm)	Set	15	9	15	68	17	11	22	2	29	20	12
504	Grouted Riprap	m3	-	-	-	-	-	-	3896	-	1368	-	-
	Side Ditch (Grouted Riprap)	m	-	750	500	8115	200	2750	-	-	5850	2750	500
	Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
	Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
	2-lane Bridge,Superstructure	m	7	-	-	36	90	-	27	-	32	-	26
	1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
	2-lane Bridge,Abutment	Each	2	-	-	8	6	-	4	-	6	-	6
	1-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
	2-lane Bridge,Pier	Each	-	-	-	-	2	-	-	-	-	-	-
	1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
	2-lane Spillway	m	-	-	-	171	-	-	-	-	12	-	-
	1-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
	1-cell RCBC	m	-	-	-	-	-	-	-	-	-	-	-
	2-cell RCBC	m	-	-	-	-	-	-	-	-	-	-	11
	Wingwall for 1-cell RCBC	Set	-	-	-	-	-	-	-	-	-	-	-
	Wingwall for 2-cell RCBC	Set	-	-	-	-	-	-	-	-	-	-	1
	Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost		M.p.	3.88	3.81	5.66	26.57	6.19	4.95	8.16	.73	18.49	9.23	4.57
Bridge Construction Cost		M.p.	1.04	.00	.00	7.74	7.11	.00	2.72	.00	3.91	.00	4.05
Total Construction Cost		M.p.	4.92	3.81	5.66	34.32	13.31	4.95	10.89	.73	22.39	9.23	8.62
Road Construction Cost/Impr't km		M.p.	.52	.81	.74	1.07	.76	.90	1.74	.61	1.42	.91	.79
Total Construction Cost/Total km		M.p.	.64	.81	.47	1.38	1.62	.90	2.18	.61	1.72	.57	1.49

TABLE 5.1 - 4 (5)

Quantity and Construction Cost LEYTE

	Unit	P26-1	P59-1	N26-1	P73-1	P77-1	P66-1	P23-1	P56-1	P31-1	P7-1	P16-2
Total Road Length	km	9.3	4.6	11.7	.8	2.2	15.8	10.4	9.2	8.2	7.6	6.6
Improvement Length	km	9.3	4.6	11.7	.8	2.2	15.8	10.4	9.2	8.2	6.2	6.3
Proposed Pavement Type		6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-GRV	6.0-PCC 5.0-GRV	6.0-PCC 6.0-GRV	6.0-GRV 6.0-PCC	6.0-GRV
Quantity												
100 Clearing & Grubbing	m2	-	-	102000	-	-	50000	-	-	-	-	-
Stripping	m3	-	-	10710	-	-	5250	-	-	-	-	-
102 Roadway & Drainage Excavation	m3	17886	21576	54434	762	1650	67091	8124	48699	26784	8138	4725
104 Borrow	m3	5637	1561	8152	386	918	7811	29163	1754	3247	1738	3560
200 Aggregate Subbase	m3	5283	2461	7722	393	1452	7878	6594	6331	6091	4414	4158
Preparation of Prev.Road(Grvl)	m2	52240	18490	30120	4650	14520	74370	67380	45840	42520	35580	41580
Preparation of Prev.Road(Asph)	m2	-	-	-	-	-	-	-	1080	1450	-	-
Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202 Crushed Aggregate Base Course	m3	-	-	-	-	-	-	-	-	-	-	-
300 Crushed Aggr. Surface Course	m3	8280	4140	10152	720	1980	13662	9360	7650	6570	4950	5670
301 Bituminous Prime Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
302 Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305 Bituminous Macadam Pavement	m2	-	-	-	-	-	-	-	-	-	-	-
310 Bitum.Concrete Surface Course	M.T.	-	-	-	-	-	-	-	-	-	-	-
304 Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1 PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2 PCC Pavement (t=20 cm)	m2	-	-	-	-	-	-	-	1200	2400	1260	-
311-3 PCC Pavement (t=18 cm)	m2	600	-	2520	-	-	3720	-	3000	3000	-	-
500 RCPC (dia.910mm)	m	285	135	495	30	60	555	420	270	240	173	195
Headwall for RCPC (dia.910mm)	Set	19	9	33	2	4	37	28	18	16	12	13
504 Grouted Riprap	m3	-	-	-	-	-	-	3213	-	-	-	-
Side Ditch (Grouted Riprap)	m	1700	1400	4935	-	-	4925	-	4750	1600	200	-
Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Superstructure	m	96	-	30	-	-	-	-	-	-	40	-
1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Abutment	Each	16	-	6	-	-	-	-	-	-	2	-
1-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	1	-
1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Spillway	m	-	-	-	-	-	30	-	-	262	-	-
1-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-cell RCBC	m	22	-	-	-	-	10	-	-	-	-	-
2-cell RCBC	m	-	-	-	-	-	10	-	-	-	-	-
Wingwall for 1-cell RCBC	Set	2	-	-	-	-	1	-	-	-	-	-
Wingwall for 2-cell RCBC	Set	-	-	-	-	-	1	-	-	-	-	-
Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost	M.p.	7.70	4.52	14.45	.53	1.47	16.78	12.35	11.41	8.81	4.56	4.36
Bridge Construction Cost	M.p.	11.18	.00	3.62	.00	.00	1.48	.00	.00	4.76	2.95	.00
Total Construction Cost	M.p.	18.87	4.52	18.08	.53	1.47	18.27	12.35	11.41	13.57	7.51	4.36
Road Construction Cost/Impr't km	M.p.	.83	.98	1.24	.66	.67	1.06	1.19	1.24	1.07	.74	.69
Total Construction Cost/Total km	M.p.	2.03	.98	1.54	.66	.67	1.16	1.19	1.24	1.65	.99	.66

TABLE 5.1 - 4 (6)

Quantity and Construction Cost LEYTE

		Unit	P35-1	P75-1	N26-3	P16-1	N27-1	N17-1	N12	B38-5	B38-12	B38-13	B14-2
Total Road Length		km	3.9	5.8	4.2	12.1	13.4	12.0	49.3	5.8	3.3	6.4	3.0
Improvement Length		km	3.4	5.8	4.2	10.6	7.6	2.3	43.6	3.4	3.3	6.4	3.0
Proposed Pavement Type			6.0-PCC	6.0-GRV	6.0-GRV	6.0-GRV 6.0-PCC	6.0-Ovl 6.0-GRV	6.0-GRV	6.0-GRV	4.0-PCC 4.0-GRV	4.0-GRV	4.0-GRV	4.0-GRV
Quantity													
100	Clearing & Grubbing	m2	-	-	-	-	-	-	622600	15000	-	-	-
	Stripping	m3	-	-	-	-	-	-	67920	1500	-	-	-
102	Roadway & Drainage Excavation	m3	5014	14736	28238	8241	6995	2561	371790	1875	2546	1725	1196
104	Borrow	m3	-	2852	693	89570	2696	597	34717	8055	2058	5636	7110
200	Aggregate Subbase	m3	7434	3003	2172	7494	4965	473	28551	4540	1518	2944	1380
	Preparation of Prev.Road(Grvl)	m2	15200	33490	18010	67980	49800	13090	85110	15140	15030	29440	13320
	Preparation of Prev.Road(Asph)	m2	7500	-	-	1200	-	-	-	-	-	-	-
	Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	600	-	-	-	-	-	-
	Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202	Crushed Aggregate Base Course	m3	-	-	-	-	-	-	-	-	-	-	-
300	Crushed Aggr. Surface Course	m3	-	5220	3510	9270	6750	2070	38880	1080	1980	3840	1800
301	Bituminous Prime Coat	M.T.	-	-	-	-	1	-	-	-	-	-	-
302	Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305	Bituminous Macadam Pavement	m2	-	-	-	-	-	-	-	-	-	-	-
310	Bitum.Concrete Surface Course	M.T.	-	-	-	-	66	-	-	-	-	-	-
304	Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1	PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2	PCC Pavement (t=20 cm)	m2	20400	-	-	1800	-	-	-	6400	-	-	-
311-3	PCC Pavement (t=18 cm)	m2	-	-	1800	-	-	-	2400	-	-	-	-
500	RCPC (dia.910mm)	m	105	180	120	555	225	75	2160	80	56	104	48
	Headwall for RCPC (dia.910mm)	Set	7	12	8	37	15	5	144	10	7	13	6
504	Grouted Riprap	m3	-	-	-	9557	-	-	-	648	-	-	-
	Side Ditch (Grouted Riprap)	m	1900	1000	2100	-	2250	-	21550	-	-	-	-
	Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
	Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
	2-lane Bridge,Superstructure	m	-	24	12	22	12	12	17	-	-	-	-
	1-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	6	-	-	-
	2-lane Bridge,Abutment	Each	-	4	2	2	2	2	2	-	-	-	-
	1-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	2	-	-	-
	2-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
	1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
	2-lane Spillway	m	-	-	-	-	-	-	108	-	-	-	-
	1-lane Spillway	m	-	-	-	-	-	-	-	330	-	-	-
	1-cell RCBC	m	-	-	-	11	10	-	-	-	-	-	-
	2-cell RCBC	m	-	-	-	-	51	-	-	-	-	-	-
	Wingwall for 1-cell RCBC	Set	-	-	-	1	1	-	-	-	-	-	-
	Wingwall for 2-cell RCBC	Set	-	-	-	-	5	-	-	-	-	-	-
	Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost		M.p.	9.58	4.78	5.30	25.05	6.09	1.29	67.35	5.40	1.68	3.25	2.09
Bridge Construction Cost		M.p.	.00	2.58	1.30	2.17	4.54	1.30	3.50	5.08	.00	.00	.00
Total Construction Cost		M.p.	9.58	7.36	6.60	27.23	10.64	2.59	70.85	10.49	1.68	3.25	2.09
Road Construction Cost/Impr't km		M.p.	2.82	.82	1.26	2.36	.80	.56	1.54	1.59	.51	.51	.70
Total Construction Cost/Total km		M.p.	2.46	1.27	1.57	2.25	.79	.22	1.44	1.81	.51	.51	.70

TABLE 5.1 - 4 (7)

Quantity and Construction Cost LEYTE

	Unit	B40-1	B47-4	B08-4	B07-2	B13-1	B33-1	B45-1	B22-2	B50-5	B14-1	B00-1
Total Road Length	km	10.5	3.0	5.6	4.0	23.4	4.2	1.4	4.8	8.0	19.2	8.7
Improvement Length	km	10.5	2.9	5.6	4.0	22.6	4.2	1.4	4.8	8.0	19.2	8.7
Proposed Pavement Type		4.0-GRV	4.0-GRV	4.0-GRV	4.0-GRV	4.0-PCC 4.0-GRV	4.0-GRV	4.0-GRV 6.0-PCC	4.0-GRV	4.0-GRV	4.0-GRV	4.0-GRV
Quantity												
100 Clearing & Grubbing	m2	60000	-	4000	-	-	-	-	-	-	217200	66000
Stripping	m3	6000	-	400	-	-	-	-	-	-	21720	6600
102 Roadway & Drainage Excavation	m3	15200	2175	6429	3000	19620	6750	1545	8550	9680	14580	13813
104 Borrow	m3	3950	1589	1852	1260	11492	10949	360	1117	1742	16788	3114
200 Aggregate Subbase	m3	4830	1334	2576	1840	10768	1932	1468	2208	3680	8832	4002
Preparation of Prev.Road(Grvl)	m2	22480	13340	23020	18400	104760	15000	4600	17160	32590	-	19630
Preparation of Prev.Road(Asph)	m2	-	-	-	-	-	-	800	-	-	-	-
Preparation of Pave.Surf.(PCC)	m2	-	-	-	-	-	-	-	-	-	-	-
Preparation of Pave.Surf.(AC)	m2	-	-	-	-	-	-	-	-	-	-	-
202 Crushed Aggregate Base Course	m3	-	-	-	-	-	-	-	-	-	-	-
300 Crushed Aggr. Surface Course	m3	6060	1740	3180	2400	13440	2400	600	2544	4506	11520	4914
301 Bituminous Prime Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
302 Bituminous Tack Coat	M.T.	-	-	-	-	-	-	-	-	-	-	-
305 Bituminous Macadam Pavement	m2	-	-	-	-	-	-	-	-	-	-	-
310 Bitum.Concrete Surface Course	M.T.	-	-	-	-	-	-	-	-	-	-	-
304 Double Bitum.Surface Treatment	m2	-	-	-	-	-	-	-	-	-	-	-
311-1 PCC Pavement (t=23 cm)	m2	-	-	-	-	-	-	-	-	-	-	-
311-2 PCC Pavement (t=20 cm)	m2	-	-	-	-	800	-	2400	-	-	-	-
311-3 PCC Pavement (t=18 cm)	m2	1600	-	1200	-	-	800	-	2240	1960	-	2040
500 RCPC (dia.910mm)	m	248	48	88	64	360	88	31	80	128	560	216
Headwall for RCPC (dia.910mm)	Set	31	6	11	8	45	11	3	10	16	70	27
504 Grouted Riprap	m3	-	-	-	-	-	1623	-	-	-	-	-
Side Ditch (Grouted Riprap)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Cut Slope)	m	-	-	-	-	-	-	-	-	-	-	-
Slope Protection (Embank't Sl)	m	-	-	-	-	-	-	-	-	-	-	-
2-lane Bridge,Superstructure	m	-	-	-	-	-	-	-	-	-	-	-
1-lane Bridge,Superstructure	m	7	-	-	-	103	-	-	-	-	-	-
2-lane Bridge,Abutment	Each	-	-	-	-	-	-	-	-	-	-	-
1-lane Bridge,Abutment	Each	2	-	-	-	20	-	-	-	-	-	-
2-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
1-lane Bridge,Pier	Each	-	-	-	-	-	-	-	-	-	-	-
2-lane Spillway	m	-	-	-	-	-	-	-	-	-	-	-
1-lane Spillway	m	20	-	60	25	85	-	-	-	-	18	24
1-cell RCBC	m	-	-	-	-	-	-	-	-	-	-	-
2-cell RCBC	m	-	-	-	-	8	-	-	-	-	-	8
Wingwall for 1-cell RCBC	Set	-	-	-	-	-	-	-	-	-	-	-
Wingwall for 2-cell RCBC	Set	-	-	-	-	1	-	-	-	-	-	1
Miscellaneous	l.s.	1	1	1	1	1	1	1	1	1	1	1
Road Construction Cost	M.p.	6.29	1.45	3.06	1.88	11.63	4.68	1.55	3.00	4.31	11.94	5.59
Bridge Construction Cost	M.p.	1.02	.00	.79	.33	10.31	.00	.00	.00	.00	.24	.80
Total Construction Cost	M.p.	7.32	1.45	3.86	2.21	21.94	4.68	1.55	3.00	4.31	12.17	6.40
Road Construction Cost/Impr't km	M.p.	.60	.50	.55	.47	.51	1.11	1.11	.62	.54	.62	.64
Total Construction Cost/Total km	M.p.	.70	.48	.69	.55	.94	1.11	1.11	.62	.54	.63	.74

TABLE 5.1 - 4 (8)

Quantity and Construction Cost LEYTE

		Unit	B42-3	B34-2
Total Road Length		km	2.4	3.9
Improvement Length		km	2.4	3.9
Proposed Pavement Type			4.0-GRV	4.0-GRV
Quantity				
100	Clearing & Grubbing	m2	33000	46800
	Stripping	m3	3300	4680
102	Roadway & Drainage Excavation	m3	4680	3900
104	Borrow	m3	1626	2204
200	Aggregate Subbase	m3	1104	1794
	Preparation of Prev.Road(Grvl)	m2	-	-
	Preparation of Prev.Road(Asph)	m2	-	-
	Preparation of Pave.Surf.(PCC)	m2	-	-
	Preparation of Pave.Surf.(AC)	m2	-	-
202	Crushed Aggregate Base Course	m3	-	-
300	Crushed Aggr. Surface Course	m3	1440	2340
301	Bituminous Prime Coat	M.T.	-	-
302	Bituminous Tack Coat	M.T.	-	-
305	Bituminous Macadam Pavement	m2	-	-
310	Bitum.Concrete Surface Course	M.T.	-	-
304	Double Bitum.Surface Treatment	m2	-	-
311-1	PCC Pavement (t=23 cm)	m2	-	-
311-2	PCC Pavement (t=20 cm)	m2	-	-
311-3	PCC Pavement (t=18 cm)	m2	-	-
500	RCPC (dia.910mm)	m	72	128
	Headwall for RCPC (dia.910mm)	Set	9	16
504	Grouted Riprap	m3	-	-
	Side Ditch (Grouted Riprap)	m	-	-
	Slope Protection (Cut Slope)	m	-	-
	Slope Protection (Embank't Sl)	m	-	-
	2-lane Bridge,Superstructure	m	-	-
	1-lane Bridge,Superstructure	m	-	-
	2-lane Bridge,Abutment	Each	-	-
	1-lane Bridge,Abutment	Each	-	-
	2-lane Bridge,Pier	Each	-	-
	1-lane Bridge,Pier	Each	-	-
	2-lane Spillway	m	-	-
	1-lane Spillway	m	-	-
	1-cell RCBC	m	-	-
	2-cell RCBC	m	-	-
	Wingwall for 1-cell RCBC	Set	-	-
	Wingwall for 2-cell RCBC	Set	-	-
	Miscellaneous	l.s.	1	1
Road Construction Cost		M.p.	1.67	2.39
Bridge Construction Cost		M.p.	.00	.00
Total Construction Cost		M.p.	1.67	2.39
Road Construction Cost/Impr't km		M.p.	.70	.61
Total Construction Cost/Total km		M.p.	.70	.61

5.1.3 Summary of Preliminary Design

Results of preliminary design were summarized in Tables 5.1-5 and 5.1-6 for major and minor roads, respectively.

TABLE 5:1-5 SUMMARY OF PRELIMINARY DESIGN :
Province of Leyte
- Major Roads -

	Type of Improvement			
	Rehabilitation/ Improvement -1	Improvement-2/ Widening	New Construction	Total
Primary Major Roads				
1. No. of Links	-	-	-	-
2. Total Length (km)	-	-	-	-
3. Improvement Length (km)	-	-	-	-
4. Construction Cost (million P)	-	-	-	-
5. Const. Cost/Imp. Length (MP/km)	-	-	-	-
Secondary Major Roads				
1. No. of Links	12	10	2	24
2. Total Length (km)	169.1	77.1	53.6	299.8
3. Improvement Length (km)	159.2	68.4	52.7	280.3
4. Construction Cost (million P)	309.1	177.7	128.2	615.0
5. Const. Cost/Imp. Length (MP/km)	1.94	2.60	2.43	2.19
Major Roads Total				
1. No. of Links	12	10	2	24
2. Total Length (km)	169.1	77.1	53.6	299.8
3. Improvement Length (km)	159.2	68.4	52.7	280.3
4. Construction Cost (million P)	309.1	177.7	128.2	615.0
5. Const. Cost/Imp. Length (MP/km)	1.94	2.60	2.43	2.19

TABLE 5.1-6 SUMMARY OF PRELIMINARY DESIGN
Province of Leyte
- Minor Roads -

	Type of Improvement		
	Rehabilitation/ Improvement-1&2/ Widening	New Construction	Total
Minor Roads (National/ Provincial/City)			
1. No. of Links	37	1	38
2. Total Length (km)	294.3	49.3	343.6
3. Improvement Length (km)	248.8	43.6	292.4
4. Construction Cost (million P)	344.8	70.8	415.7
5. Const. Cost/Imp. Length (MP/km)	1.39	1.62	1.42
Minor Roads (Barangay)			
1. No. of Links	13	4	17
2. Total Length (km)	83.4	34.2	117.6
3. Improvement Length (km)	80.1	34.2	114.3
4. Construction Cost (million P)	67.8	22.6	90.4
5. Const. Cost/Imp. Length (MP/km)	0.85	0.66	0.79
Minor Roads Total			
1. No. of Links	50	5	55
2. Total Length (km)	377.7	83.5	461.2
3. Improvement Length (km)	328.9	77.8	406.7
4. Construction Cost (million P)	412.6	93.4	506.1
5. Const. Cost/Imp. Length (MP/km)	1.25	1.20	1.24

5.2 ECONOMIC EVALUATION

5.2.1 Basic Assumptions

The commonly used cost-benefit analysis was applied under the following basic assumptions:

i) Analysis Period

1991 - Detailed design
1992 - Construction
1993 ┐
     ↕ -Project life (25 years)
2017 ┘

ii) Discount Rate: 15% pa

iii) Quantified Cost

Initial construction/improvement costs
Periodic maintenance costs

iv) Quantified Benefit

Traffic benefit
Development benefit (only for development projects)
Maintenance cost savings

The periodic maintenance costs, or rehabilitation costs, such as overlay, reconstruction and regravelling which will be needed after completion of the project to prolong the pavement life, were treated as project costs in this study, while the difference between routine maintenance costs and total maintenance costs in the "w/o" case was taken into account as a project benefit. In the case where the routine maintenance costs are higher than the "w/o" maintenance costs, the difference is considered as a negative benefit.

5.2.2 Economic Costs

1) Initial Construction/Improvement Costs

The construction costs discussed in Section 5.2.1 are the financial costs and do not include the costs for detailed design and construction supervision. In the cost-benefit analysis, the following economic cost was used:

Construction Cost	100%
-Tax	-15%
+Detailed Design Cost	4%
+Construction Supervision Cost	6%
Total Economic Cost	95%

In the cost-benefit stream, 4% for detailed design cost was assumed to be spent in 1991 and the remaining 91% in 1992.

2) Periodic Maintenance Costs

Periodic maintenance, or rehabilitation, will be necessary when the riding quality of a pavement decreases to a certain minimum level of acceptability. Table 5.2-1 shows the periodic maintenance assumed in this Study.

TABLE 5.2-1 PERIODIC MAINTENANCE COST ASSUMED IN THE ANALYSIS

Surface Type	Periodic Maintenance Work	Timing	Financial Cost 1) (million₱/Km)	Economic Cost
Gravel	10cm Regravelling	When thickness of gravel is reduced by 10cm, assuming 1.5cm loss annually from rainfall and 1.5cm loss every 100,000 vehicles (2-6 years)	4.0 m Gravel: ₱ 0.210 M 6.0 m Gravel: ₱ 0.320 M	85% of Cost
BMP	5.5cm BMP Overlay	When pavement serviceability decreases to 2.0, assuming 85,000 ESAL or 350,000 vehicle repetitions (4-10 years)	₱ 0.830 M	85% of Cost
AC	5 cm AC Overlay	When pavement serviceability decreases to 2.0, assuming 800,000 ESAL or 2,300,000 vehicle repetitions (8-20 years)	₱ 1.170 M	85% of Cost
PCC	5 cm AC Overlay	When pavement serviceability decreases to 2.0, assuming 2,000,000 ESAL or 5,700,000 vehicle repetitions (10-25 years)	₱ 1.200 M	85% of Cost

Note: 1) As of April 1990

5.2.3 Benefits

1) Traffic Benefits

a) Traffic Cost

Basic Traffic Costs

The basic traffic costs were provided by PMO-FS, as shown in Table 5.2-2.

TABLE 5.2-2 BASIC TRAFFIC COSTS EXCLUDING TAX (AS OF DECEMBER 1989)

	Running Cost (₱/km)	Fixed Cost (₱/hour)	Time Cost (₱/hour)
Car/Van	1.75	6.30	17.70
Jeepney	1.12	23.76	26.40
Bus	2.81	35.64	95.04
Truck	3.48	38.88	0
Motor-tricycle	0.36	8.76	4.98
Motorcycle	0.31	0.72	8.34

Actual Traffic Costs

The actual traffic costs were estimated according to the dl-system concerning running costs and the dt-system with regard to fixed and time costs. The dl-values and operating speed for different surface conditions are shown in Tables 5.2-3 and 5.2-4, respectively.

TABLE 5.2-3 DL-VALUES IN KM PER ACTUAL KM

Surface Condition \ Surface Type	PCC/AC	BMP/DBST	Gravel	Earth
Good	0	0.14	0.29	-
Fair	0.17	0.38	0.60	-
Bad	0.43	0.65	0.87	1.20
Very Bad	0.89	1.04	1.20	1.56
Impassable	1.73	1.73	1.73	1.73

TABLE 5.2-4 OPERATING SPEED IN KM/HOUR

Surface Condition	Surface Type: PCC/AC OV	PCC/AC TR	PCC/AC MC	BMP/DBST OV	BMP/DBST TR	BMP/DBST MC	Gravel OV	Gravel TR	Gravel MC	Earth OV	Earth TR	Earth MC
Good	65	40	60	63	38	55	60	35	50	-	-	-
Fair	55	35	50	53	33	45	50	30	40	-	-	-
Bad	30	20	20	30	20	20	30	20	20	20	10	10
Very Bad	20	10	10	20	10	10	20	10	10	10	5	5
Impassable	10	5	5	10	5	5	10	5	5	10	5	5

Note: OV = Car/Jeepney/Bus/Truck
TR = Motor-tricycle
MC = Motorcycle

Traffic Costs of Other Transport Modes

In addition to the land-based motorized vehicles, the traffic costs of other modes were estimated as shown in Table 5.2-5.

TABLE 5.2-5 TRAFFIC COST OF OTHER MODES (COMMON TO ALL SURFACE TYPES AND CONDITIONS)

Mode	Traffic Cost in ₱/Km
Animal Drawn	4.0
Walking (head loading)	1.2
Banca Boat	2.25

b) Traffic Benefits in Traffic Projects

Traffic on the project roads wwas broken down into four categories: normal traffic, diverted traffic-1, diverted traffic-2 and generated traffic.

The traffic benefits were estimated as follows:

i) Normal Traffic : Difference in traffic costs between "w/o" and "with" cases. The change in traffic costs results not only from the improvement of surface type and condition but also from consequent change in modal distribution.

ii) Diverted Traffic-1 : Difference between traffic costs along the "w/o" route and those along the "with" route. Where diverted traffic passes through two or more project roads, the benefits were allocated to each road in proportion to length.

iii) Diverted Traffic-2 and Generated Traffic: Half of the difference in traffic costs between "w/o" and "with" cases. This is the commonly used approximation.

Traffic costs were calculated assuming the following surface conditions:

"W/O" Case : Present surface condition is maintained.
"With" Case: Gravel/BMP are maintained in a fair condition.
AC/PCC are maintained in a good condition

c) Traffic Benefits in Development Projects

No diverted traffic is expected in most development projects. The benefits from normal traffic generated traffic were estimated in the same way as used for the traffic projects paying attention to the following:

i) The travel distance considered in the benefit calculation is the distrance from the average gravity point of transport (gravity of population for passenger traffic and non-agricultural traffic and gravity of agricultural production for agricultural traffic) to the connecting point with a higher road.

ii) The benefit from generated agricultural traffic is not considered as a traffic benefit because it is included in the development benefit. Therefore, the generated traffic benefits are only from passenger traffic and non-agricultural traffic.

2) Development Benefits

Development benefits were assessed using the producer surplus approach, under the hypothesis that substantial road improvement which removes constraints on development will permit and encourage farmers to adopt modern agricultural techniques and inputs. The development benefit consists of the difference in the

net value of total production (farmgate value less production costs) between the "w/o" and "with" cases. Changes in the volume and value of agricultural production will be achieved by one or more of the following:

i) Increase in cultivated area
ii) Increase in yield
iii) Increase in intensity of land use through increasing the number of harvest or intercropping
iv) Changes in the type of crop

Using the data obtained from the socio-economic survey, development benefits were calculated from the following equation:

Benefit = PRODw(FGPw-CPw)-(FGPw-CPw/o)

where, PRODw = Production in metric tons, with
PRODw/o= Production in metric tons, w/o
FGPw = Farmgate price in pesos per metric ton, with
CPw = Production cost in pesos per metric ton, with
CPw/o = Production cost in pesos per metric ton, w/o

The increase in farmgate price resulting from reduction in traffic cost is not included in the development benefits, because it is considered a part of the traffic benefits.

Table 5.2-6 presents the summary of demographic and agricultural data.

TABLE 5.2 - 6 (1)

Summary of Demographic and Agricultural Data LEYTE

Class of Road	Type of Impr't	Road Number	Road Length (km)	1990 Population Total	1990 Population /km	1990 Crop Area (ha) Total	1990 Crop Area (ha) Major Crop	1993 AADT w/o	1993 AADT with	IRR (%)
Second'y Major	Rehab/ Imp-1	P42-1	6.3	13366	2122	3610	3024(Coco.) 360(Palay) 226(Banan)	164	176	22.2
		N9-2	19.9	7922	398	2319	1617(Coco.) 702(Palay)	0	57	8.0
	New Const.	B01-1	25.2	15405	611	3975	3636(Coco.) 339(Banan)	0	50	17.7
Minor (Nat'l/ Prov'l)	Rehab/ Imp-1	P4-1	10.5	6786	646	3259	2600(Coco.) 518(Palay) 141(Banan)	110	117	28.0
		P28-1	2.5	1552	621	245	113(Sugar) 94(Coco.) 38(Palay)	26	28	27.3
		P30-1	3.8	4986	1312	2448	2017(Coco.) 185(Root) 154(Corn) 92(Palay)	72	89	25.1
		P15-1	5.1	2304	452	1806	860(Coco.) 851(Palay) 95(Banan)	43	47	21.5
		P63-1	3.6	5976	1660	927	748(Coco.) 179(Palay)	0	60	20.8
		P84-1	4.7	2843	605	1239	1044(Coco.) 130(Palay) 65(Corn)	0	37	19.8
		P70-1	2.5	1997	799	664	587(Coco.) 42(Palay) 35(Sugar)	29	36	19.8
		N8-1	11.8	5724	485	3313	1781(Palay) 1425(Coco.) 107(Banan)	90	94	18.3
		P9-1	7.9	1869	237	1633	1449(Coco.) 97(Root) 48(Banan) 39(Vege.)	26	30	16.7
		P53-1	7.7	6018	782	2010	1513(Coco.) 497(Palay)	97	103	15.6
		P2-1	4.7	2033	433	1495	1206(Coco.) 225(Palay) 64(Banan)	28	35	15.1
		P3-1	12.0	2366	197	1639	937(Coco.) 468(Palay) 234(Corn)	39	40	14.9
		N30-1	24.8	10556	426	7436	4042(Coco.) 1374(Corn) 1212(Palay) 808(Root)	106	116	14.9
		N90-1	8.2	3782	461	1736	1376(Coco.) 212(Palay) 148(Vege.)	0	52	13.6
		P36-1	5.5	3260	593	1256	1022(Coco.) 146(Root) 88(Banan)	38	41	13.4
		P17-1	5.0	4288	858	1434	765(Coco.) 669(Palay)	76	82	13.1
		P45-1	1.2	1552	1293	110	55(Palay) 55(Coco.)	24	31	12.9
		P27-1	13.0	7973	613	3046	2451(Coco.) 350(Palay) 175(Root) 70(Corn)	0	67	12.2
		N11-1	16.2	3050	188	3616	3125(Coco.) 357(Banan) 134(Corn)	58	54	11.1
		P72-1	5.8	1915	330	1377	918(Coco.) 367(Palay) 92(Root)	33	34	10.5
		P26-1	9.3	10857	1167	2918	1459(Coco.) 973(Corn) 486(Palay)	137	178	10.2
		P59-1	4.6	2588	563	425	200(Coco.) 150(Palay) 50(Banan) 25(Vege.)	41	44	9.9
		N26-1	11.7	3642	311	3257	2764(Coco.) 315(Palay) 99(Root) 79(Banan)	32	35	9.8
		P73-1	.8	1477	1846	75	73(Coco.) 2(Palay)	21	27	8.9
		P77-1	2.2	890	405	366	302(Coco.) 28(Palay) 20(Banan) 16(Corn)	14	16	8.6
		P66-1	15.8	1051	67	3990	2992(Coco.) 848(Palay) 150(Corn)	25	29	8.4
		P23-1	10.4	3558	342	2249	1692(Coco.) 363(Palay) 121(Corn) 73(Root)	54	52	8.1
		P56-1	9.2	4306	468	1717	1173(Coco.) 272(Palay) 136(Corn) 136(Root)	40	44	8.1
		P31-1	8.2	3592	438	1390	1198(Coco.) 160(Banan) 32(Palay)	41	45	7.5
		P7-1	7.6	3671	483	1273	1115(Coco.) 66(Palay) 66(Banan) 26(Corn)	50	53	6.6
		P16-2	6.6	4537	687	1195	1039(Coco.) 91(Palay) 65(Banan)	61	67	5.8
		P35-1	3.9	5416	1645	750	476(Coco.) 179(Palay) 95(Corn)	94	103	5.6
		P75-1	5.8	3763	649	547	262(Coco.) 200(Palay) 85(Banan)	57	61	5.6
		N26-3	4.2	2489	593	1194	1016(Coco.) 82(Root) 54(Corn) 42(Palay)	37	40	4.5
		P16-1	12.1	6519	539	1105	585(Palay) 455(Coco.) 65(Vege.)	91	97	3.7
		N27-1	13.4	4459	333	856	750(Coco.) 106(Palay)	44	48	.0
	Imp-2/ Widen	N17-1	12.0	5608	467	2230	1333(Coco.) 835(Sugar) 62(Corn)	119	125	45.7
Minor (Baran-gay)	Rehab/ Imp-1	B38-5	5.8	8271	1426	507	230(Coco.) 217(Palay) 60(Sugar)	0	119	49.9
		B38-12	3.3	2267	687	871	530(Sugar) 240(Coco.) 101(Banan)	49	55	49.4
		B38-13	6.4	5915	924	1078	625(Sugar) 257(Palay) 196(Coco.)	100	125	37.0
		B14-2	3.0	1696	565	879	788(Coco.) 65(Sugar) 26(Palay)	22	25	28.5
		B40-1	10.5	3919	373	4157	3681(Coco.) 260(Corn) 216(Palay)	0	33	24.0
		B47-4	3.0	528	176	560	250(Palay) 250(Coco.) 30(Corn) 30(Vege.)	0	8	22.7
		B08-4	5.6	3621	647	2078	1671(Coco.) 226(Palay) 136(Root) 45(Corn)	35	45	20.0
		B07-2	4.0	913	228	1013	833(Coco.) 180(Corn)	0	6	17.5

TABLE 5.2 - 6 (2)

Summary of Demographic and Agricultural Data LEYTE

Class of Road	Type of Impr't	Road Number	Road Length (km)	1990 Population Total	1990 Population /km	1990 Crop Area (ha) Total	1990 Crop Area (ha) Major Crop	1993 AADT w/o	1993 AADT with	IRR (%)
Minor (Barangay)	Rehab/Imp-1	B13-1	23.4	8779	375	3013	2309(Coco.) 660(Corn) 44(Palay)	0	56	17.5
		B33-1	4.2	4893	1165	1776	1395(Coco.) 260(Palay) 121(Corn)	35	49	17.4
		B45-1	1.4	3110	2221	391	350(Coco.) 21(Palay) 20(Corn)	22	30	15.2
		B22-2	4.8	969	202	712	610(Coco.) 68(Corn) 34(Palay)	8	10	6.6
		B50-5	8.0	2075	259	950	856(Coco.) 71(Corn) 23(Palay)	28	31	5.9
	New Const.	B14-1	19.2	5202	271	1620	1200(Coco.) 420(Palay)	0	18	9.5
		B00-1	8.7	1440	166	1753	1421(Coco.) 215(Corn) 117(Palay)	0	15	9.3
		B42-3	2.4	1851	771	416	192(Corn) 192(Coco.) 32(Palay)	0	6	8.8
		B34-2	3.9	1181	303	556	487(Coco.) 40(Corn) 29(Root)	0	5	4.2

3) Maintenance Cost Savings

The difference in maintenance costs between the "w/o" and "with" cases is considered one of the benefits. Maintenance costs in the "w/o" case were estimated based on the current EMK system, while maintenance costs in the "with" case were estimated as shown in b) below. It is noted that periodic maintenance cost in the "with" case is not included in the calculation of maintenance cost savings, because it is treated as a part of project costs.

In the case where the routine maintenance costs in the "with" case are higher than the maintenance costs in the "w/o" case (especially in the case of new construction, the maintenance cost in the "w/o" case in zero), the difference is considered as a negative benefit).

a) Maintenance Cost in "w/o" Case

According to the current EMK system, the annual maintenance cost per km was estimated as basic maintenance cost of ₱17,143.00/km times the EMK factor as shown in Table 5.2-7.

TABLE 5.2-7
EMK FACTOR FOR DIFFERENT SURFACING AND AADT

AADT / Surface Type	25	50	75	100	150	200	300	400
Earth	0.35	0.40	0.50					
Gravel	0.40	0.60	0.90	1.40	1.90	2.20	2.40	2.50	2.60

AADT / Surface Type	400	600	1000	1500	2000	3000	5000	10000
Bituminous	1.10	1.55	2.10	2.50	2.60			
Gravel	0.50	0.60	0.80	0.85	0.90	0.95	1.00	1.05	1.10

b) Routine Maintenance Costs in "with" Case

The costs deemed necessary to maintain the improved roads in a fair condition were estimated as shown in Table 5.2-8.

TABLE 5.2-8
ESTIMATED ROUTINE MAINTENANCE COSTS

Surface Type	Operation	Annual Cost (peso/km)
Gravel	Vegetation Control	1,150
	Ditch Cleaning	4.0 m Gravel: 2,650 + 40 AADT
	Grading	6.0 m Gravel: 3,000 + 45 AADT
	Pothole Repair	
	Total	4.0 m Gravel: 3,800 + 45 AADT
		6.0 m Gravel: 4,150 + 45 AADT
BMP	Vegetation Control	1,150
	Ditch Cleaning	1,100
	Shoulder Repair	2,150
	Patching	8,000 + 7.5 AADT
	Regravelling Shoulder	8,600
	Total	21,000 + 7.5 AADT
AC	Vegetation Control	1,150
	Ditch Cleaning	1,100
	Shoulder Repair	2,150
	Crack and Joint Sealing	9,300
	Regravelling Shoulder	8,600
	Total	20,400
PCC	Vegetation Control	1,150
	Ditch Cleaning	1,100
	Shoulder Repair	2,150
	Crack and Joint Sealing	5,600
	Regravelling Shoulder	8,600
	Total	18,600

5.2.4 Economic Evaluation

Results of economic evaluation are summarized in Table 5.2-9 and illustrated in Figure 5.2-1. Results of economic evaluation of each project road is presented in Table 5.2-10.

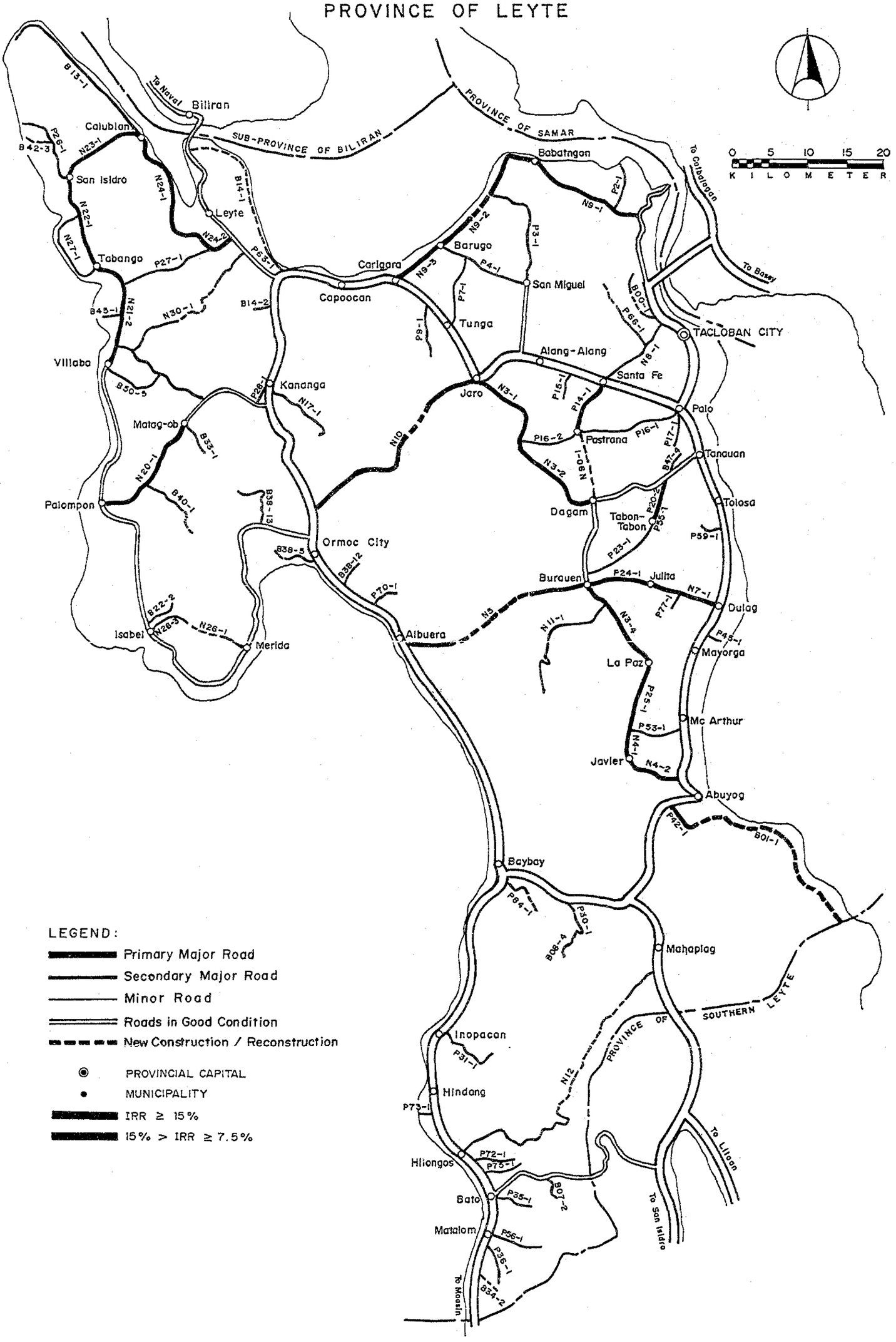

FIGURE 5.2 - 1 PROJECT ROADS and ECONOMIC EVALUATION RESULTS

TABLE 5.2 - 9 (1)

Road Length and Construction Cost LEYTE

Class of Road	Range of IRR	Rehabilitation/Improvement-1						Improvement-2/Widening						New Construction					
		No.	Total Length	Improv Length	Road Cost	Bridge Cost	Total Cost	No.	Total Length	Improv Length	Road Cost	Bridge Cost	Total Cost	No.	Total Length	Improv Length	Road Cost	Bridge Cost	Total Cost
Primary Major	15<	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.5-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	<7.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Second'y Major	15<	4	56.9	47.9	84.2	5.0	89.2	2	15.2	12.5	30.1	-	30.1	1	25.2	25.2	40.0	4.2	44.2
	10-15	1	8.9	8.9	19.0	3.0	22.1	3	10.7	8.1	15.6	15.9	31.5	1	28.4	27.5	73.8	10.2	84.0
	7.5-10	2	35.5	35.1	34.2	45.4	79.5	2	20.5	19.9	37.5	11.5	49.0	-	-	-	-	-	-
	<7.5	5	67.8	67.3	53.8	64.5	118.3	3	30.7	27.9	48.7	18.4	67.1	-	-	-	-	-	-
	Total	12	169.1	159.2	191.2	117.9	309.1	10	77.1	68.4	131.9	45.8	177.7	2	53.6	52.7	113.7	14.4	128.2
Minor (Nat'l/ Prov'l)	15<	11	64.8	49.3	43.7	16.1	59.8	1	12.0	2.3	1.3	1.3	2.6	1	49.3	43.6	67.3	3.5	70.8
	10-15	10	101.0	90.2	92.2	36.7	129.0	-	-	-	-	-	-	-	-	-	-	-	-
	7.5-10	7	54.7	54.7	61.5	5.1	66.6	-	-	-	-	-	-	-	-	-	-	-	-
	<7.5	8	61.8	52.3	68.5	18.3	86.8	-	-	-	-	-	-	-	-	-	-	-	-
	Total	36	282.3	246.5	266.0	76.3	342.2	1	12.0	2.3	1.3	1.3	2.6	1	49.3	43.6	67.3	3.5	70.8
Minor (Baran-gay)	15<	11	70.6	67.3	43.0	17.5	60.5	-	-	-	-	-	-	-	-	-	-	-	-
	10-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7.5-10	-	-	-	-	-	-	-	-	-	-	-	-	3	30.3	30.3	19.2	1.0	20.2
	<7.5	2	12.8	12.8	7.3	-	7.3	-	-	-	-	-	-	1	3.9	3.9	2.4	-	2.4
	Total	13	83.4	80.1	50.3	17.5	67.8	-	-	-	-	-	-	4	34.2	34.2	21.6	1.0	22.6
Total	15<	26	192.3	164.5	170.9	38.6	209.5	3	27.2	14.8	31.4	1.3	32.7	2	74.5	68.8	107.3	7.7	115.0
	10-15	11	109.9	99.1	111.3	39.8	151.0	3	10.7	8.1	15.6	15.9	31.5	1	28.4	27.5	73.8	10.2	84.0
	7.5-10	9	90.2	89.8	95.7	50.5	146.2	2	20.5	19.9	37.5	11.5	49.0	3	30.3	30.3	19.2	1.0	20.2
	<7.5	15	142.4	132.4	129.6	82.8	212.4	3	30.7	27.9	48.7	18.4	67.1	1	3.9	3.9	2.4	-	2.4
	Total	61	534.8	485.8	507.5	211.7	719.2	11	89.1	70.7	133.1	47.1	180.3	7	137.1	130.5	202.7	19.0	221.6

TABLE 5.2 - 9 (2)

Road Length and Construction Cost LEYTE

Class of Road	Range of IRR	Total					
		No.	Total Length	Improv Length	Road Cost	Bridge Cost	Total Cost
Primary Major	15<	-	-	-	-	-	-
	10-15	-	-	-	-	-	-
	7.5-10	-	-	-	-	-	-
	<7.5	-	-	-	-	-	-
	Total	-	-	-	-	-	-
Second'y Major	15<	7	97.3	85.6	154.3	9.2	163.5
	10-15	5	48.0	44.5	108.4	29.1	137.5
	7.5-10	4	56.0	55.0	71.7	56.9	128.6
	<7.5	8	98.5	95.2	102.4	82.9	185.4
	Total	24	299.8	280.3	436.8	178.1	615.0
Minor (Nat'l/ Prov'l)	15<	13	126.1	95.2	112.3	20.9	133.3
	10-15	10	101.0	90.2	92.2	36.7	129.0
	7.5-10	7	54.7	54.7	61.5	5.1	66.6
	<7.5	8	61.8	52.3	68.5	18.3	86.8
	Total	38	343.6	292.4	334.6	81.1	415.7
Minor (Baran-gay)	15<	11	70.6	67.3	43.0	17.5	60.5
	10-15	-	-	-	-	-	-
	7.5-10	3	30.3	30.3	19.2	1.0	20.2
	<7.5	3	16.7	16.7	9.7	-	9.7
	Total	17	117.6	114.3	71.9	18.6	90.4
Total	15<	31	294.0	248.1	309.6	47.7	357.2
	10-15	15	149.0	134.7	200.7	65.8	266.5
	7.5-10	14	141.0	140.0	152.4	63.0	215.4
	<7.5	19	177.0	164.2	180.7	101.2	281.9
	Total	79	761.0	687.0	843.3	277.8	1121.1

TABLE 5.2 - 10 (1)

Summary of Economic Analysis LEYTE

Cost/Benefit:1991-2017 Discounted Total

Class of Road	Type of Impr't	Road Number	1993 AADT w/o	1993 AADT with	Length (km) Total	Length (km) Improvement	Economic Cost (Mp/km) Construct.	Economic Cost (Mp/km) Period Maint.	Economic Cost (Mp/km) Total	Benefit (Mp/km) Normal	Diverted	Generated	Develop't	Maint sav'g	Benefit (Mp/km) Total	Econom. Indicator NPV (Mp)	B/C	IRR (%)
Second'y Major	Rehab/ Imp-1	N10	0	425	31.4	22.7(6.0-AC)	2.56	.04	2.60	-	4.44	.64	-	-.09	4.99	54.3	1.9	26.9
		P42-1	164	176	6.3	6.3(6.0-GRV)	.56	.35	.91	.47	-	.02	.74	.06	1.29	2.4	1.4	22.2
		N4-2	195	196	6.8	6.5(6.0-GRV)	.75	.35	1.11	1.40	-	-	-	.11	1.51	2.6	1.4	22.0
		N3-4	112	124	12.4	12.3(6.0-GRV)	.61	.27	.89	.79	-	.04	-	.10	.94	.6	1.1	16.3
		N24-2	173	239	8.9	8.9(6.0-BMP)	2.06	.35	2.41	1.08	.54	.08	-	.06	1.76	-5.8	.7	10.2
		N9-2	0	57	19.9	19.5(6.0-GRV)	2.39	.20	2.59	1.11	-	.14	.28	-.02	1.51	-21.2	.5	8.0
		N21-2	161	167	15.6	14.6(6.0-GRV) 1.0(6.0-Ovl)	1.25	.29	1.55	.89	-	.00	-	.10	.99	-8.7	.6	8.0
		N20-1	214	147	21.5	21.0(6.0-GRV)	.91	.30	1.21	.60	-	-	-	.13	.72	-10.2	.6	6.0
		N22-1	145	181	13.9	.4(6.0-Ovl) 13.5(6.0-GRV)	1.47	.33	1.80	.80	-	.01	-	.10	.91	-12.4	.5	4.6
		N3-1	93	89	10.7	10.7(6.0-GRV)	2.34	.27	2.61	.96	-	.05	-	.09	1.10	-16.1	.4	4.0
		N3-2	93	89	13.0	13.0(6.0-GRV)	1.80	.27	2.06	.73	-	.04	-	.09	.86	-15.7	.4	3.3
		P26-1	40	47	8.7	.6(6.0-PCC) 8.1(6.0-GRV)	1.25	.18	1.43	.38	-	.02	-	.02	.41	-8.9	.3	.0
	Imp-2/ Widen	N7-1	366	502	7.6	6.2(6.0-AC)	2.02	.12	2.13	3.25	-	.47	-	.10	3.82	10.4	1.8	26.3
		P24-1	399	506	7.6	6.3(6.0-AC)	1.99	.08	2.07	2.76	-	.54	-	.10	3.40	8.4	1.6	23.9
		P55-1	297	284	1.5	1.5(6.0-PCC)	1.89	-	1.89	1.52	-	-	-	.05	1.57	-.5	.8	12.7
		N9-3	213	280	6.0	3.4(6.0-PCC)	5.50	-	5.50	3.86	-	.67	-	.02	4.55	-3.2	.8	12.7
		P20-2	297	284	3.2	3.2(6.0-BMP)	1.46	.37	1.82	1.39	-	-	-	.08	1.47	-1.1	.8	11.4
		N24-1	173	239	14.0	13.4(6.0-BMP)	2.22	.35	2.57	1.15	.35	.08	-	.06	1.64	-12.4	.6	8.5
		P14-1	261	264	6.5	6.5(6.0-BMP)	1.70	.37	2.07	1.24	-	-	-	.07	1.31	-4.9	.6	8.0
		N9-1	196	211	14.3	11.9(6.0-BMP)	2.07	.28	2.35	1.27	-	.02	-	.07	1.36	-11.8	.6	7.3
		N23-1	172	214	12.8	12.8(6.0-BMP)	2.24	.27	2.51	1.12	-	.03	-	.06	1.21	-16.7	.5	5.4
		N4-1	40	47	3.6	3.2(6.0-GRV)	.75	.20	.94	.30	-	.01	-	.03	.34	-1.9	.4	.0
	New Const.	B01-1	0	50	25.2	25.2(6.0-GRV)	1.46	.22	1.67	1.37	-	.45	.18	-.05	1.95	7.0	1.2	17.7
		N5	0	207	28.4	27.5(6.0-BMP)	2.54	.27	2.81	-	1.67	.94	-	-.12	2.49	-8.8	.9	13.3

TABLE 5.2 - 10 (2)

Summary of Economic Analysis LEYTE

Cost/Benefit:1991-2017 Discounted Total

Class of Road	Type of Impr't	Road Number	1993 AADT w/o	1993 AADT with	Length (km) Total	Length (km) Improvement	Economic Cost (Mp/km) Construct.	Economic Cost (Mp/km) Period Maint.	Economic Cost (Mp/km) Total	Benefit (Mp/km) Normal	Diverted	Generated	Develop't	Maint sav'g	Benefit (Mp/km) Total	Econom.Indicator NPV (Mp)	B/C	IRR (%)
Minor (Nat'l/ Prov'l)	Rehab/ Imp-1	P4-1	110	117	10.5	.9(6.0-GRV)	1.80	.27	2.07	-.48	-	.00	5.36	.10	4.99	2.6	2.4	28.0
		P28-1	26	28	2.5	.7(6.0-PCC)	2.24	-	2.24	.03	-	.00	6.77	-.05	6.74	3.2	3.0	27.3
		P30-1	72	89	3.8	3.8(6.0-GRV)	.83	.24	1.07	.24	-	.01	1.83	.06	2.14	4.1	2.0	25.1
		P15-1	43	47	5.1	5.1(6.0-GRV)	.85	.19	1.04	.26	-	.00	1.31	.03	1.60	2.9	1.5	21.5
		P63-1	0	60	3.6	3.6(6.0-GRV)	1.53	.22	1.74	1.43	-	.32	.74	-.02	2.48	2.6	1.4	20.8
		P84-1	0	37	4.7	4.7(6.0-GRV)	1.43	.18	1.61	1.58	-	.11	.45	-.01	2.13	2.5	1.3	19.8
		P70-1	29	36	2.5	2.5(6.0-GRV)	.65	.18	.83	.07	-	.00	1.13	.02	1.22	1.0	1.5	19.8
		N8-1	90	94	11.8	7.9(6.0-GRV)	1.71	.25	1.96	.09	-	.00	2.37	.09	2.56	4.7	1.3	18.3
		P9-1	26	30	7.9	7.9(6.0-GRV)	.56	.18	.74	.23	-	.03	.55	.02	.83	.7	1.1	16.7
		P53-1	97	103	7.7	7.5(6.0-GRV)	.55	.25	.79	.06	-	.00	.67	.10	.82	.2	1.0	15.6
		P2-1	28	35	4.7	4.7(6.0-GRV)	.67	.18	.85	.11	-	.01	.72	.02	.86	.0	1.0	15.1
		P3-1	39	40	12.0	7.6(6.0-GRV)	.62	.18	.80	.04	-	.00	.73	.02	.79	.0	1.0	14.9
		N30-1	106	116	24.8	24.8(6.0-GRV)	1.15	.27	1.42	.37	-	.04	.97	.02	1.40	-.5	1.0	14.9
		N90-1	0	52	8.2	8.2(6.0-GRV)	1.35	.20	1.55	.38	-	.03	.97	-.02	1.37	-1.5	.9	13.6
		P36-1	38	41	5.5	5.5(6.0-GRV)	.75	.18	.93	.09	-	.00	.70	.01	.81	-.7	.9	13.4
		P17-1	76	82	5.0	4.7(6.0-GRV)	1.93	.24	2.16	.67	-	.03	1.04	.08	1.82	-1.6	.8	13.1
		P45-1	24	31	1.2	1.0(6.0-GRV) .2(6.0-PCC)	.51	.15	.65	.04	-	.00	.51	.00	.55	-.1	.8	12.9
		P27-1	0	67	13.0	13.0(6.0-GRV)	1.43	.22	1.65	.82	-	.11	.44	-.02	1.35	-3.9	.8	12.2
		N11-1	58	54	16.2	10.1(6.0-GRV)	.76	.19	.95	.34	-	.01	.33	.05	.74	-2.1	.8	11.1
		P72-1	33	34	5.8	5.8(6.0-GRV)	1.24	.18	1.41	.12	-	.00	.77	.02	.92	-2.9	.6	10.5
		P26-1	137	178	9.3	9.3(6.0-GRV)	1.69	.33	2.02	.33	-	.01	.94	.09	1.37	-6.0	.7	10.2
		P59-1	41	44	4.6	4.6(6.0-GRV)	.82	.19	1.00	.12	-	.01	.49	.03	.64	-1.7	.6	9.9
		N26-1	32	35	11.7	11.7(6.0-GRV)	1.28	.18	1.46	.17	-	.02	.73	-.01	.91	-6.5	.6	9.8
		P73-1	21	27	.8	.8(6.0-GRV)	.55	.18	.72	.06	-	.00	.36	.01	.43	-.2	.6	8.9
		P77-1	14	16	2.2	2.2(6.0-GRV)	.55	.17	.73	.01	-	.00	.41	.01	.43	-.7	.6	8.6
		P66-1	25	29	15.8	15.8(6.0-GRV)	.96	.18	1.14	.22	-	.01	.44	.01	.68	-7.3	.6	8.4
		P23-1	54	52	10.4	10.4(6.0-GRV)	.99	.20	1.19	.18	-	.02	.45	.05	.70	-5.1	.6	8.1
		P56-1	40	44	9.2	.2(6.0-PCC) 9.0(6.0-GRV)	1.03	.19	1.22	.14	-	.02	.51	.00	.67	-5.1	.5	8.1
		P31-1	41	45	8.2	.4(6.0-PCC) 7.8(6.0-GRV)	1.38	.18	1.56	.37	-	.04	.38	.01	.81	-6.2	.5	7.5
		P7-1	50	53	7.6	5.5(6.0-GRV) .7(6.0-PCC)	1.01	.18	1.18	.04	-	.00	.47	.03	.54	-4.0	.5	6.6
		P16-2	61	67	6.6	6.3(6.0-GRV)	.58	.20	.78	.02	-	.00	.31	.05	.39	-2.4	.5	5.8
		P35-1	94	103	3.9	3.4(6.0-PCC)	2.34	-	2.34	.12	-	.00	.64	.00	.76	-5.4	.3	5.6
		P75-1	57	61	5.8	5.8(6.0-GRV)	1.05	.20	1.26	.09	-	.00	.38	.05	.52	-4.3	.4	5.6
		N26-3	37	40	4.2	4.2(6.0-GRV)	1.31	.18	1.48	.06	-	.00	.47	.02	.55	-3.9	.4	4.5
		P16-1	91	97	12.1	10.3(6.0-GRV) .3(6.0-PCC)	2.14	.25	2.38	.11	-	.00	.53	.09	.73	-17.5	.3	3.7
		N27-1	44	48	13.4	.1(6.0-Ovl) 7.5(6.0-GRV)	1.16	.20	1.36	.12	-	.01	.16	.00	.28	-8.2	.2	.0
	Imp-2/ Widen	N17-1	119	125	12.0	2.3(6.0-GRV)	.94	.27	1.21	-.45	-	.00	8.31	.10	7.97	15.5	6.6	45.7
	New Const.	N12	0	157	49.3	43.6(6.0-GRV)	1.35	.45	1.80	-	.70	1.69	-	-.11	2.29	21.3	1.3	19.5

TABLE 5.2 - 10 (3)

Summary of Economic Analysis LEYTE

Cost/Benefit:1991-2017 Discounted Total

Class of Road	Type of Impr't	Road Number	1993 AADT w/o	1993 AADT with	Length (km) Total	Length (km) Improvement	Economic Cost (Mp/km) Construct.	Economic Cost (Mp/km) Period Maint.	Economic Cost (Mp/km) Total	Benefit (Mp/km) Normal	Diverted	Generated	Develop't	Maint sav'g	Benefit (Mp/km) Total	Econom. Indicator NPV (Mp)	B/C	IRR (%)
Minor (Barangay)	Rehab/Imp-1	B38-5	0	119	5.8	1.6(4.0-PCC) 1.8(4.0-GRV)	2.56	.09	2.66	9.13	-	.40	.75	-.06	10.22	25.7	3.8	49.9
		B38-12	49	55	3.3	3.3(4.0-GRV)	.42	.13	.55	.18	-	.01	3.50	.04	3.73	10.5	6.7	49.4
		B38-13	100	125	6.4	6.4(4.0-GRV)	.42	.18	.60	.06	-	.00	2.11	.10	2.27	10.7	3.8	37.0
		B14-2	22	25	3.0	3.0(4.0-GRV)	.58	.11	.69	.21	-	.02	1.60	.01	1.85	3.5	2.7	28.5
		B40-1	0	33	10.5	10.5(4.0-GRV)	.58	.12	.70	.65	-	.10	.36	-.02	1.09	4.1	1.6	24.0
		B47-4	0	8	3.0	2.9(4.0-GRV)	.42	.11	.53	.28	-	.01	.56	.01	.86	1.0	1.6	22.7
		B08-4	35	45	5.6	5.6(4.0-GRV)	.57	.13	.70	.19	-	.02	.76	.00	.98	1.6	1.4	20.0
		B07-2	0	6	4.0	4.0(4.0-GRV)	.46	.11	.57	.23	-	.03	.41	.01	.67	.4	1.2	17.5
		B13-1	0	56	23.4	.2(4.0-PCC) 22.4(4.0-GRV)	.81	.13	.94	.77	-	.20	.12	-.01	1.07	3.0	1.1	17.5
		B33-1	35	49	4.2	4.2(4.0-GRV)	.93	.14	1.06	.46	-	.11	.68	.00	1.25	.8	1.2	17.4
		B45-1	22	30	1.4	1.0(4.0-GRV) .4(6.0-PCC)	.92	.08	1.00	.13	-	.02	.89	-.02	1.02	.0	1.0	15.2
		B22-2	8	10	4.8	4.8(4.0-GRV)	.52	.11	.63	.07	-	.01	.24	.01	.32	-1.5	.5	6.6
		B50-5	28	31	8.0	8.0(4.0-GRV)	.45	.12	.56	.18	-	.02	.10	.02	.31	-2.0	.6	5.9
	New Const.	B14-1	0	18	19.2	19.2(4.0-GRV)	.53	.11	.64	.19	-	.07	.21	-.03	.43	-4.0	.7	9.5
		B00-1	0	15	8.7	8.7(4.0-GRV)	.61	.11	.73	.15	-	.01	.31	-.01	.47	-2.2	.6	9.3
		B42-3	0	6	2.4	2.4(4.0-GRV)	.58	.11	.69	.16	-	.05	.25	-.02	.44	-.6	.6	8.8
		B34-2	0	5	3.9	3.9(4.0-GRV)	.51	.11	.62	.16	-	.02	.14	-.02	.30	-1.3	.5	4.2