

REPUBLIC OF THE PHILIPPINES  
DEPARTMENT OF PUBLIC WORKS & HIGHWAYS

**Feasibility Study of the Road Improvement Project  
on the  
Pan-Philippine Highway  
(Philippines-Japan Friendship Highway)**

FINAL REPORT

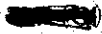
APPENDIX

(VOLUME III)

SEPTEMBER, 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

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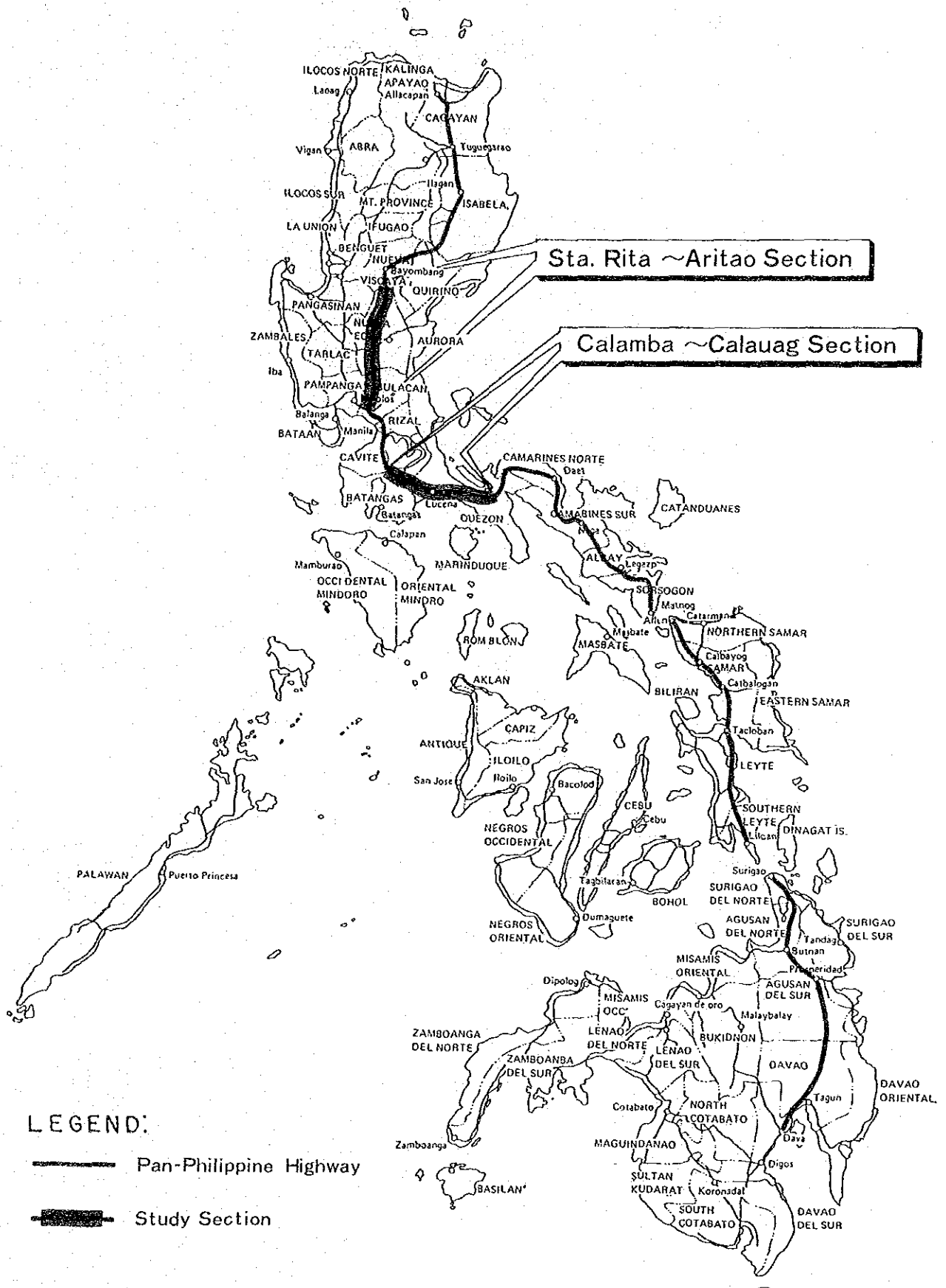
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国際協力事業団		
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# LOCATION MAP







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**APPENDICES FOR  
CHAPTER 4**



APPENDIX 4-1  
TRAFFIC SURVEY  
FIELD SHEETS



TABLE 1

THE ROAD IMPROVEMENT PROJECT ON THE PAN-PHILIPPINE HIGHWAY  
O-D INTERVIEW FIELD SHEET

STATION NO. \_\_\_\_\_ DATE: \_\_\_\_\_ 1986 INTERVIEWER \_\_\_\_\_  
LOCATION Km. \_\_\_\_\_ NAME OF ROAD/ SECTION \_\_\_\_\_

1. STATION CODE: _____		2. HOUR: _____		1	<input type="text"/>	<input type="text"/>	4	<input type="text"/>	<input type="text"/>
3. DIRECTION: From _____ To _____				6	<input type="text"/>	<input type="text"/>			
4. VEHICLE TYPE:				7	<input type="text"/>	<input type="text"/>			
<input type="checkbox"/> 1. CAR	<input type="checkbox"/> 5. JEEPNEY	<input type="checkbox"/> 9. TRUCK (2 AXLE)							
<input type="checkbox"/> 2. JEEP	<input type="checkbox"/> 6. PU BUS (MINI) < 30 SEATS	<input type="checkbox"/> 10. TRUCK (3 AXLE)							
<input type="checkbox"/> 3. TAXI	<input type="checkbox"/> 7. PU BUS (BIG) ≥ 30 SEATS	<input type="checkbox"/> 11. TRK-TRL, SEMI-TRL							
<input type="checkbox"/> 4. PICKUP, VAN	<input type="checkbox"/> 8. TOURIST BUS	<input type="checkbox"/> 12. TRICYCLE							
5. ORIGIN:				9	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
CITY/MUNICIPALITY _____		PROVINCE _____							
6. DESTINATION:				13	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
CITY/MUNICIPALITY _____		PROVINCE _____							
7. TRIP PURPOSE:				17	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="checkbox"/> 1. TO/FROM WORK	<input type="checkbox"/> 6. SOCIAL/RECREATION								
<input type="checkbox"/> 2. TO/FROM SCHOOL	<input type="checkbox"/> 7. VISIT RELATIVES								
<input type="checkbox"/> 3. AT WORK/BUSINESS	<input type="checkbox"/> 8. TOURISM								
<input type="checkbox"/> 4. SHOPPING	<input type="checkbox"/> 9. OTHERS								
<input type="checkbox"/> 5. MEDICAL/DENTAL									
8. NO. OF PASSENGERS: (INCLUDING DRIVER(S) & CONDUCTOR) _____		9. SEAT CAPACITY: (BUS, JEEPNEY ONLY) _____		18	<input type="text"/>	<input type="text"/>	20	<input type="text"/>	<input type="text"/>
10. COMMODITY TYPE:				22	<input type="text"/>	<input type="text"/>	24	<input type="text"/>	<input type="text"/>
NAME		QUANTITY		UNIT					
TYPE-1 _____		_____		_____					
TYPE-2 _____		_____		_____					
TYPE-3 _____		_____		_____					
11. COMMODITY WEIGHT:		12. TOTAL COMMODITY WEIGHT:		28	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TYPE-1 _____ Kg.		_____ Kg.		33	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TYPE-2 _____ Kg.		_____ Kg.		38	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
TYPE-3 _____ Kg.		_____ Kg.		43	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
13. GROSS VEHICLE WEIGHT: _____ Kg.				48	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
14. NET VEHICLE WEIGHT: _____ Kg.				53	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
15. NET LOAD CAPACITY: _____ Kg.				58	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

TABLE 2

THE ROAD IMPROVEMENT PROJECT ON THE PAN-PHILIPPINE HIGHWAY  
 BUS/JEEPNEY PASSENGER O-D SURVEY FIELD SHEET

STATION NO. \_\_\_\_\_ DATE: \_\_\_\_\_ 1986 INTERVIEWER \_\_\_\_\_

LOCATION Km. \_\_\_\_\_ NAME OF ROAD/SECTION \_\_\_\_\_

1 STATION CODE: _____		1	<input type="checkbox"/>	<b>TRIP PURPOSE</b> 1 TO/FROM WORK 2 TO/FROM SCHOOL 3 AT WORK/BUSINESS 4 SHOPPING 5 MEDICAL/DENTAL 6 SOCIAL/RECREATION 7 VISIT RELATIVES 8 TOURISM 9 OTHERS
2 HOUR: _____		4	<input type="checkbox"/>	
3 DIRECTION: From _____ To _____		6	<input type="checkbox"/>	
4 VEHICLE TYPE: <input type="checkbox"/> 1 BIG BUS (≥ 30 SEATS) <input type="checkbox"/> 2 MINI BUS (< 30 SEATS) <input type="checkbox"/> 3 JEEPNEY		7	<input type="checkbox"/>	
ORIGIN		DESTINATION		T.P.
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
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CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>
CITY/MUN.: _____ 8 <input type="checkbox"/>	PROVINCE: _____ 10 <input type="checkbox"/>	CITY/MUN.: _____ 12 <input type="checkbox"/>	PROVINCE: _____ 14 <input type="checkbox"/>	16 <input type="checkbox"/>





TABLE 4

CAR/BUS/TRUCK DRIVER INTERVIEW FORMAT

Date and Day: \_\_\_\_\_

Interviewer: \_\_\_\_\_

Vehicle Type:  Car,  Bus,  Truck

Interview Station: \_\_\_\_\_

ORIGIN : \_\_\_\_\_

Are you travelling daily/regularly?  Yes,  No

DESTINATION: \_\_\_\_\_

YOUR (DRIVER'S) OBSERVATION REGARDING TRAFFIC CONGESTION

Ranking	Name of Section/Town or Intersection	When do you usually pass?	Degree of Congestion	Needs of Improvement
			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/>
			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/>
			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/>
			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/>
			1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/> 4. <input type="checkbox"/>	1. <input type="checkbox"/> 2. <input type="checkbox"/> 3. <input type="checkbox"/>

- 1. Very congested. You are always irritated whenever you pass. Congestion is not tolerable.
- 2. Congested. Sometimes you are irritated when you pass. Sometimes congestion is not tolerable.
- 3. Slightly congested. You do not feel irritated due when you pass. Congestion is tolerable.
- 4. No congestion. You can drive comfortably.

- 1. Urgent Improvement Needed
- 2. Improvement needed, but not urgent
- 3. Improvement is not yet needed

TABLE 5

TRAFFIC/HIGHWAY ENGINEER'S OCULAR ASSESSMENT OF TRAFFIC CONDITION

- NORTH SECTION -

Date: \_\_\_\_\_

Assessor: \_\_\_\_\_

		Section/ Intersection	Passing Time	<b>A</b>	<b>B</b>	<b>C</b>
				Degree of Congestion	Needs of Improvement	What kinds of Improvement are needed?
Km 39	Expressway	Expressway Exit - Plaridel (Rural)				
Km 41		Plaridel (Urban)				
Km 41+700		Plaridel Intersection				
Km 42+500		Plaridel (Urban)				
		Plaridel-Gapan (Rural)				
Km 92		Gapan (Urban)				
Km 93+900		Gapan Intersection				
Km 95		Gapan (Urban)				
		Gapan-Sta. Rosa				
Km 106		Sta. Rosa (Urban)				
Km 107+500		Sta. Rosa Intersection				
Km 109		Sta. Rosa (Urban)				
		Sta. Rosa-Cabanatuan (Rural)				
Km 111		Cabanatuan Section (Urban)				
		Mabini Intersection				
		Burgos Intersection				
		Del Pilar Intersection				
Km 118		Cabanatuan-San Jose (Rural)				
		San Jose (Urban)				
Km 157		San Jose Intersection				
Km 159+500		San Jose (Urban)				
Km 161		San Jose-Aritao				

TABLE 6

TRAFFIC/HIGHWAY ENGINEER'S OCULAR ASSESSMENT OF TRAFFIC CONDITION  
- SOUTH SECTION -

Date: \_\_\_\_\_

Assessor: \_\_\_\_\_

			A	B	C	
		Section/ Intersection	Passing Time	Degree of Congestion	Needs of Improvement	What kinds of Improvement are needed?
Km 52	Expressway	Expressway Exit - Batangas I.S. (Kubo)				
Km 60		Batangas I.S.-I				
		Batangas I.S.-II				
		Batangas I.S.-II - Alaminos				
Km 73		Alaminos (Urban)				
Km 74		Alaminos-San Pablo				
Km 80		San Pablo (Urban)				
Km 81		San Pablo-Tiaong				
Km 92		Tiaong (Urban)				
Km 96		Tiaong-Candelaria				
Km 107		Candelaria (Urban)				
Km 108+500		Candelaria-Sariaya				
Km 120		Sariaya (Urban)				
Km 121		Sariaya-Pagbilao				
Km 140		Pagbilao (Urban)				
Km 141+500		Pagbilao-Gumaca				
Km 196		Gumaca (Urban)				
Km 197+500		Gumaca-Lopez				
Km 216		Lopez (Urban)				
Km 217	Calauag	Lopez-Calauag				

TABLE 7

<p><b>A</b> Degree of Congestion</p>	<p><b>B</b> Needs of Improvement</p>	<p><b>C</b> What kind of Improvement is needed?</p>
<ol style="list-style-type: none"> <li>1. Congestion is not tolerable. You are irritated and feel quite uncomfortable.</li> <li>2. Congestion is approaching to intolerable level. You are slightly irritated and feel uncomfortable.</li> <li>3. Congestion is tolerable. You feel uncomfortable, but not irritated.</li> <li>4. Congestion is tolerable. You are not irritated at all and feel comfortable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Urgent improvement needed.</li> <li>2. Improvement needed but not urgent.</li> <li>3. Improvement is not yet needed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Widening</li> <li>2. Bypass</li> <li>3. Signalization at Intersection</li> <li>4. Channelization at Intersection</li> <li>5. Loading/unloading Control</li> <li>6. Parking Ban</li> <li>7. Phase-out of Tri Tricycle</li> <li>8. Others (specify)</li> </ol>



APPENDIX 4-2  
EXISTING TRAFFIC FLOW  
AT SURVEY STATIONS  
(NORTH STUDY SECTION)





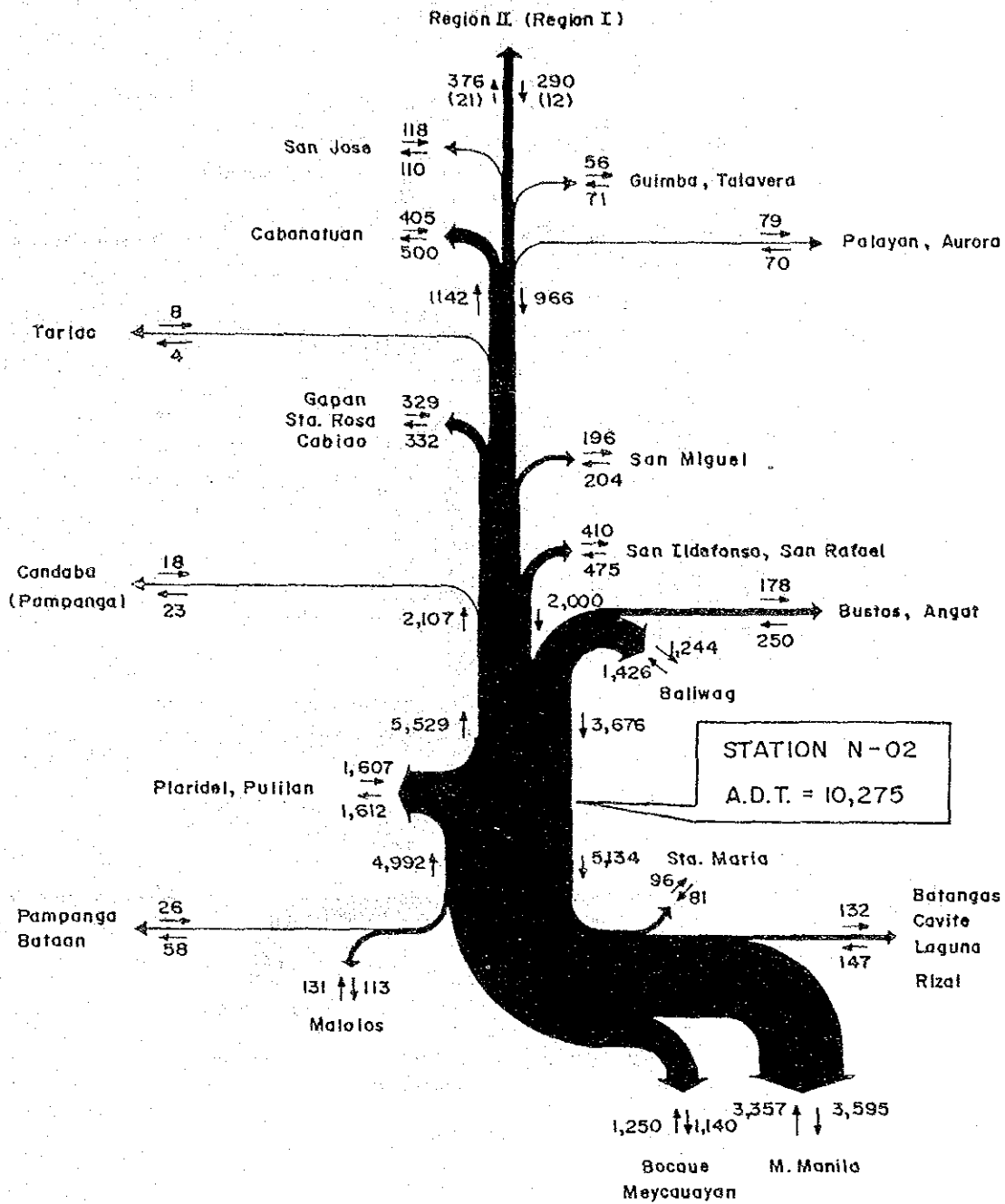
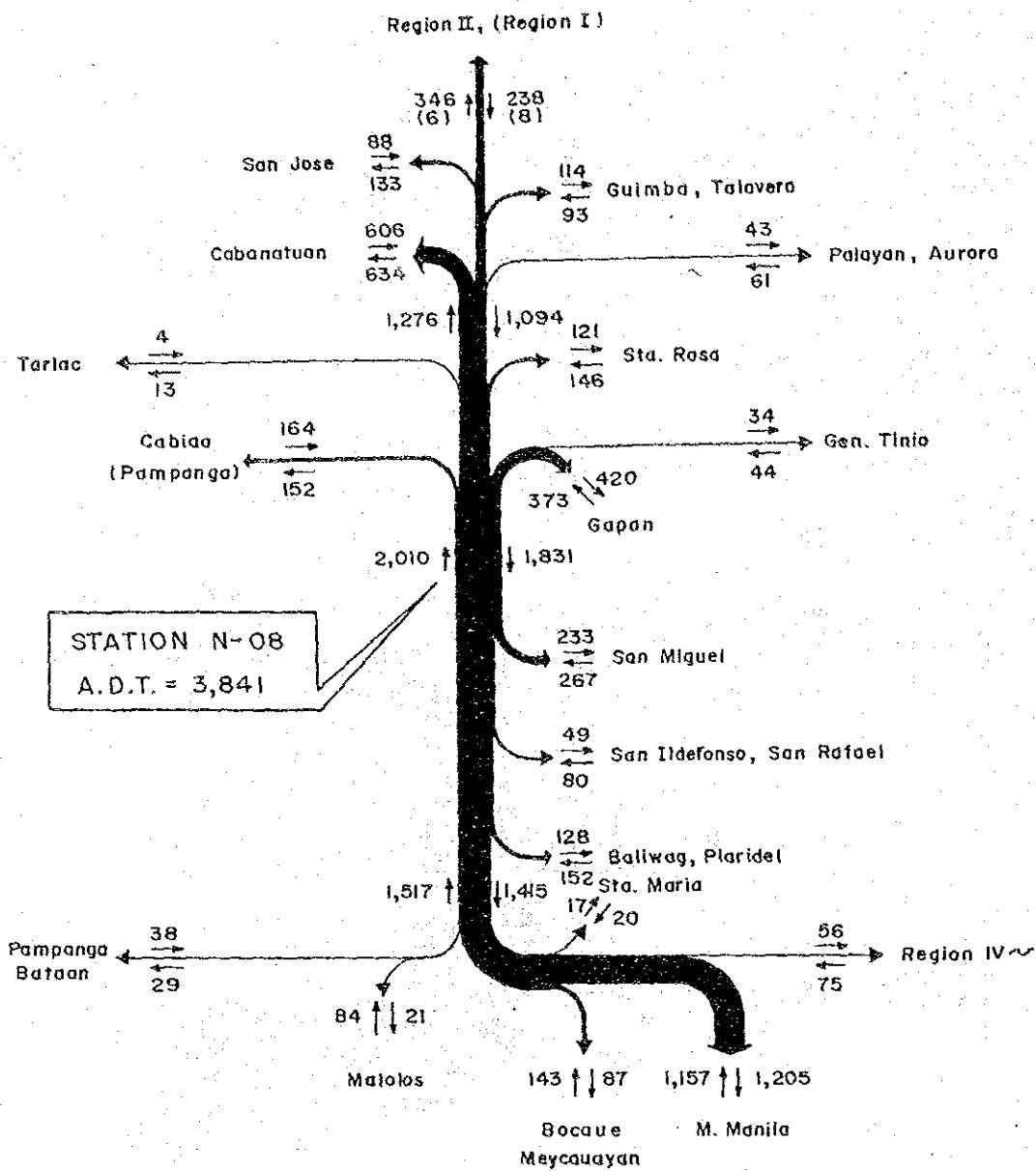


FIGURE: 1 EXISTING TRAFFIC FLOW AT STATION N-02



LEGEND :

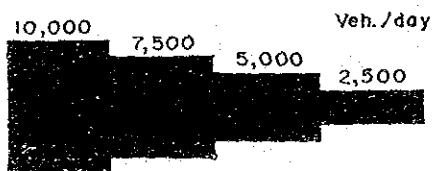


FIGURE: 2 EXISTING TRAFFIC FLOW AT STATION N-08

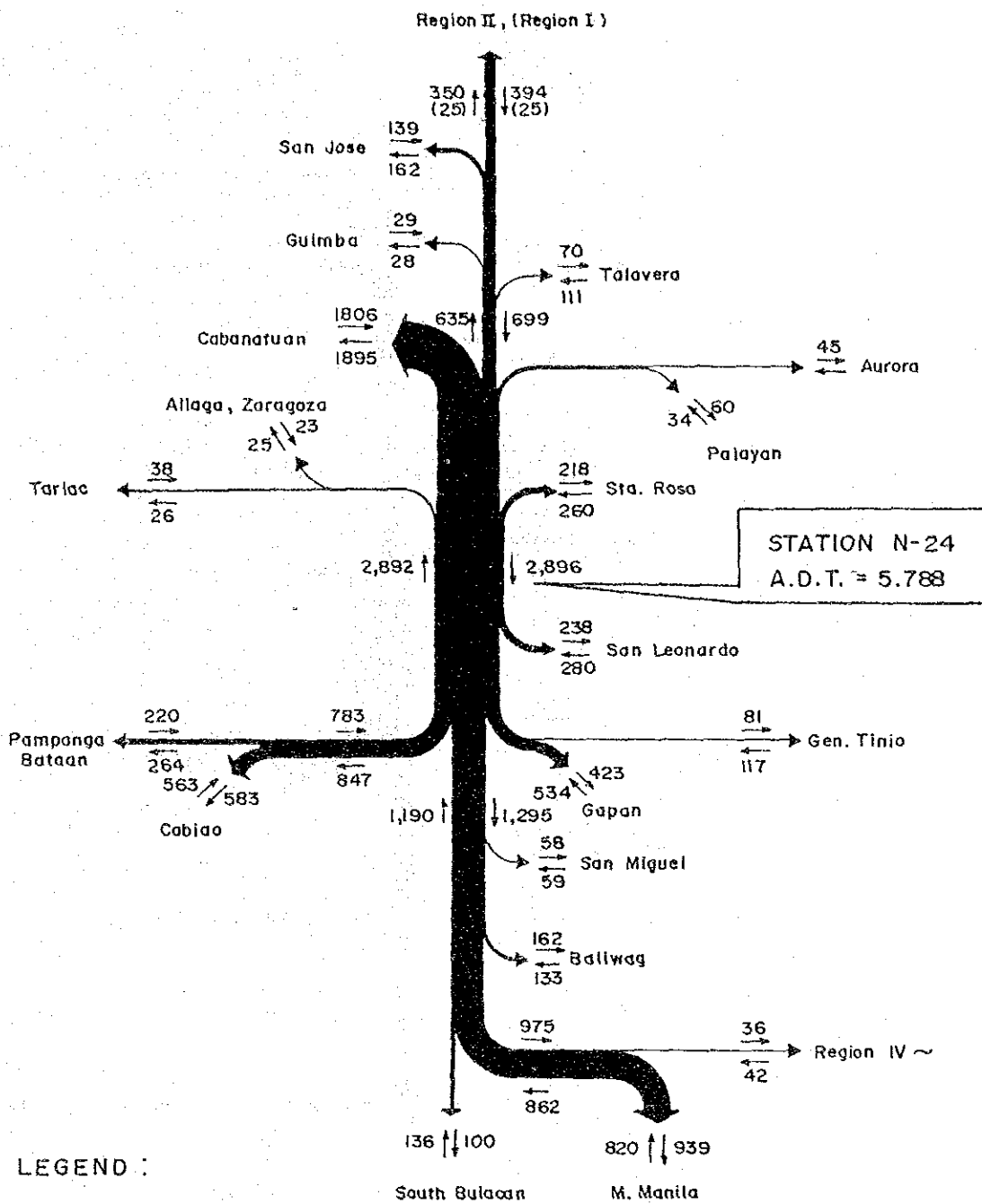


FIGURE: 3 EXISTING TRAFFIC FLOW AT STATION N-24

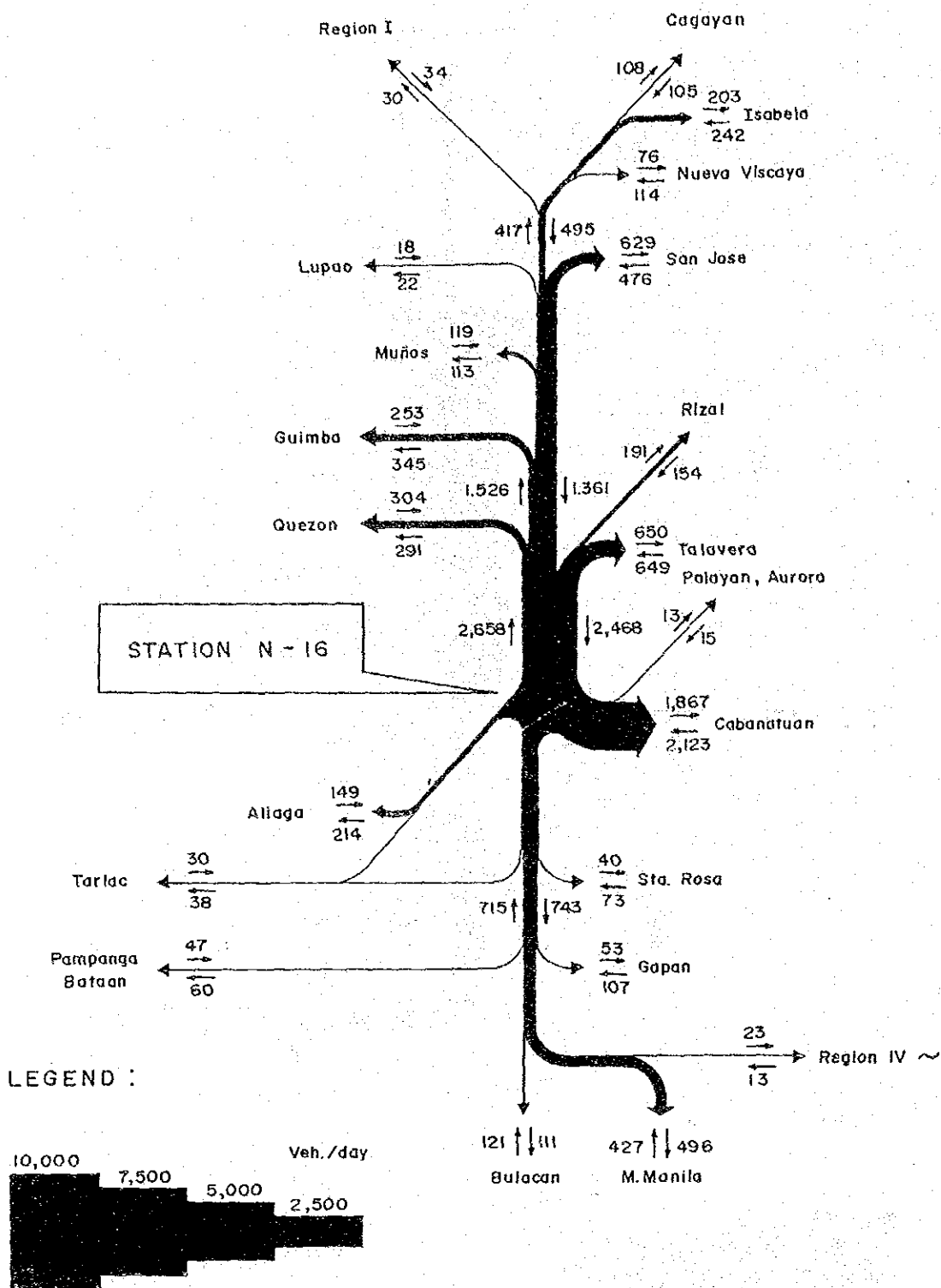


FIGURE: 4 EXISTING TRAFFIC FLOW AT STATION N-16

APPENDIX 4-3  
EXISTING TRAFFIC FLOW  
AT SURVEY STATIONS  
(SOUTH STUDY SECTION)



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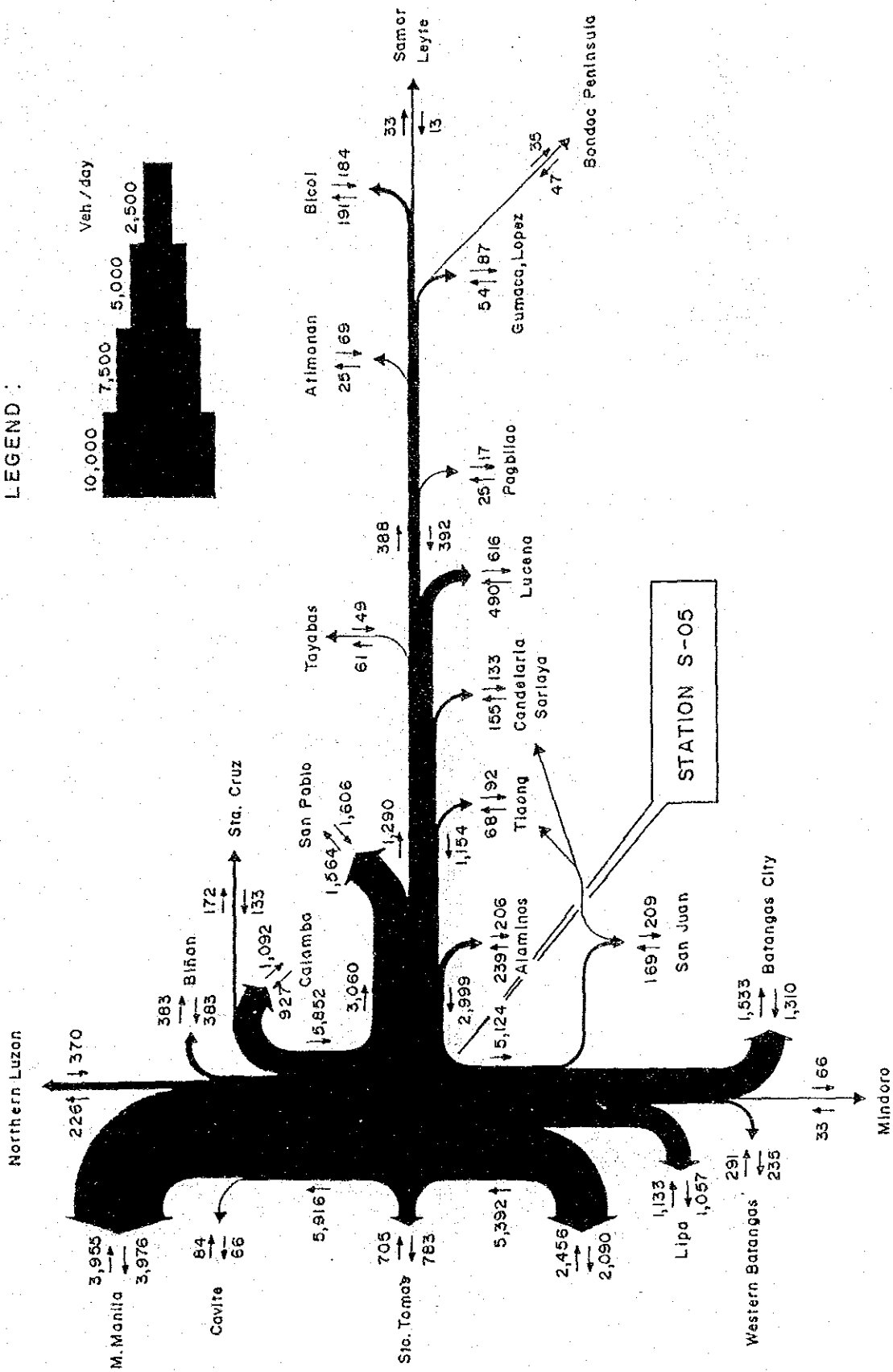
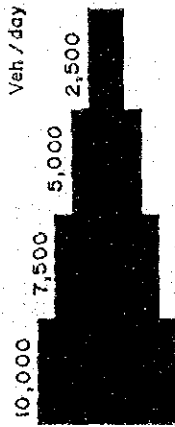


FIGURE: 1 EXISTING TRAFFIC FLOW AT STATION S-05





APPENDIX 4-4  
EXISTING COMMODITY FLOW  
AT SURVEY STATIONS  
(NORTH STUDY SECTION)



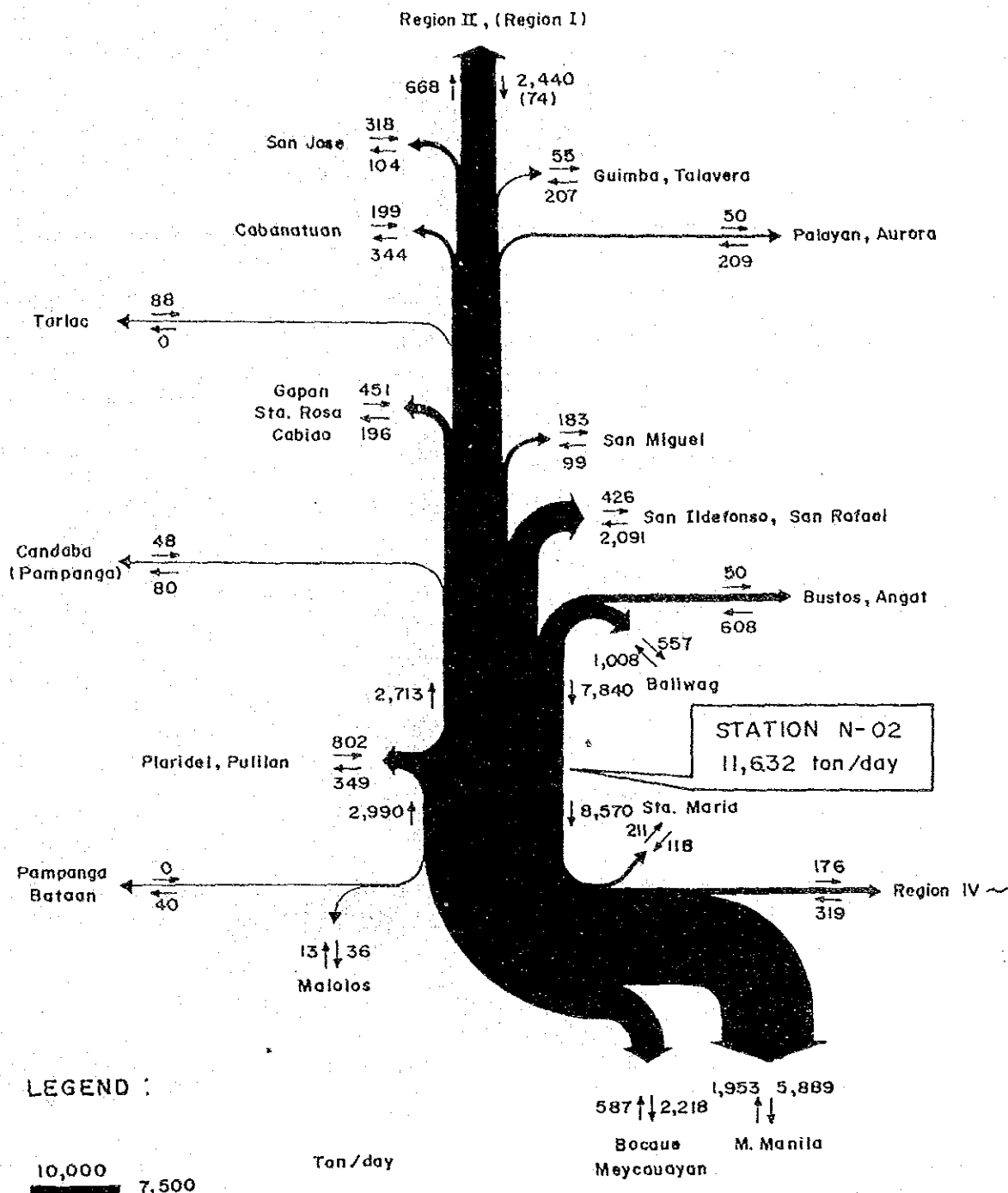


FIGURE: 1 EXISTING COMMODITY FLOW AT STATION N-02

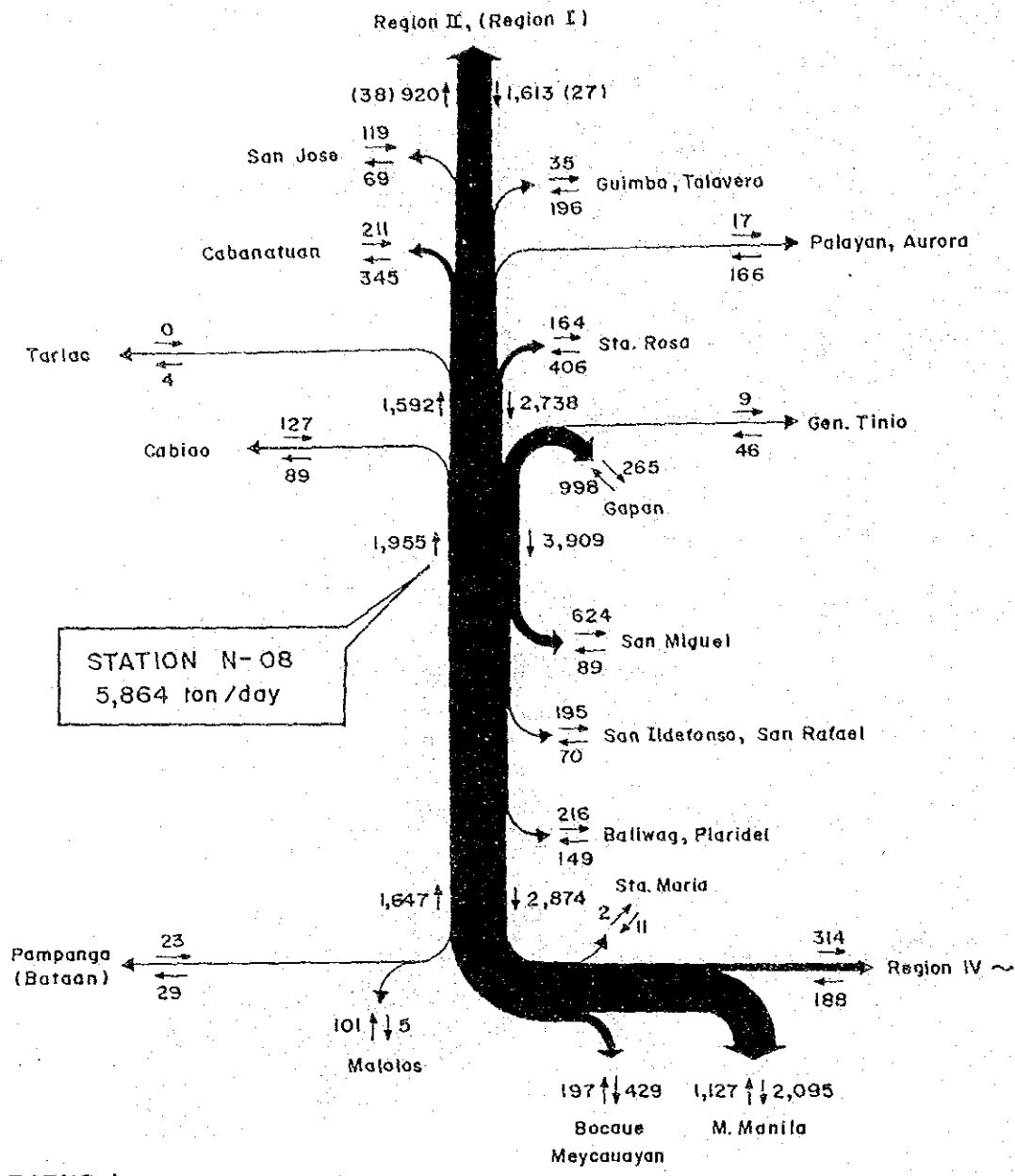


FIGURE: 2 EXISTING COMMODITY FLOW AT STATION N-08

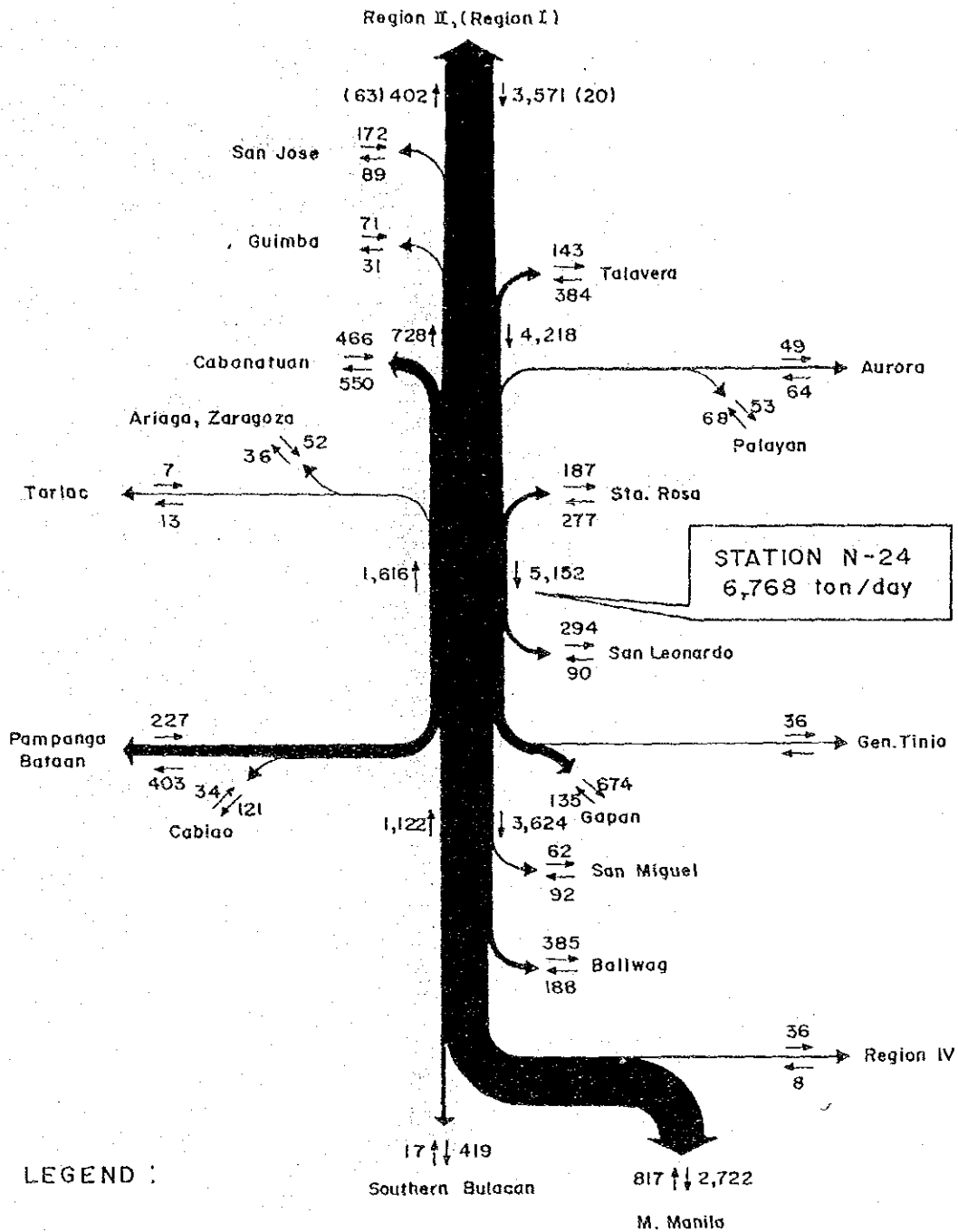


FIGURE: 3 EXISTING COMMODITY FLOW AT STATION N-24.

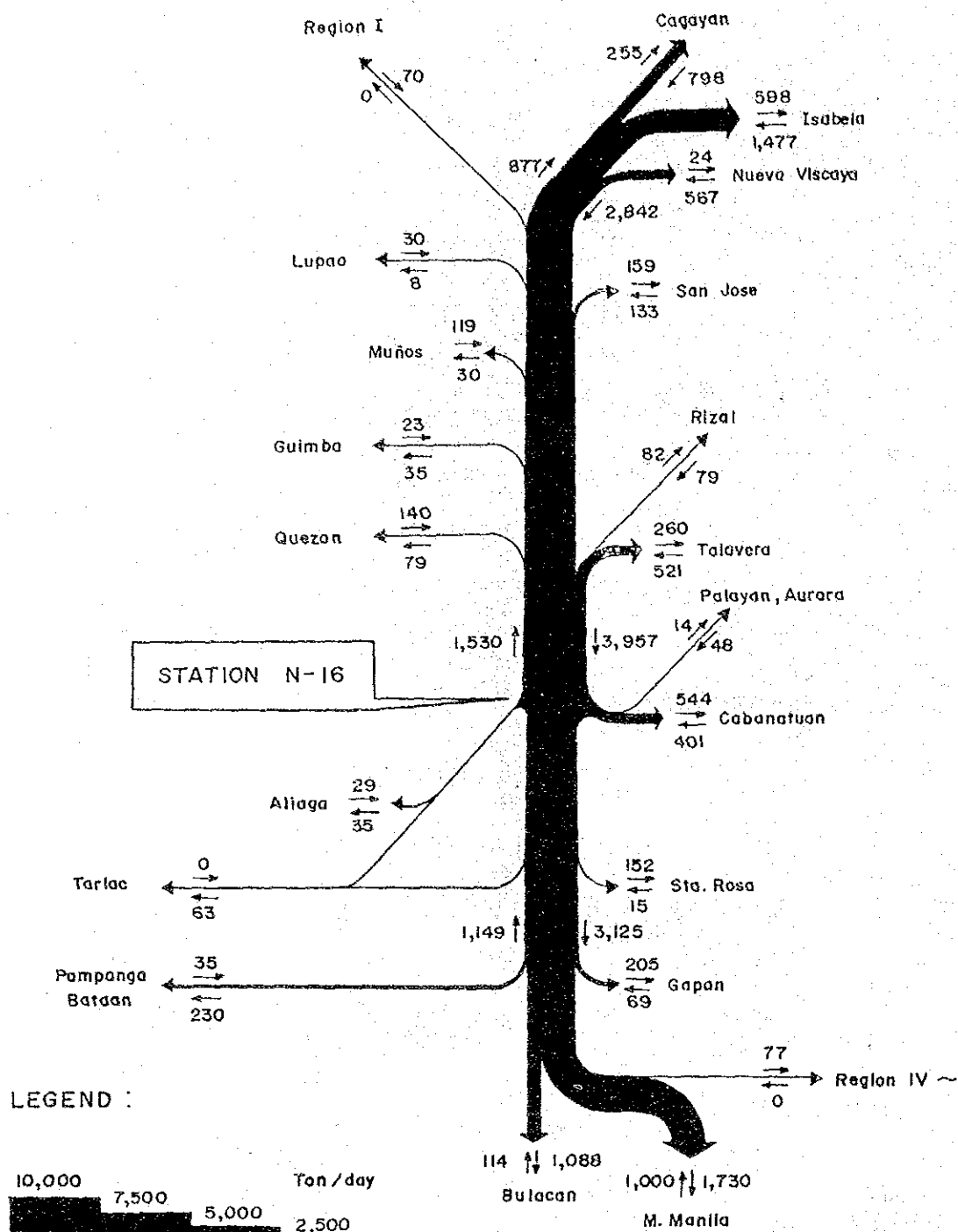


FIGURE: 4 EXISTING COMMODITY FLOW AT STATION N-16

APPENDIX 4-5  
EXISTING COMMODITY FLOW  
AT SURVEY STATIONS  
(SOUTH STUDY SECTION)





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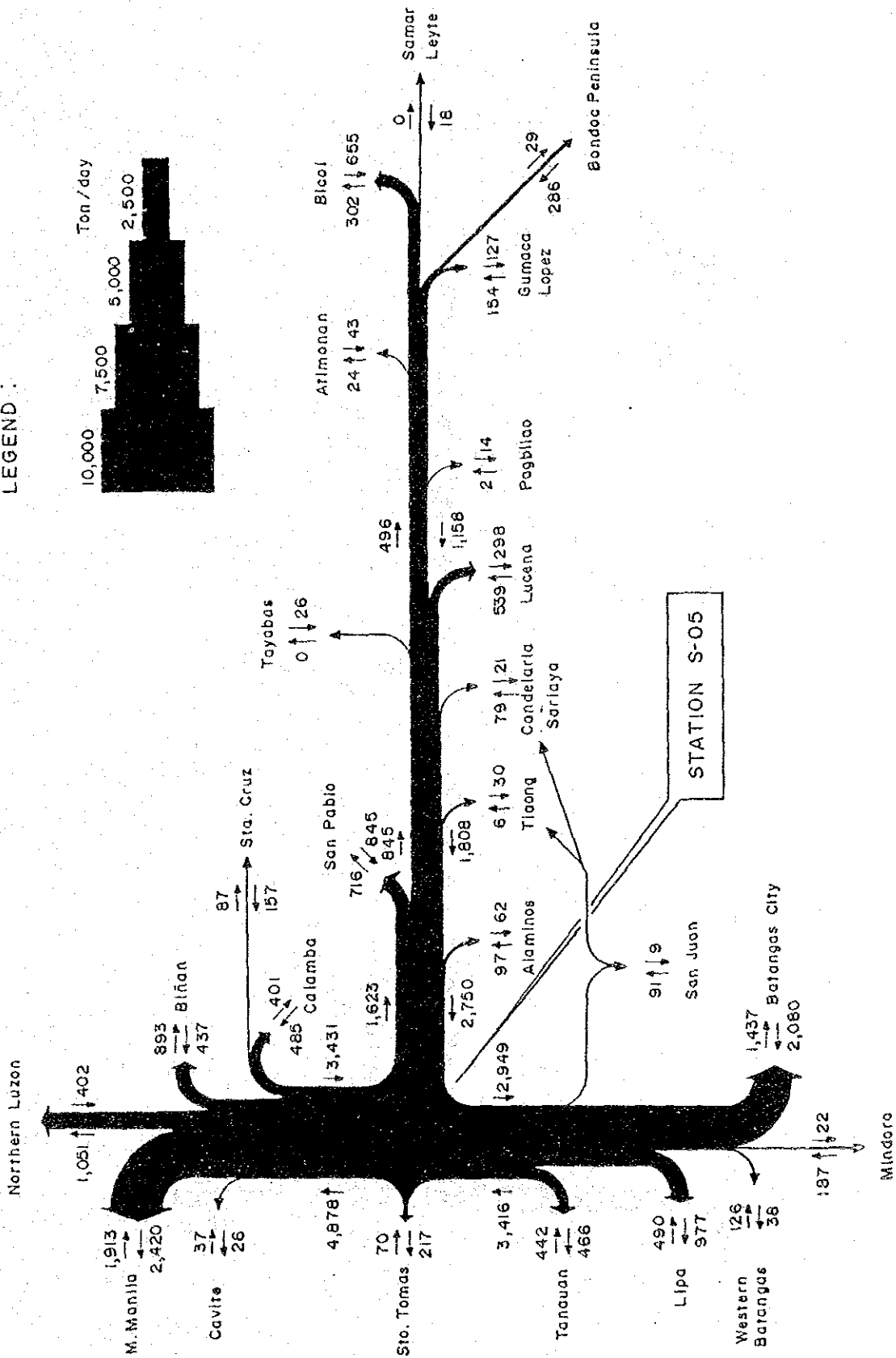


FIGURE: 1 EXISTING COMMODITY FLOW AT STATION S-05



**APPENDICES FOR  
CHAPTER 5**



APPENDIX 5-1  
PROJECTED POPULATION  
BY MUNICIPALITY



TABLE 1

P R O J E C T E D P O P U L A T I O N  
 \*\* N U E V A E C I J A \*\*

City Mun. Code	P r o j e c t e d P o p u l a t i o n					Annual Growth (%)	
	1980	1986	1990	2000	2010	1986-1990	1990-2000 2000-2010
0	14,959	18,736	21,663	29,566	37,358	3.70	3.16
1	32,349	37,331	40,871	49,699	57,141	2.29	1.97
2	32,451	36,892	39,989	47,612	53,806	2.04	1.76
3	138,298	159,465	174,489	211,927	243,422	2.28	1.96
4	37,922	44,369	49,024	60,780	70,997	2.53	2.17
5	19,891	22,613	24,511	29,184	32,980	2.04	1.76
6	39,654	45,081	48,865	58,180	65,748	2.04	1.76
7	17,169	19,204	20,592	23,963	26,579	1.76	1.53
8	60,014	70,212	77,574	96,166	112,322	2.52	2.17
9	17,388	19,768	21,427	25,511	28,830	2.04	1.76
10	23,406	26,135	27,992	32,495	35,972	1.73	1.50
11	58,847	66,650	72,065	85,350	96,039	1.97	1.71
12	39,064	44,507	48,313	57,698	65,368	2.07	1.79
13	17,729	19,362	20,433	22,991	24,811	1.36	1.19
14	14,543	16,258	17,427	20,265	22,465	1.75	1.52
15	18,652	21,735	23,951	29,527	34,331	2.46	2.12
16	23,050	25,981	28,002	32,941	36,863	1.89	1.64
17	43,211	48,683	52,453	61,662	68,964	1.88	1.63
18	7,597	8,581	9,261	10,926	12,256	1.93	1.67
19	13,916	12,760	11,985	10,551	9,325	-1.56	-1.27
20	16,753	18,641	19,918	23,008	25,366	1.67	1.45
21	20,846	23,699	25,688	30,585	34,564	2.04	1.76
22	31,407	35,231	37,850	44,226	49,217	1.81	1.57
23	42,969	48,889	53,021	63,199	71,486	2.05	1.77
24	28,550	32,457	35,182	41,888	47,337	2.04	1.76
25	64,254	71,070	75,640	86,645	94,878	1.57	1.37
26	34,706	39,837	43,459	52,449	59,932	2.20	1.90
27	32,424	37,025	40,252	48,225	54,777	2.11	1.82
28	29,013	33,230	36,289	43,754	49,958	2.19	1.89
29	62,225	73,907	82,484	104,457	124,149	2.78	2.39
30	11,734	13,340	14,460	17,216	19,456	2.04	1.76
31	24,418	27,793	30,151	35,960	40,696	2.06	1.78
Total	1,069,409	1,219,492	1,325,281	1,588,606	1,807,393	2.10	1.83
							1.30

TABLE 2  
P R O J E C T E D P O P U L A T I O N  
\*\* B U L A C A N \*\*

City Mun. Code	P r o j e c t e d P o p u l a t i o n					Annual Growth (%)		
	1980	1986	1990	2000	2010	1986-1990	1990-2000	2000-2010
0	95,699	106,526	112,051	125,381	133,693	1.27	1.13	0.64
1	24,844	28,475	30,542	35,610	39,266	1.77	1.55	0.98
2	28,654	35,166	39,476	50,676	60,445	2.93	2.53	1.78
3	70,555	82,716	90,066	108,405	122,677	2.15	1.87	1.24
4	49,693	59,206	65,163	80,232	92,494	2.43	2.10	1.43
5	34,920	41,605	45,791	56,380	64,997	2.43	2.10	1.43
6	25,739	29,441	31,534	36,661	40,329	1.73	1.52	0.96
7	45,454	51,393	54,625	62,482	67,829	1.54	1.35	0.82
8	27,751	34,038	38,195	48,992	58,399	2.92	2.52	1.77
9	73,176	81,753	86,203	96,955	103,817	1.33	1.18	0.69
10	35,069	44,966	51,973	70,970	89,037	3.69	3.16	2.29
11	83,579	99,578	109,597	134,943	155,565	2.43	2.10	1.43
12	26,032	29,926	32,161	37,654	41,661	1.82	1.59	1.02
13	39,618	47,202	51,951	63,966	73,741	2.43	2.10	1.43
14	22,679	26,685	29,126	35,237	40,043	2.21	1.92	1.29
15	26,267	30,234	32,519	38,142	42,262	1.84	1.61	1.03
16	39,121	45,809	49,840	59,887	67,678	2.13	1.85	1.23
17	38,110	45,063	49,348	60,116	68,703	2.30	1.99	1.34
18	44,931	51,156	54,625	63,094	69,040	1.65	1.45	0.90
19	90,732	129,702	161,188	256,666	365,203	5.58	4.75	3.59
20	73,113	83,931	90,115	105,299	116,317	1.79	1.57	1.00
21	36,803	43,566	47,743	58,251	66,656	2.32	2.01	1.36
22	58,748	72,233	81,188	104,500	124,916	2.96	2.56	1.80
23	4,759	5,670	6,241	7,684	8,858	2.43	2.10	1.43
Total	1,096,046	1,306,040	1,441,261	1,798,183	2,113,626	2.49	2.24	1.63



TABLE 3  
 P R O J E C T E D P O P U L A T I O N  
 \*\* L A G U N A \*\*

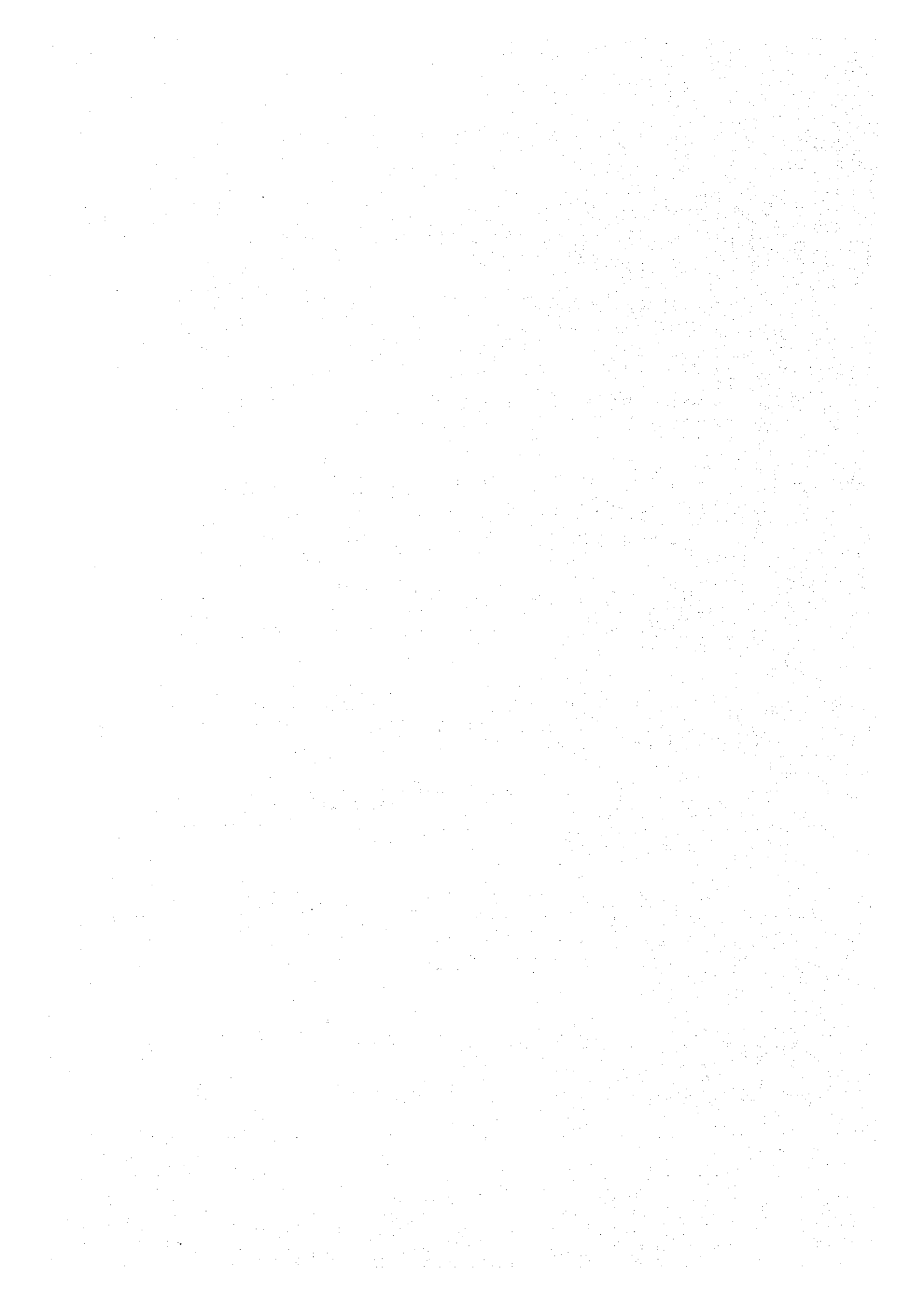
City Mun. Code	P r o j e c t e d P o p u l a t i o n				Annual Growth (%)	
	1980	1986	1990	2000	2010	1986-1990 1990-2000 2000-2010
0	60,620	72,107	80,057	98,869	113,868	2.65 2.13 1.42
1	20,615	24,077	26,408	31,785	35,845	2.34 1.87 1.21
2	22,960	27,777	31,189	39,447	46,323	2.94 2.38 1.62
3	83,684	102,194	115,468	147,983	175,663	3.10 2.51 1.73
4	46,286	56,071	63,015	79,849	93,912	2.96 2.40 1.64
5	121,175	150,927	172,789	227,687	276,484	3.44 2.80 1.96
6	25,259	28,728	30,957	35,896	39,270	1.89 1.49 0.90
7	13,222	15,199	16,495	19,414	21,499	2.07 1.64 1.03
8	5,241	6,191	6,841	8,366	9,558	2.53 2.03 1.34
9	10,247	12,413	13,951	17,677	20,791	2.40 2.40 1.64
10	17,436	19,860	21,421	24,889	27,273	1.91 1.51 0.92
11	49,555	60,311	67,991	86,720	102,540	3.04 2.46 1.69
12	12,199	13,821	14,855	17,133	18,660	1.82 1.44 0.86
13	17,360	20,386	22,440	27,217	30,386	2.43 1.95 1.27
14	8,543	10,349	11,631	14,738	17,333	2.96 2.40 1.64
15	10,433	12,639	14,204	17,998	21,168	2.96 2.40 1.64
16	13,699	15,340	16,360	18,560	19,946	1.62 1.27 0.72
17	30,637	35,595	38,904	46,480	52,103	2.25 1.80 1.15
18	16,383	18,931	20,617	24,445	27,233	2.16 1.72 1.09
19	19,489	23,462	26,259	32,984	38,517	2.86 2.31 1.56
20	9,048	10,289	11,085	12,849	14,052	1.88 1.49 0.90
21	10,519	12,650	14,147	17,741	20,690	2.84 2.29 1.55
22	20,962	25,393	28,538	36,162	42,531	2.96 2.40 1.64
23	7,510	9,097	10,224	12,956	15,237	2.96 2.40 1.63
24	131,655	152,792	166,876	199,069	222,875	2.23 1.78 1.14
25	74,556	104,839	130,137	203,512	284,305	5.55 4.57 3.40
26	15,744	18,029	19,516	22,847	25,190	2.00 1.59 0.98
27	64,325	78,213	88,117	112,242	132,575	3.03 2.45 1.68
28	17,220	20,860	23,444	29,707	34,939	2.96 2.40 1.64
29	16,522	18,655	20,005	27,371	31,708	1.76 3.18 1.48
Total	973,104	1,177,195	1,323,941	1,692,593	2,012,974	2.98 2.49 1.75

TABLE 4  
 P R O J E C T E D P O P U L A T I O N  
 \*\* B A T A N G A S \*\*

City Mun. Code	P r o j e c t e d P o p u l a t i o n				Annual Growth (%)			
	1980	1986	1990	2000	2010	1986-1990	1990-2000	2000-2010
0	143,570	165,055	180,687	218,179	249,441	2.29	1.90	1.35
1	16,143	18,538	20,369	24,650	28,232	2.31	1.93	1.37
2	14,500	16,920	18,708	23,070	26,833	2.54	2.12	1.52
3	43,486	49,643	54,090	64,669	73,339	2.17	1.80	1.27
4	8,698	9,530	10,104	11,402	12,335	1.47	1.22	0.79
5	43,560	49,780	54,278	64,990	73,792	2.19	1.82	1.28
6	36,508	42,225	46,410	56,516	65,063	2.39	1.99	1.42
7	27,578	32,038	35,318	43,278	50,078	2.47	2.05	1.47
8	17,109	19,232	20,740	24,263	27,032	1.91	1.58	1.09
9	25,875	29,313	31,776	37,582	42,246	2.04	1.69	1.18
10	17,889	21,199	23,681	29,842	35,330	2.31	2.34	1.70
11	42,783	48,932	53,382	63,991	72,727	2.20	1.83	1.29
12	26,091	29,539	32,007	37,822	42,486	2.03	1.68	1.17
13	121,166	138,873	151,716	182,406	207,809	2.24	1.86	1.31
14	24,333	27,773	30,253	36,167	41,008	2.17	1.80	1.25
15	23,637	26,903	29,254	34,823	39,361	2.12	1.76	1.23
16	18,028	20,577	22,418	26,796	30,382	2.17	1.80	1.26
17	12,057	13,644	14,780	17,455	19,597	2.02	1.68	1.16
18	59,405	68,821	75,726	92,433	106,615	2.42	2.01	1.44
19	19,591	22,133	23,948	28,214	31,615	1.99	1.65	1.14
20	55,768	62,890	67,967	81,753	93,173	1.96	1.86	1.32
21	28,743	32,131	34,523	40,073	44,362	1.81	1.50	1.02
22	60,829	68,408	73,795	88,206	100,012	1.91	1.80	1.26
23	17,991	20,535	22,372	26,741	30,320	2.17	1.80	1.26
24	10,511	12,264	13,559	16,717	19,440	2.54	2.12	1.52
25	26,221	30,193	33,088	40,044	45,866	2.32	1.93	1.37
26	11,134	12,288	13,091	14,924	16,280	1.59	1.32	0.87
27	43,010	49,598	54,406	65,977	75,697	2.34	1.95	1.38
28	26,699	31,674	35,407	40,841	44,981	2.82	1.44	0.97
29	19,447	22,363	24,485	29,575	33,822	2.29	1.91	1.35
30	74,020	82,173	87,891	101,036	110,971	1.69	1.40	0.94
31	19,370	22,109	24,087	28,790	32,644	2.17	1.80	1.26
32	13,381	15,129	16,379	19,320	21,669	2.00	1.67	1.15
33	25,070	28,680	31,293	37,523	42,657	2.20	1.83	1.29
Total	1,174,201	1,341,158	1,461,993	1,750,073	1,987,215	2.18	1.81	1.28

TABLE 5  
 P R O J E C T E D P O P U L A T I O N  
 \*\* Q U E Z O N \*\*

City Nun. Code	P r o j e c t e d P o p u l a t i o n				Annual Growth (%)			
	1980	1986	1990	2000	2010	1986-1990	1990-2000	2000-2010
0	107,880	129,821	144,852	183,268	217,600	2.78	2.38	1.73
1	7,389	8,155	8,590	9,623	10,346	1.31	1.14	0.73
2	11,385	12,984	13,977	16,394	18,300	1.86	1.61	1.11
3	39,894	44,853	47,828	54,988	60,384	1.62	1.40	0.94
5	16,246	18,960	20,728	25,117	28,790	2.25	1.94	1.37
6	14,388	16,898	18,125	21,112	23,430	1.77	1.54	1.05
7	57,907	65,603	70,312	81,713	90,520	1.75	1.51	1.03
8	54,629	63,930	70,016	85,170	97,932	2.30	1.98	1.41
10	42,121	48,864	53,206	63,932	72,779	2.15	1.85	1.30
15	15,352	18,155	20,023	24,719	28,768	2.48	2.13	1.53
16	16,526	19,035	20,627	24,535	27,701	2.03	1.75	1.22
17	12,127	13,656	14,577	16,796	18,478	1.65	1.43	0.96
18	29,174	33,548	36,315	43,098	48,568	2.00	1.73	1.20
19	42,143	47,728	51,143	59,406	65,784	1.74	1.51	1.03
20	27,814	32,461	35,487	43,002	49,290	2.25	1.94	1.37
21	3,972	4,369	4,592	5,119	5,488	1.25	1.09	0.70
22	58,422	66,284	71,111	82,811	91,891	1.77	1.53	1.05
23	25,826	30,441	33,500	41,166	47,728	2.42	2.08	1.49
24	17,167	20,008	21,853	26,430	30,248	2.23	1.92	1.36
26	37,814	44,131	48,245	58,462	67,012	2.25	1.94	1.37
27	31,701	38,147	42,562	53,847	63,935	2.78	2.38	1.73
28	14,078	16,113	17,388	20,501	22,979	1.92	1.66	1.15
29	31,681	36,244	39,099	46,066	51,606	1.91	1.65	1.14
30	7,885	8,868	9,459	10,881	11,954	1.62	1.41	0.94
31	7,456	9,308	10,643	14,181	17,566	3.41	2.91	2.16
32	7,551	9,106	10,175	12,912	15,369	2.81	2.41	1.76
33	15,825	18,469	20,190	24,466	28,044	2.25	1.94	1.37
34	6,386	7,113	7,537	8,551	9,289	1.46	1.27	0.83
35	20,565	23,073	24,570	28,167	30,857	1.58	1.38	0.92
36	10,734	11,711	12,241	13,492	14,314	1.11	0.98	0.59
37	14,463	16,814	18,334	22,097	25,216	2.19	1.88	1.33
38	9,365	10,430	11,052	12,539	13,621	1.46	1.27	0.83
39	17,822	21,137	23,357	28,953	33,809	2.53	2.17	1.56
40	17,701	20,658	22,584	27,366	31,369	2.25	1.94	1.37
41	33,928	46,896	57,390	88,301	123,054	5.18	4.40	3.37
43	28,958	36,453	41,914	56,508	70,673	3.55	3.03	2.26
44	74,148	86,902	95,271	116,136	133,765	2.33	2.00	1.42
45	31,381	31,976	31,932	31,973	31,371	-0.03	0.01	-0.19
46	42,137	49,552	54,447	66,688	77,118	2.38	2.05	1.46
47	48,606	56,726	62,014	75,147	86,137	2.25	1.94	1.37
48	18,230	20,808	22,413	26,322	29,411	1.87	1.62	1.12
Total	1,129,277	1,316,383	1,439,679	1,751,955	2,022,494	2.26	1.98	1.45



APPENDIX 5-2  
TRAFFIC GROWTH RATE BY  
VEHICLE TYPE



TABLE 1

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
( C A R )

SEC.	TRAFFIC VOLUME (Vol/day)				ANNUAL GROWTH RATE (%)			
	1986	1990	2000	2010	1986-90	1990-00	2000-10	1986-10
N- 1	5248.	6486.	11903.	21840.	5.44	6.26	6.26	6.12
N- 2	5422.	6705.	12315.	22602.	5.45	6.27	6.26	6.13
N- 3	5911.	7334.	13558.	24906.	5.54	6.34	6.27	6.18
N- 4	2357.	2902.	5318.	9717.	5.34	6.24	6.21	6.08
N- 5	2756.	3394.	6229.	11381.	5.34	6.26	6.21	6.09
N- 6	2398.	2949.	5408.	9885.	5.31	6.25	6.22	6.08
N- 7	2398.	2946.	5407.	9889.	5.28	6.26	6.22	6.08
N- 8	2398.	2948.	5399.	9839.	5.30	6.24	6.19	6.06
N- 9	2230.	2733.	5031.	9207.	5.22	6.29	6.23	6.09
N-10	2230.	2735.	5030.	9189.	5.24	6.28	6.21	6.08
N-11	1930.	2366.	4364.	8002.	5.22	6.31	6.25	6.11
N-12	2759.	3422.	6405.	11896.	5.53	6.47	6.39	6.28
N-13	3761.	4696.	8862.	16572.	5.71	6.56	6.46	6.37
N-14	2824.	3489.	6489.	12000.	5.43	6.40	6.34	6.21
N-15	2770.	3417.	6338.	11693.	5.39	6.37	6.32	6.18
N-16	3524.	4362.	8106.	14976.	5.48	6.39	6.33	6.21
N-17	3708.	4597.	8542.	15798.	5.52	6.39	6.34	6.23
N-18	6144.	7672.	14374.	26752.	5.71	6.48	6.41	6.32
N-19	3904.	4884.	9210.	17165.	5.76	6.55	6.42	6.37
N-20	3886.	4838.	9065.	16859.	5.63	6.48	6.40	6.31
N-21	2121.	2614.	4866.	9000.	5.36	6.41	6.34	6.21
N-22	2052.	2528.	4708.	8704.	5.35	6.42	6.34	6.21
N-23	3054.	3783.	7061.	13102.	5.50	6.44	6.38	6.26
N-24	1130.	1387.	2584.	4760.	5.26	6.42	6.30	6.18
N-25	983.	1209.	2246.	4129.	5.31	6.39	6.28	6.16
N-26	1037.	1274.	2360.	4328.	5.28	6.36	6.25	6.13
N-27	983.	1207.	2239.	4107.	5.27	6.37	6.25	6.14
N-28	2175.	2683.	4923.	8981.	5.39	6.26	6.20	6.09
N-29	2221.	2743.	5014.	9124.	5.42	6.22	6.17	6.06
N-30	600.	750.	1448.	2756.	5.74	6.80	6.65	6.56
N-31	600.	750.	1448.	2756.	5.74	6.80	6.65	6.56
S- 1	7945.	9854.	18075.	33169.	5.53	6.25	6.26	6.14
S- 2	6074.	7484.	13389.	23977.	5.36	5.99	6.00	5.89
S- 3	4086.	5024.	9106.	16509.	5.30	6.13	6.13	5.99
S- 4	3462.	4255.	7751.	14116.	5.29	6.18	6.18	6.03
S- 5	3711.	4559.	8305.	15124.	5.28	6.18	6.18	6.03
S- 6	3000.	3693.	6701.	12087.	5.33	6.14	6.08	5.98
S- 7	2000.	2449.	4488.	8208.	5.19	6.24	6.22	6.06
S- 8	2450.	3008.	5508.	10061.	5.26	6.24	6.21	6.06
S- 9	2000.	2451.	4489.	8215.	5.22	6.24	6.23	6.06
S-10	2613.	3211.	5878.	10740.	5.29	6.23	6.21	6.07
S-11	2100.	2572.	4716.	8636.	5.20	6.25	6.24	6.07
S-12	2540.	3112.	5705.	10445.	5.21	6.25	6.23	6.07
S-13	2124.	2601.	4765.	8735.	5.20	6.24	6.25	6.07
S-14	1961.	2405.	4406.	8082.	5.23	6.24	6.25	6.08
S-15	433.	513.	951.	1759.	4.33	6.37	6.34	6.02
S-16	1306.	1620.	3045.	5676.	5.53	6.51	6.43	6.31
S-17	1306.	1581.	2825.	5054.	4.89	5.98	5.99	5.80
S-18	757.	909.	1633.	2942.	4.68	6.03	6.06	5.82
S-19	574.	687.	1233.	2222.	4.60	6.02	6.07	5.80
S-20	1221.	1478.	2616.	4643.	4.89	5.88	5.90	5.72
S-21	574.	697.	1243.	2220.	4.97	5.96	5.97	5.80
S-22	833.	1014.	1796.	3188.	5.04	5.88	5.91	5.75
S-23	490.	593.	1052.	1875.	4.89	5.90	5.95	5.75
S-24	490.	590.	1040.	1844.	4.75	5.83	5.89	5.68

TABLE 2

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
(JEEPNEY)

SEC.	TRAFFIC VOLUME (Vol./day)				ANNUAL GROWTH RATE (%)			
	1986	1990	2000	2010	1986-90	1990-00	2000-10	1986-10
N- 1	1954.	2343.	3832.	6120.	4.64	5.04	4.79	4.87
N- 2	3236.	3972.	6433.	10359.	5.26	4.94	4.88	4.97
N- 3	4499.	5665.	9113.	14847.	5.93	4.87	5.00	5.10
N- 4	635.	759.	1259.	2030.	4.56	5.19	4.89	4.96
N- 5	1660.	1987.	3268.	5245.	4.60	5.10	4.84	4.91
N- 6	1611.	1928.	3171.	5090.	4.59	5.10	4.85	4.91
N- 7	1611.	1927.	3171.	5091.	4.58	5.11	4.85	4.91
N- 8	1611.	1915.	3108.	4928.	4.42	4.96	4.72	4.77
N- 9	640.	759.	1238.	1966.	4.36	5.01	4.73	4.79
N-10	640.	760.	1238.	1965.	4.39	5.00	4.73	4.79
N-11	89.	103.	177.	285.	3.72	5.56	4.88	4.97
N-12	736.	897.	1540.	2568.	5.07	5.55	5.25	5.35
N-13	1209.	1477.	2535.	4235.	5.13	5.55	5.27	5.36
N-14	1450.	1759.	2980.	4926.	4.95	5.41	5.15	5.23
N-15	1089.	1315.	2212.	3633.	4.83	5.34	5.09	5.15
N-16	2412.	2914.	4874.	7983.	4.84	5.28	5.06	5.11
N-17	2842.	3437.	5740.	9398.	4.87	5.26	5.05	5.11
N-18	2634.	3193.	5369.	8832.	4.93	5.33	5.10	5.17
N-19	732.	885.	1494.	2459.	4.86	5.38	5.11	5.18
N-20	3469.	4198.	7031.	11532.	4.88	5.29	5.07	5.13
N-21	1685.	2033.	3388.	5532.	4.81	5.24	5.03	5.08
N-22	1674.	2019.	3365.	5496.	4.80	5.24	5.03	5.08
N-23	1621.	1955.	3260.	5323.	4.80	5.25	5.03	5.08
N-24	1731.	2087.	3475.	5676.	4.79	5.23	5.03	5.07
N-25	1141.	1372.	2266.	3674.	4.72	5.15	4.95	4.99
N-26	371.	446.	738.	1198.	4.71	5.17	4.96	5.01
N-27	1141.	1367.	2241.	3612.	4.62	5.07	4.89	4.92
N-28	1908.	2282.	3723.	5980.	4.58	5.02	4.85	4.88
N-29	1794.	2140.	3468.	5544.	4.51	4.95	4.80	4.81
N-30	751.	930.	1641.	2829.	5.49	5.84	5.60	5.68
N-31	751.	930.	1641.	2829.	5.49	5.84	5.60	5.68
S- 1	1092.	1337.	2265.	3736.	5.19	5.41	5.13	5.26
S- 2	170.	202.	331.	524.	4.41	5.06	4.70	4.80
S- 3	1226.	1466.	2354.	3698.	4.57	4.85	4.62	4.71
S- 4	979.	1171.	1882.	2955.	4.58	4.86	4.61	4.71
S- 5	436.	522.	839.	1318.	4.60	4.86	4.62	4.72
S- 6	700.	839.	1359.	2131.	4.63	4.94	4.60	4.75
S- 7	700.	841.	1384.	2223.	4.69	5.11	4.85	4.93
S- 8	1027.	1236.	2030.	3261.	4.74	5.09	4.85	4.93
S- 9	700.	841.	1384.	2223.	4.69	5.11	4.85	4.93
S-10	1128.	1360.	2254.	3643.	4.79	5.18	4.92	5.01
S-11	680.	840.	1370.	2222.	5.42	5.01	4.95	5.06
S-12	1600.	1935.	3201.	5181.	4.87	5.16	4.93	5.02
S-13	682.	827.	1383.	2253.	4.94	5.28	5.00	5.11
S-14	632.	767.	1285.	2098.	4.96	5.30	5.02	5.13
S-15								
S-16	1060.	1301.	2217.	3677.	5.26	5.47	5.19	5.32
S-17	1060.	1254.	1980.	3086.	4.29	4.67	4.54	4.55
S-18	152.	178.	282.	435.	4.03	4.71	4.43	4.48
S-19	395.	462.	718.	1101.	3.99	4.51	4.37	4.36
S-20	524.	617.	969.	1500.	4.17	4.62	4.47	4.48
S-21	395.	466.	731.	1133.	4.22	4.61	4.48	4.49
S-22	368.	435.	682.	1059.	4.27	4.60	4.50	4.50
S-23	214.	251.	389.	598.	4.07	4.48	4.39	4.38
S-24	214.	249.	381.	579.	3.86	4.35	4.27	4.23



TABLE 3

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
( B U S )

SEC.	TRAFFIC VOLUME (Vol/day)				ANNUAL GROWTH RATE (%)			
	1986	1990	2000	2010	1986-90	1990-00	2000-10	1985-10
N- 1	825.	982.	1570.	2456.	4.45	4.80	4.58	4.65
N- 2	810.	974.	1558.	2436.	4.72	4.81	4.57	4.70
N- 3	804.	957.	1527.	2385.	4.45	4.78	4.56	4.64
N- 4	461.	548.	876.	1370.	4.42	4.80	4.57	4.64
N- 5	826.	985.	1587.	2502.	4.50	4.89	4.66	4.73
N- 6	695.	827.	1329.	2088.	4.44	4.86	4.62	4.69
N- 7	695.	827.	1329.	2088.	4.44	4.86	4.62	4.69
N- 8	695.	827.	1324.	2077.	4.44	4.82	4.61	4.67
N- 9	595.	707.	1132.	1771.	4.41	4.82	4.58	4.65
N-10	595.	707.	1134.	1776.	4.41	4.84	4.59	4.66
N-11	551.	655.	1049.	1642.	4.42	4.82	4.58	4.66
N-12	593.	706.	1137.	1790.	4.46	4.88	4.64	4.71
N-13	635.	758.	1226.	1938.	4.53	4.93	4.69	4.76
N-14	611.	728.	1197.	1920.	4.48	5.10	4.84	4.89
N-15	587.	699.	1148.	1840.	4.46	5.09	4.83	4.88
N-16	604.	720.	1181.	1892.	4.49	5.07	4.83	4.87
N-17	641.	774.	1270.	2036.	4.83	5.08	4.83	4.93
N-18	687.	820.	1348.	2164.	4.52	5.10	4.85	4.90
N-19	229.	274.	446.	714.	4.59	4.99	4.82	4.85
N-20	742.	896.	1485.	2414.	4.83	5.18	4.98	5.04
N-21	652.	786.	1301.	2112.	4.78	5.17	4.96	5.02
N-22	479.	576.	946.	1529.	4.72	5.09	4.92	4.96
N-23	384.	460.	753.	1211.	4.62	5.05	4.87	4.90
N-24	282.	347.	564.	905.	5.32	4.98	4.84	4.98
N-25	268.	318.	518.	827.	4.37	5.00	4.79	4.81
N-26	191.	235.	381.	610.	5.32	4.95	4.82	4.96
N-27	268.	318.	518.	827.	4.37	5.00	4.79	4.81
N-28	233.	285.	463.	740.	5.17	4.97	4.80	4.93
N-29	239.	286.	463.	738.	4.59	4.94	4.77	4.81
N-30	208.	252.	419.	686.	4.91	5.22	5.05	5.10
N-31	208.	252.	419.	686.	4.91	5.22	5.05	5.10
S- 1	1164.	1407.	2325.	3745.	4.85	5.15	4.88	4.99
S- 2	297.	359.	596.	960.	4.85	5.20	4.88	5.01
S- 3	467.	563.	934.	1507.	4.78	5.19	4.90	5.00
S- 4	475.	576.	955.	1540.	4.94	5.19	4.89	5.02
S- 5	682.	824.	1356.	2171.	4.84	5.11	4.82	4.94
S- 6	500.	603.	1002.	1617.	4.79	5.21	4.90	5.01
S- 7	500.	604.	1005.	1628.	4.84	5.22	4.94	5.04
S- 8	464.	560.	934.	1514.	4.81	5.25	4.95	5.05
S- 9	500.	604.	1005.	1628.	4.84	5.22	4.94	5.04
S-10	622.	751.	1246.	2016.	4.82	5.19	4.93	5.02
S-11	530.	647.	1065.	1725.	5.11	5.11	4.94	5.04
S-12	489.	591.	984.	1595.	4.85	5.23	4.95	5.05
S-13	531.	642.	1067.	1729.	4.86	5.21	4.95	5.04
S-14	527.	640.	1071.	1748.	4.98	5.28	5.02	5.12
S-15	83.	98.	163.	262.	4.24	5.22	4.86	4.91
S-16	534.	652.	1103.	1815.	5.12	5.40	5.11	5.23
S-17	534.	634.	1013.	1591.	4.38	4.80	4.62	4.65
S-18	445.	527.	838.	1312.	4.32	4.75	4.58	4.61
S-19	236.	280.	451.	711.	4.37	4.88	4.66	4.70
S-20	369.	438.	700.	1099.	4.38	4.80	4.61	4.65
S-21	236.	281.	452.	715.	4.46	4.87	4.69	4.73
S-22	260.	309.	497.	785.	4.41	4.87	4.69	4.71
S-23	254.	301.	480.	755.	4.34	4.78	4.63	4.64
S-24	254.	300.	474.	742.	4.25	4.68	4.58	4.57

TABLE 4

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
( TRUCK )

SEC.	TRAFFIC VOLUME (Vol/day)				ANNUAL GROWTH RATE (%)			
	1986	1990	2000	2010	1986-90	1990-00	2000-10	2010-10
N-1	2248.	2813.	4907.	8830.	5.77	5.72	6.05	5.87
N-2	2143.	2334.	4064.	7304.	2.16	5.70	6.04	5.24
N-3	2097.	2612.	4516.	8040.	5.64	5.63	5.94	5.76
N-4	1630.	2026.	3472.	6131.	5.59	5.53	5.85	5.68
N-5	1526.	1904.	3282.	5855.	5.69	5.60	5.96	5.75
N-6	1469.	1837.	3182.	5710.	5.75	5.65	6.02	5.82
N-7	1469.	1835.	3173.	5682.	5.72	5.63	6.00	5.80
N-8	1469.	1817.	3064.	5336.	5.46	5.36	5.70	5.52
N-9	1239.	1548.	2667.	4762.	5.72	5.59	5.97	5.77
N-10	1239.	1546.	2650.	4715.	5.69	5.54	5.93	5.73
N-11	1271.	1589.	2736.	4886.	5.74	5.58	5.97	5.77
N-12	1517.	1883.	3199.	5592.	5.55	5.44	5.74	5.59
N-13	1763.	2176.	3660.	6293.	5.40	5.34	5.57	5.45
N-14	1256.	1566.	2690.	4787.	5.67	5.56	5.93	5.73
N-15	1342.	1671.	2863.	5083.	5.63	5.53	5.91	5.71
N-16	1414.	1756.	2992.	5274.	5.56	5.47	5.83	5.64
N-17	1406.	1748.	2976.	5249.	5.59	5.47	5.84	5.64
N-18	1556.	1926.	3253.	5665.	5.48	5.38	5.70	5.53
N-19	1405.	1725.	2867.	4878.	5.26	5.21	5.46	5.32
N-20	1614.	1989.	3326.	5713.	5.36	5.28	5.56	5.41
N-21	1095.	1391.	2406.	4338.	6.16	5.63	6.07	5.90
N-22	1081.	1368.	2367.	4267.	6.06	5.64	6.07	5.89
N-23	1195.	1491.	2555.	4548.	9.69	5.53	5.94	5.73
N-24	1013.	1261.	2141.	3770.	5.63	5.44	5.82	5.63
N-25	1015.	1253.	2104.	3637.	5.41	5.32	5.63	5.46
N-26	927.	1149.	1941.	3391.	5.51	5.38	5.74	5.55
N-27	1015.	1251.	2093.	3610.	5.37	5.28	5.60	5.43
N-28	1055.	1297.	2161.	3710.	5.30	5.24	5.55	5.38
N-29	1038.	1269.	2074.	3488.	5.15	5.04	5.34	5.18
N-30	806.	1010.	1724.	3030.	5.80	5.49	5.80	5.67
N-31	806.	1010.	1724.	3030.	5.80	5.49	5.80	5.67
S-1	1828.	2002.	3163.	5126.	2.30	4.68	4.95	4.39
S-2	1729.	1942.	2916.	4375.	2.95	4.15	4.14	3.94
S-3	1163.	1260.	1966.	3132.	2.02	4.55	4.77	4.21
S-4	938.	1018.	1589.	2527.	2.07	4.55	4.75	4.22
S-5	1337.	1451.	2251.	3555.	2.07	4.49	4.68	4.16
S-6	1100.	1208.	1843.	2820.	2.37	4.31	4.35	4.00
S-7	950.	1033.	1589.	2472.	2.12	4.40	4.52	4.07
S-8	800.	856.	1323.	2084.	1.71	4.45	4.65	4.07
S-9	950.	1036.	1595.	2478.	2.19	4.41	4.50	4.08
S-10	1229.	1350.	2070.	3191.	2.38	4.37	4.42	4.06
S-11	1000.	1084.	1665.	2586.	2.04	4.39	4.50	4.04
S-12	1004.	1085.	1695.	2706.	1.96	4.56	4.79	4.22
S-13	987.	1066.	1668.	2663.	1.94	4.58	4.79	4.22
S-14	885.	954.	1496.	2395.	1.89	4.60	4.82	4.24
S-15	379.	388.	588.	918.	.59	4.24	4.56	3.76
S-16	915.	1028.	1594.	2444.	2.95	4.48	4.37	4.18
S-17	915.	1006.	1487.	2201.	2.40	3.99	4.00	3.73
S-18	675.	731.	1079.	1603.	2.01	3.97	4.04	3.67
S-19	642.	699.	1025.	1510.	2.15	3.90	3.95	3.63
S-20	648.	708.	1044.	1546.	2.24	3.96	4.00	3.69
S-21	642.	707.	1043.	1534.	2.44	3.96	3.93	3.70
S-22	608.	668.	988.	1457.	2.38	3.99	3.96	3.71
S-23	485.	529.	780.	1156.	2.19	3.96	4.01	3.69
S-24	485.	527.	771.	1136.	2.10	3.88	3.95	3.61

TABLE 5

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
(TRICYCLE)

SEC.	TRAFFIC VOLUME (vol/day)				ANNUAL GROWTH RATE (%)			
	1986	1990	2000	2010	1986-90	1990-00	2000-10	1986-10
N- 1	475	604	964	1570	6.19	4.79	5.00	5.11
N- 2	3070	3902	6229	10149	6.18	4.79	5.00	5.11
N- 3	5590	7105	11342	18481	6.18	4.79	5.00	5.11
N- 4	120	144	238	383	4.66	5.15	4.87	4.95
N- 5	390	468	768	1231	4.66	5.08	4.83	4.91
N- 6	270	324	531	852	4.66	5.06	4.84	4.91
N- 7	3700	4436	7282	11677	4.64	5.08	4.84	4.91
N- 8	270	322	521	824	4.50	4.93	4.69	4.76
N- 9	3000	3573	5784	9159	4.47	4.93	4.70	4.76
N-10	270	322	521	824	4.50	4.93	4.69	4.76
N-11	240	290	484	789	4.84	5.26	5.01	5.08
N-12	270	331	568	951	5.22	5.55	5.29	5.39
N-13	9350	11463	19672	32949	5.23	5.55	5.29	5.39
N-14	5755	7056	12109	20281	5.23	5.55	5.29	5.39
N-15	199	241	400	654	4.90	5.20	5.04	5.08
N-16	3100	3748	6237	10193	4.86	5.22	5.03	5.09
N-17	199	241	400	654	4.90	5.20	5.04	5.08
N-18	10290	12492	21012	34605	4.97	5.34	5.12	5.18
N-19	9340	11339	19072	31410	4.97	5.34	5.12	5.18
N-20	14220	17263	29037	47822	4.97	5.34	5.12	5.18
N-21	430	522	878	1446	4.97	5.34	5.12	5.18
N-22	389	470	784	1290	4.84	5.25	5.11	5.12
N-23	4370	5275	8806	14487	4.82	5.26	5.10	5.12
N-24	485	585	977	1608	4.80	5.26	5.11	5.12
N-25	410	493	810	1311	4.72	5.09	4.93	4.96
N-26	800	954	1546	2470	4.50	4.95	4.80	4.81
N-27	410	489	792	1266	4.50	4.94	4.80	4.81
N-28	9480	11310	18315	29274	4.51	4.94	4.80	4.81
N-29	10720	12789	20711	33103	4.51	4.94	4.80	4.81
N-30								
N-31	590	731	1290	2225	5.50	5.84	5.60	5.69
S- 1	56	71	130	227	6.11	6.24	5.73	6.01
S- 2	125	149	236	371	4.49	4.71	4.63	4.64
S- 3	418	498	790	1239	4.48	4.72	4.60	4.63
S- 4	12	14	23	36	3.93	5.09	4.58	4.68
S- 5	930	1119	1800	2820	4.73	4.87	4.59	4.73
S- 6								
S- 7								
S- 8	430	519	849	1364	4.82	5.04	4.86	4.93
S- 9					.00			
S-10	3680	4438	7268	11684	4.79	5.06	4.86	4.93
S-11								
S-12	2160	2607	4279	6890	4.81	5.08	4.88	4.95
S-13	479	578	949	1528	4.81	5.08	4.88	4.95
S-14								
S-15								
S-16								
S-17	1550	1835	2892	4509	4.31	4.65	4.54	4.55
S-18	1	1	2	3	.00	7.18	4.14	4.68
S-19	13	15	24	36	3.64	4.81	4.14	4.34
S-20	2910	3434	5369	8314	4.23	4.57	4.47	4.47
S-21	13	15	24	37	3.64	4.81	4.42	4.45
S-22	1800	2126	3334	5171	4.25	4.60	4.49	4.50
S-23								
S-24	420	489	744	1131	3.88	4.29	4.28	4.21

TABLE 6

\*\*\* FUTURE TRAFFIC VOLUME \*\*\*  
T O T A L

SEC.	TRAFFIC VOLUME (Vol/day)				ANNUAL GROWTH RATE (%)			1986-10
	1986	1990	2000	2010	1986-90	1990-00	2000-10	
N- 1	10750.	13228.	23176.	40816.	5.32	5.77	5.82	5.72
N- 2	14681.	17887.	30599.	52850.	5.06	5.52	5.62	5.48
N- 3	18901.	23673.	40056.	68659.	5.79	5.40	5.54	5.52
N- 4	5203.	6379.	11163.	19631.	5.23	5.76	5.81	5.69
N- 5	7158.	8738.	15134.	26214.	5.11	5.65	5.65	5.56
N- 6	6443.	7865.	13621.	23625.	5.11	5.65	5.66	5.56
N- 7	9873.	11971.	20362.	34427.	4.93	5.46	5.39	5.34
N- 8	6443.	7829.	13416.	23004.	4.99	5.53	5.54	5.45
N- 9	7704.	9320.	15852.	26865.	4.88	5.45	5.42	5.34
N-10	4974.	6070.	10573.	18469.	5.10	5.71	5.74	5.52
N-11	4081.	5003.	8810.	15604.	5.22	5.82	5.88	5.75
N-12	5875.	7239.	12849.	22797.	5.36	5.91	5.90	5.81
N-13	16718.	20570.	35955.	61987.	5.32	5.74	5.60	5.61
N-14	11896.	14598.	25465.	43914.	5.25	5.72	5.60	5.59
N-15	5987.	7343.	12961.	22903.	5.24	5.85	5.86	5.75
N-16	11054.	13500.	23390.	40318.	5.12	5.65	5.60	5.54
N-17	8796.	10797.	18928.	33135.	5.26	5.77	5.76	5.68
N-18	21311.	26103.	45356.	78018.	5.20	5.68	5.57	5.56
N-19	15610.	19107.	33089.	56626.	5.18	5.65	5.52	5.52
N-20	23931.	29184.	49944.	84340.	5.09	5.52	5.38	5.39
N-21	5983.	7346.	12839.	22428.	5.26	5.74	5.74	5.66
N-22	5675.	6961.	12170.	21286.	5.24	5.75	5.75	5.66
N-23	10624.	12964.	22435.	38671.	5.10	5.64	5.60	5.53
N-24	4641.	5667.	9741.	16719.	5.12	5.57	5.55	5.49
N-25	3817.	4645.	7944.	13578.	5.03	5.51	5.51	5.43
N-26	3326.	4058.	6966.	11997.	5.10	5.55	5.59	5.49
N-27	3817.	4632.	7883.	13422.	4.96	5.46	5.47	5.38
N-28	14851.	17857.	29585.	48685.	4.72	5.18	5.11	5.07
N-29	16012.	19227.	31730.	51997.	4.68	5.14	5.06	5.03
N-30	2365.	2942.	5232.	9301.	5.61	5.93	5.92	5.87
N-31	2955.	3673.	6522.	11526.	5.59	5.91	5.86	5.84
S- 1	12085.	14671.	25958.	46003.	4.97	5.87	5.89	5.73
S- 2	8395.	10136.	17468.	30207.	4.82	5.59	5.63	5.48
S- 3	7360.	8811.	15150.	26085.	4.60	5.57	5.58	5.41
S- 4	5866.	7034.	12200.	21174.	4.64	5.66	5.67	5.49
S- 5	7096.	8475.	14551.	24988.	4.54	5.55	5.56	5.39
S- 6	5300.	6343.	10905.	18655.	4.59	5.57	5.52	5.38
S- 7	4150.	4927.	8466.	14531.	4.38	5.56	5.55	5.36
S- 8	5171.	6179.	10644.	18284.	4.55	5.59	5.56	5.40
S- 9	4150.	4932.	8473.	14544.	4.41	5.56	5.55	5.36
S-10	9272.	11110.	18716.	31274.	4.62	5.35	5.27	5.20
S-11	4310.	5143.	8816.	15169.	4.52	5.54	5.58	5.38
S-12	7793.	9330.	15864.	26817.	4.60	5.45	5.39	5.28
S-13	4803.	5714.	9832.	16908.	4.44	5.58	5.57	5.38
S-14	4005.	4766.	8258.	14323.	4.45	5.65	5.66	5.45
S-15	895.	999.	1702.	2939.	2.79	5.47	5.61	5.08
S-16	3815.	4601.	7959.	13612.	4.79	5.63	5.51	5.44
S-17	5365.	6310.	10197.	16441.	4.14	4.92	4.89	4.78
S-18	2030.	2346.	3834.	6295.	3.68	5.03	5.08	4.83
S-19	1860.	2143.	3451.	5580.	3.60	4.88	4.92	4.68
S-20	5672.	6675.	10698.	17102.	4.15	4.83	4.80	4.71
S-21	1860.	2166.	3493.	5639.	3.88	4.89	4.91	4.73
S-22	3869.	4552.	7297.	11660.	4.15	4.83	4.80	4.70
S-23	1443.	1674.	2701.	4384.	3.78	4.90	4.96	4.74
S-24	1863.	2155.	3410.	5432.	3.71	4.70	4.77	4.56

APPENDIX 5-3  
FUTURE TRAFFIC VOLUME  
AT INTERSECTIONS



TABLE 1

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(PLARIDEL)

APPR. VEHICLE NO.	1986			1990			2000			2010		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	12	139	24	15	172	30	27	316	55	50	579	180
JEEPNEY	5	109	4	6	134	5	10	217	8	16	349	13
BUS		27	1		32	1		52	2		81	3
TRUCK	2	32	16	2	35	17	4	61	30	7	109	55
TRICYCLE	39	29	37	50	37	47	79	59	75	129	96	122
TOTAL	58	335	82	73	410	100	120	704	170	202	1214	293
2 CAR	13	168	38	16	208	47	30	385	87	55	708	160
JEEPNEY	2	95	43	3	120	54	4	192	87	7	314	142
BUS		24			29			46			71	
TRUCK	3	59	11	4	73	14	6	127	24	12	226	42
TRICYCLE	21	41	171	27	52	217	43	83	347	69	136	565
TOTAL	39	387	263	49	482	332	83	834	545	142	1454	910
3 CAR	29	23	21	36	28	26	66	52	48	122	96	88
JEEPNEY	4	5	4	5	6	5	8	10	8	13	16	13
BUS												
TRUCK	11	14	6	13	16	7	22	28	12	40	51	22
TRICYCLE	33	84	44	42	107	56	67	170	89	109	278	145
TOTAL	77	126	75	96	158	94	163	261	157	283	441	268
4 CAR	43	8	12	53	10	15	98	18	27	180	34	50
JEEPNEY	49	2	2	61	2	2	98	4	4	159	7	7
BUS												
TRUCK	13	8	1	15	9	1	26	16	2	47	29	4
TRICYCLE	173	80	45	220	102	57	351	162	91	572	264	149
TOTAL	278	98	60	349	123	76	574	201	125	959	333	209

NOTE, APPR. NO. 1 : Macilla leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Angat leg  
 APPR. NO. 4 : Malolos leg

TABLE 2

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(BALIUAG)

APPR. VEHICLE NO.	1986			1990			2000			2010		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	72	89	9	89	162	16	297	29				
JEEPNEY	20	24	1	24	40	2	64	3				
BUS	25	30	2	30	48	4	74	6				
TRUCK	23	29	6	29	49	11	87	19				
TRICYCLE	9	11	2	11	18	4	29	6				
TOTAL	149	182	21	182	316	36	550	63				
2 CAR	20	25	85	25	45	83	285					
JEEPNEY	29	35	31	35	57	51	92					
BUS	14	17	6	17	27	10	42	15				
TRUCK	16	20	45	20	34	77	61	138				
TRICYCLE	9	11	5	11	19	8	33	15				
TOTAL	88	107	172	107	183	303	311	535				
3 CAR	2	15	2	2	5	34	8	62				
JEEPNEY	24	29	29	29	47	47	76					
BUS	14	17	17	17	27	27	42					
TRUCK	13	16	4	16	28	6	49	11				
TRICYCLE	2	6	7	2	4	12	7	21				
TOTAL	17	62	76	21	36	127	65	212				

NOTE: APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Casayan leg  
APPR. NO. 3 : Baliuag leg



TABLE 3

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
( CAVAN )

APPK. VEHICLE NO.	1 9 8 6						1 9 9 0						2 0 0 0						2 0 1 0					
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN			
1	CAR	26.	35.	55.	32.	44.	69.	82.	61.	82.	130.	115.	154.	242.										
	JEEPNEY	3.	23.	36.	4.	28.	44.	48.	6.	48.	75.	11.	81.	126.										
	BUS		10.			12.		19.					31.											
	TRUCK	16.	47.	22.	20.	58.	27.	98.	33.	98.	46.	57.	168.	79.										
	TRICYCLE	116.	47.	359.	142.	58.	440.	99.	244.	99.	755.	409.	165.	1255.										
	TOTAL	161.	162.	472.	198.	199.	580.	345.	346.	1006.	591.	599.	1712.											
2	CAR	12.	50.	19.	15.	62.	23.	115.	23.	115.	44.	51.	212.	81.										
	JEEPNEY	4.		29.	5.		35.	8.	8.		60.	14.	99.											
	BUS		15.	3.		18.	4.	29.		29.	6.	47.	9.											
	TRUCK	28.	19.	9.	35.	24.	11.	60.	41.	19.	107.	72.	34.											
	TRICYCLE	177.	63.	32.	217.	77.	39.	372.	133.	67.	624.	222.	113.											
	TOTAL	221.	147.	92.	272.	181.	113.	468.	318.	196.	795.	554.	336.											
3	CAR	33.	15.	18.	41.	19.	22.	77.	35.	42.	143.	65.	78.											
	JEEPNEY	15.	13.	14.	18.	16.	17.	31.	27.	29.	52.	45.	48.											
	BUS																							
	TRUCK	4.	3.	14.	5.	4.	17.	8.	6.	30.	15.	11.	52.											
	TRICYCLE	254.	278.	168.	311.	341.	206.	534.	535.	353.	895.	980.	592.											
	TOTAL	305.	309.	214.	376.	379.	263.	651.	653.	454.	1104.	1101.	770.											
4	CAR	17.	29.	16.	21.	36.	20.	40.	67.	37.	74.	126.	69.											
	JEEPNEY	47.	13.	18.	57.	16.	22.	93.	27.	37.	162.	45.	62.											
	BUS	11.		6.	13.		7.	21.		12.	34.	19.												
	TRUCK	2.	32.	6.	2.	40.	7.	4.	67.	13.	7.	118.	22.											
	TRICYCLE	32.	325.	112.	39.	398.	137.	67.	684.	236.	113.	1145.	395.											
	TOTAL	109.	399.	158.	133.	490.	194.	230.	846.	335.	390.	1434.	567.											

NOTE. APPR. NO. 1 : Manila leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Penaranda leg  
 APPR. NO. 4 : S. Fernando leg

TABLE 4

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(SIA, ROSA)

APPR. VEHICLE NO.	( Veh. / Hour )															
	1 9 8 6				1 9 9 0				2 0 0 0				2 0 1 0			
	LEFT TURN	STRAIGHT	RIGHT TURN	TOTAL	LEFT TURN	STRAIGHT	RIGHT TURN	TOTAL	LEFT TURN	STRAIGHT	RIGHT TURN	TOTAL	LEFT TURN	STRAIGHT	RIGHT TURN	TOTAL
1	CAR	31.	86.	32.	40.	106.	40.	71.	198.	74.	132.	365.	136.			
	JEEPNEY	12.	66.	13.	16.	80.	16.	24.	133.	26.	40.	218.	43.			
	BUS		20.			24.			39.			63.				
	TRUCK	19.	32.	14.	17.	40.	17.	40.	68.	30.	71.	119.	52.			
	TRICYCLE	22.	47.	24.	29.	57.	29.	44.	95.	48.	72.	155.	79.			
	TOTAL	84.	251.	83.	102.	307.	102.	180.	533.	178.	315.	920.	310.			
2	CAR	13.	111.	29.	36.	138.	36.	30.	250.	67.	55.	473.	124.			
	JEEPNEY	9.	122.	29.	35.	148.	35.	18.	246.	59.	30.	403.	96.			
	BUS	1.	15.			18.		2.	30.		3.	48.				
	TRUCK	4.	44.	18.	22.	55.	22.	8.	93.	38.	15.	164.	67.			
	TRICYCLE	48.	60.	61.	74.	73.	74.	96.	121.	123.	158.	197.	200.			
	TOTAL	75.	352.	137.	167.	431.	167.	155.	748.	286.	261.	1285.	487.			
3	CAR	13.	12.	28.	15.	35.	35.	30.	28.	64.	55.	119.				
	JEEPNEY	6.	6.	12.	7.	15.	15.	12.	12.	24.	20.	40.				
	BUS															
	TRUCK	11.	17.	14.	17.	21.	17.	23.	36.	30.	41.	63.	52.			
	TRICYCLE	31.	42.	20.	24.	51.	24.	62.	84.	40.	102.	138.	66.			
	TOTAL	61.	77.	74.	91.	94.	91.	128.	160.	159.	218.	272.	277.			
4	CAR	35.	7.	8.	9.	43.	10.	81.	16.	18.	149.	30.	34.			
	JEEPNEY	16.	2.	8.	10.	19.	10.	32.	4.	16.	53.	7.	26.			
	BUS															
	TRUCK	17.	2.	3.	4.	21.	4.	36.	4.	6.	63.	7.	11.			
	TRICYCLE	32.	17.	20.	21.	39.	21.	64.	34.	40.	105.	56.	66.			
	TOTAL	100.	28.	39.	34.	123.	48.	213.	59.	81.	370.	100.	137.			

NOTE: APPR. NO. 1 : Manila leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Gen. Yonic leg  
 APPR. NO. 4 : Tarlac leg

TABLE 5 (a)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(CABANATUAN-1)

APPR. VEHICLE NO. TYPE	( Veh./Hour )											
	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	47.	214.		59.	267.		110.	501.		205.	932.	
JEEPNEY	92.	44.		112.	53.		188.	90.		308.	148.	
BUS	11.	9.		13.	11.		22.	18.		35.	28.	
TRUCK	22.	73.		27.	90.		46.	153.		80.	266.	
TRICYCLE	152.	269.		185.	327.		310.	549.		511.	905.	
TOTAL	324.	609.		395.	748.		675.	1310.		1199.	2278.	
2 CAR	165.	165.	11.	206.		14.	389.		26.	725.	48.	
JEEPNEY	50.	11.	11.	60.	13.	102.	22.	168.	37.			
BUS	13.			16.		25.		41.				
TRUCK	28.	10.	10.	34.	12.	20.	57.	97.	35.			
TRICYCLE	292.	37.	37.	354.	45.	76.	596.	902.	124.			
TOTAL	548.	69.	69.	671.	84.	144.	1170.	2013.	244.			
3 CAR	12.	57.	15.	71.	28.	134.	53.	249.				
JEEPNEY	2.	33.	2.	40.	4.	67.	7.	111.				
BUS	7.	7.	8.	8.	14.	22.						
TRUCK	8.	7.	10.	9.	14.	28.						
TRICYCLE	24.	154.	29.	187.	49.	314.	81.	518.				
TOTAL	46.	258.	56.	315.	98.	544.	168.	925.				

NOTE, APPR.NO.1 : Manila leg  
APPR.NO.2 : Cagayan leg  
APPR.NO.3 : City Center leg

TABLE 5 (b)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(CADANAYAN-2)

APPR. VEHICLE NO. TYPE	1986						1990			2000			2010					
	LEFT TURN		STRAIGHT		RIGHT TURN		LEFT TURN		STRAIGHT		RIGHT TURN		LEFT TURN		STRAIGHT		RIGHT TURN	
1	CAR	12.	86.	32.	15.	108.	40.	28.	203.	75.	53.	378.	141.					
	JEEPNEY	2.	16.	5.	2.	19.	6.	4.	33.	10.	7.	54.	17.					
	BUS		7.	1.		8.	1.		14.	2.		22.	3.					
	TRUCK	9.	62.	20.	11.	76.	25.	18.	127.	41.	31.	215.	69.					
	TRICYCLE	38.	120.	268.	46.	146.	325.	70.	245.	547.	128.	404.	901.					
	TOTAL	61.	291.	326.	75.	357.	397.	128.	621.	676.	219.	1073.	1131.					
2	CAR	21.	99.	4.	26.	124.	5.	50.	234.	9.	92.	435.	18.					
	JEEPNEY	1.	7.		1.	8.		2.	14.		3.	24.						
	BUS		2.			2.			4.			6.						
	TRUCK	8.	21.		10.	26.		16.	43.		28.	73.						
	TRICYCLE	168.	183.	55.	204.	222.	67.	343.	374.	112.	565.	815.	185.					
	TOTAL	198.	312.	59.	241.	383.	72.	411.	568.	122.	688.	1158.	203.					
3	CAR	33.	28.	27.	41.	35.	34.	78.	66.	64.	145.	123.	119.					
	JEEPNEY	3.		2.	4.		2.	6.		4.	10.		7.					
	BUS	1.		1.	1.		1.	2.		2.	3.		3.					
	TRUCK	7.	9.	2.	9.	11.	2.	14.	18.	4.	24.	31.	7.					
	TRICYCLE	184.	337.	280.	223.	409.	340.	376.	688.	572.	619.	1133.	942.					
	TOTAL	228.	374.	312.	278.	455.	380.	475.	773.	646.	801.	1288.	1077.					
4	CAR	3.	19.	13.	4.	24.	16.	7.	45.	31.	13.	84.	57.					
	JEEPNEY	1.	1.	1.	1.	1.	1.	2.	2.	2.	3.	3.	3.					
	BUS																	
	TRUCK	1.	1.	3.	1.	4.	4.	2.	6.	6.	3.	10.						
	TRICYCLE	42.	430.	63.	51.	522.	76.	86.	878.	129.	141.	1446.	212.					
	TOTAL	46.	451.	80.	56.	548.	98.	95.	927.	167.	158.	1536.	283.					

NOTE: APPR. NO. 1 : Manila leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Central leg  
 APPR. NO. 4 : City Center leg

TABLE 5 (c)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(CABANATUAN-3)

APPR. VEHICLE NO. TYPE	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	30	90	38	113	71	212	132	396				
JEEPNEY	8	36	10	43	16	73	27	121				
BUS		9		11		18		28				
TRUCK	6	54	7	66	12	110	21	187				
TRICYCLE	187	219	227	266	382	447	629	736				
TOTAL	231	408	282	499	481	861	808	1469				
2 CAR	105	33	41	131	245	77	456	143				
JEEPNEY	20	145	24	175	41	294	66	482				
BUS	3	25	4	30	6	50	10	81				
TRUCK	49	11	60	14	101	23	173	39				
TRICYCLE	387	222	470	270	790	453	1301	747				
TOTAL	564	436	689	530	1183	897	2007	1492				
3 CAR	33	7	41	9	77	16	144	31				
JEEPNEY	106	11	128	13	216	22	354	37				
BUS	15	1	18	1	30	2	48	3				
TRUCK	11	2	14	2	23	4	39	7				
TRICYCLE	205	324	249	398	419	662	689	1090				
TOTAL	370	345	450	419	764	706	1274	1167				

NOTE: APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Cagayan leg  
APPR. NO. 3 : City Center leg

TABLE 5 (d)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(CABANATUAN-4)

APPR. VEHICLE NO. TYPE	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	3	60	52	4	75	65	7	140	121	13	260	226
JEEPNEY		101	21		122	25		205	43		336	70
BUS		18	5		22	6		36	10		59	16
TRUCK	1	43	6	1	53	7	2	89	12	4	152	21
TRICYCLE	31	244	160	38	296	194	68	498	327	104	821	538
TOTAL	35	466	244	43	568	298	72	968	513	121	1627	871
2 CAR	16	123	21	20	153	26	37	237	49	69	534	91
JEEPNEY	3	256	14	4	310	17	6	519	28	10	851	47
BUS		36	1		43	1		72	2		117	3
TRUCK	6	53	12	7	65	15	12	109	25	21	188	42
TRICYCLE	42	376	291	51	456	353	96	768	594	141	1264	978
TOTAL	67	844	339	82	1028	412	142	1755	698	242	2954	1162
3 CAR	36	29	12	45	35	15	84	68	28	158	126	52
JEEPNEY	35	5	4	42	6	5	71	10	8	116	17	13
BUS	4		1	5		1	8		2	13		3
TRUCK	4	5	4	5	6	5	8	10	8	14	18	14
TRICYCLE	156	78	100	189	95	121	319	159	204	525	262	336
TOTAL	235	117	121	286	143	147	490	247	251	824	422	419
4 CAR	35	20	3	44	25	4	82	47	7	152	87	13
JEEPNEY	10	5	1	12	6	1	20	10	2	33	17	3
BUS		1			1			2			3	
TRUCK	5	2	2	6	2	2	10	4	4	18	7	7
TRICYCLE	199	48	46	242	58	56	406	98	94	669	161	155
TOTAL	249	76	52	303	93	63	519	161	107	872	275	178

NOTE:  
 APPR. NO. 1 : Manila leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Palayan leg  
 APPR. NO. 4 : City Center leg

TABLE 6

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(ALLAGA JCF.)

APPR. VEHICLE NO. TYPE	1 9 8 8			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	2	95		2	117		5	218		8	403	
JEEPNEY		56			68			113			184	
BUS	5	19		6	23		10	38		16	62	
TRUCK		22			28			48			87	
TRICYCLE	1	17		1	21		2	35		3	57	
TOTAL	8	209		10	256		17	452		28	793	
2 CAR		79			97			181			335	
JEEPNEY		77			93			155			253	
BUS		9			11			18			29	
TRUCK		37			47			81			146	
TRICYCLE		11			13			22			36	
TOTAL		213			261			457			799	
3 CAR			5			7				14		25
JEEPNEY												
BUS			8			10				16		26
TRUCK												
TRICYCLE	1		2			2				4		7
TOTAL	1		16			19				34		58

NOTE: APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Cagayan leg  
APPR. NO. 3 : Allaga leg

TABLE 7

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(BALOC JCI.)

APPR. VEHICLE NO. TYPE	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	17.	40.		21.	49.		39.	91.		72.	168.	
JEEPNEY	18.	28.		22.	34.		36.	56.		59.	92.	
BUS	3.	10.		4.	12.		6.	20.		10.	32.	
TRUCK	9.	30.		11.	37.		19.	63.		33.	112.	
TRICYCLE	13.	7.		16.	8.		26.	14.		43.	23.	
TOTAL	60.	115.		73.	141.		126.	245.		217.	427.	
2 CAR	2.	14.	2.	17.	2.	2.	32.	8.		59.	8.	
JEEPNEY	24.	1.	1.	29.	1.	2.	48.	3.		77.	3.	
BUS	4.			5.			8.			12.		
TRUCK	26.	14.		32.	17.		54.	29.		93.	50.	
TRICYCLE	6.	1.	1.	7.	1.	2.	12.	3.		19.	3.	
TOTAL	74.	18.	22.	90.	22.	38.	153.	65.		261.	65.	
3 CAR	12.	2.	2.	15.	2.	5.	27.	8.		50.	8.	
JEEPNEY	16.	2.	2.	19.	2.	4.	32.	6.		52.	6.	
BUS	2.			2.			4.			6.		
TRUCK	15.	5.	6.	19.	6.	10.	31.	18.		55.	18.	
TRICYCLE	14.	3.	4.	17.	4.	6.	26.	10.		46.	10.	
TOTAL	59.	12.	15.	72.	15.	25.	123.	43.		209.	43.	

NOTE: APPR. NO. 1 : Manila leg  
 APPR. NO. 2 : Cagayan leg  
 APPR. NO. 3 : Cuzimba leg



TABLE 8

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(SAN JOSE)

APPR. VEHICLE NO.	1 9 8 6						1 9 9 0						2 0 0 0						2 0 1 0					
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN			
1	CAR	11.	58.	22.	14.	65.	27.	25.	120.	50.	45.	219.	91.											
	JEEPNEY	8.	33.	6.	10.	39.	7.	15.	64.	12.	25.	103.	19.											
	BUS	2.	2.	2.	2.	2.	4.	4.	4.	4.	6.	6.	6.											
	TRUCK	4.	18.	7.	5.	22.	9.	8.	37.	14.	14.	63.	25.											
	TRICYCLE	56.	213.	52.	67.	254.	62.	100.	412.	100.	173.	658.	151.											
	TOTAL	81.	319.	87.	97.	384.	105.	161.	637.	176.	264.	1050.	295.											
2	CAR	8.	30.	11.	10.	37.	14.	18.	68.	25.	33.	123.	45.											
	JEEPNEY	6.	26.	6.	7.	31.	7.	12.	50.	12.	19.	80.	19.											
	BUS	3.	3.	2.	4.	4.	2.	6.	6.	4.	9.	9.	6.											
	TRUCK	4.	20.	5.	5.	24.	6.	8.	40.	10.	13.	57.	17.											
	TRICYCLE	100.	200.	105.	119.	239.	125.	193.	386.	203.	309.	618.	324.											
	TOTAL	118.	279.	129.	141.	335.	155.	231.	550.	253.	374.	898.	411.											
3	CAR	13.	9.	3.	15.	11.	4.	29.	20.	7.	54.	37.	12.											
	JEEPNEY	5.	5.	6.	6.	10.	6.	10.	10.	10.	16.	16.	16.											
	BUS																							
	TRUCK	12.	4.	1.	15.	5.	1.	24.	8.	2.	41.	14.	3.											
	TRICYCLE	56.	122.	5.	67.	146.	6.	108.	236.	10.	173.	377.	15.											
	TOTAL	81.	140.	9.	98.	168.	11.	162.	274.	18.	268.	443.	31.											
4	CAR	21.	13.	24.	25.	16.	30.	47.	29.	54.	85.	54.	99.											
	JEEPNEY	7.	5.	14.	8.	6.	17.	14.	10.	27.	22.	16.	44.											
	BUS	3.	3.	2.	4.	4.	2.	6.	6.	4.	9.	9.	6.											
	TRUCK	2.	4.	1.	2.	5.	1.	4.	8.	2.	7.	14.	3.											
	TRICYCLE	108.	124.	132.	129.	148.	157.	209.	240.	255.	334.	383.	408.											
	TOTAL	141.	146.	173.	169.	175.	207.	280.	297.	342.	458.	466.	560.											

NOTE:  
APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Cagayan leg  
APPR. NO. 3 : Rizal leg  
APPR. NO. 4 : Lupao leg

TABLE 9 (a)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(SFO, TOMAS-1)

APPR. VEHICLE NO. TYPE	1 9 0 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	193.	79.	36.	239.	98.	44.	439.	180.	836.	330.	123.	
JEEPNEY												
BUS	5.	29.	36.	6.	35.	44.	10.	58.	16.	93.		
TRUCK	52.	12.	29.	57.	13.	35.	90.	21.	146.	34.		
TRICYCLE												
TOTAL	250.	156.	79.	302.	190.	123.	539.	333.	968.	580.		
2 CAR	259.	319.		319.			571.		1022.			
JEEPNEY												
BUS	11.	13.		13.			22.		36.			
TRUCK	41.	46.		46.			69.		104.			
TRICYCLE	2.	2.		2.			4.		6.			
TOTAL	313.	381.		381.			666.		1168.			
3 CAR	22.	1.	27.	27.	1.	49.	2.	89.	4.			
JEEPNEY	36.	43.		43.		72.		117.				
BUS	24.	29.		29.		48.		77.				
TRUCK	3.	3.		3.		5.		8.				
TRICYCLE												
TOTAL	85.	103.		103.		175.		292.	4.			

NOTE: APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Bicol leg  
APPR. NO. 3 : Batangas leg

TABLE 9 (b)

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
(SIO. TOMAS-2)

APPR. VEHICLE NO. TYPE	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	57	67		70	83		126	148		225	254	
JEEPNEY		9			11			18			28	
BUS	7	2		8	2		14	4		23	6	
TRUCK	10	14		11	16		17	24		25	35	
TRICYCLE	1	3	1	1	4	1	2	6	2	3	9	3
TOTAL	75	95	1	91	115	1	158	199	2	276	343	3
2 CAR	6	18	109	7	22	134	13	40	243	24	73	440
JEEPNEY	4	46		5	55		8	88		12	139	
BUS		11	13		13	16		22	26		35	42
TRUCK	7	1	14	8	1	15	12	2	24	19	3	38
TRICYCLE	3	22	3	4	25	4	6	42	6	9	65	9
TOTAL	20	98	139	23	118	168	39	194	293	64	315	529
3 CAR	1	152	38	1	157	47	2	337	84	4	607	152
JEEPNEY		3	7		4	8		6	14		9	21
BUS		4			5			8			13	
TRUCK		24	6		26	7		41	10		63	16
TRICYCLE		3	2		4	2		6	4		9	6
TOTAL	1	186	53	1	226	64	2	397	112	4	701	195
4 CAR	1	12	2	1	15	2	2	27	4	4	48	8
JEEPNEY		43			51			83			131	
BUS		10			12			20			32	
TRUCK												
TRICYCLE		16			19			30			47	
TOTAL	1	81	2	1	97	2	2	160	4	4	259	8

NOTE:  
APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Dicol leg  
APPR. NO. 3 : Lipa leg  
APPR. NO. 4 : Sto. Tomas leg

TABLE 10

\*\*\* FUTURE TRAFFIC VOLUME AT INTERSECTION \*\*\*  
( CUNACA )

APPR. VEHICLE NO. TYPE	1 9 8 6			1 9 9 0			2 0 0 0			2 0 1 0		
	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN	LEFT TURN	STRAIGHT	RIGHT TURN
1 CAR	11.	2.	13.	2.	2.	24.	4.	42.	8.			
JEEPNEY	13.	1.	15.	1.	24.	3.	37.	3.				
BUS	6.		7.		11.	18.						
TRUCK	17.	3.	19.	3.	27.	41.	5.	7.				
TRICYCLE	89.	18.	105.	21.	164.	254.	33.	51.				
TOTAL	136.	24.	159.	28.	251.	392.	44.	69.				
2 CAR	6.	18.	7.	22.	13.	39.	23.	68.				
JEEPNEY	1.	8.	1.	9.	2.	15.	3.	23.				
BUS		2.		2.		4.		6.				
TRUCK		5.	23.	5.	25.	37.	8.	55.				
TRICYCLE		69.	112.	81.	132.	207.	127.	323.				
TOTAL		81.	163.	95.	191.	301.	150.	472.				
3 CAR	2.	5.	2.	6.	4.	11.	8.	19.				
JEEPNEY	2.	3.	2.	4.	4.	6.	6.	9.				
BUS												
TRUCK	2.	6.	2.	7.	3.	10.	5.	14.				
TRICYCLE	5.	79.	6.	93.	9.	146.	14.	226.				
TOTAL	11.	93.	13.	109.	20.	172.	32.	288.				

NOTE: APPR. NO. 1 : Manila leg  
APPR. NO. 2 : Dicol leg  
APPR. NO. 3 : Picoleg

APPENDIX 5-4  
INDUCED TRAFFIC BY CONSTRUCTION OF SOUTH  
LUZON EXPRESSWAY BETWEEN STO. TOMAS AND BATANGAS



INDUCED TRAFFIC BY CONSTRUCTION OF SOUTH LUZON  
EXPRESSWAY BETWEEN STO. TOMAS AND BATANGAS

1. Induced Traffic

Construction of a new road or improvement of an existing road may result in inducing of some new traffic which would not otherwise have occurred. This new traffic is induced as a result of the opportunity for faster, cheaper, more comfortable and reliable transport between the areas served.

Highway Planning Manual mention that the estimation of induced traffic is usually related to reductions in transport costs resulting from road improvement. And the following formula is given in the planning manual.

$$\frac{dt}{T} = E \frac{dc}{C}$$

where: T: normal traffic volume  
dT: induced traffic volume  
C: transport costs on without project case  
dC: reductions in transport costs resulting from the project  
E: induced transport demand - transport cost reduction elasticity.

The induced traffic due to construction of SLE are expected for cars and buses only. Because jeepneys will choose existing route after construction of SLE, and the low elasticities (E) for cargo will make few induced traffic.

The planning manual recommend the elasticities for cars and buses as shown in Table 1.

TABLE 1. INDUCED TRANSPORT DEMAND - TRANSPORT COST REDUCTION ELASTICITY

Cars	T. Cast Reduction	20%	30%	50%
	Elasticity	0	0.3	0.6
Buses	T. Cast Reduction	25%	40%	60%
	Elasticity	0	0.5	0.8

2. Pair of Zones

The traffic having ZONE-pair A-C and B-C are expected induced traffic. (see Figure 1).

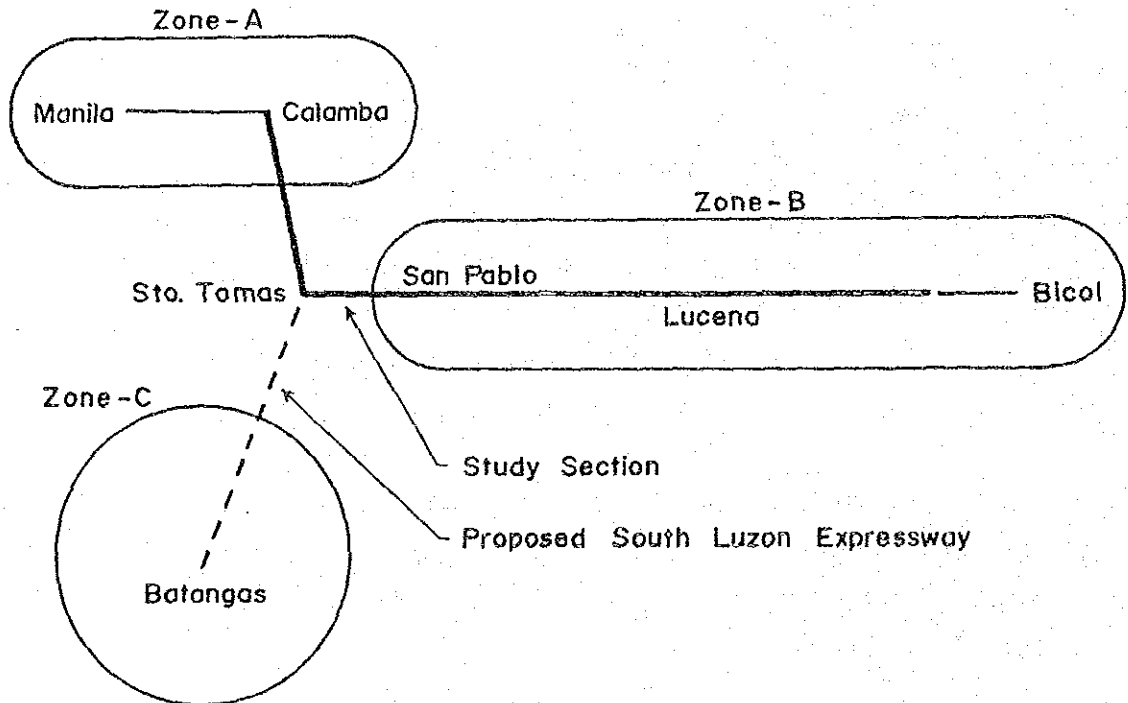


FIGURE 1



### 3. Result

Normal traffic volume, transport cost reduction, elasticities and induced traffic volume are shown in Table 3 and 4. On the Calamba - Sto. Tomas section and the Sto. Tomas - San Pablo section, induced traffic are expected. However, volume is rather low at about 1% - 5% of normal traffic.

TABLE 2 INDUCED TRAFFIC VOLUME THROUGH CALAMBA-STO. TOMAS SECTION

Zone-Pairs Vehicle Type	Manila-Bats.		Sta. Cruz-Bats.		Calamba-Batangas		Total	
	Cars	Buses	Cars	Buses	Cars	Buses	Cars	Buses
Volume of Normal Traffic								
1990	3,343	830	103	0	515	7	3,961	837
1995	4,497	1,059	139	0	698	10	5,334	1,069
2000	6,053	1,351	187	0	946	14	7,186	1,365
2005	8,162	1,707	252	0	1,284	18	9,698	1,725
2010	11,005	2,156	340	0	1,744	23	13,089	2,179
Transport Cost Reduction (%)								
1990	15.7	19.8	15.3	-	27.0	36.0		
1995	17.2	22.0	17.3	-	29.5	38.8		
2000	18.9	24.2	19.4	-	32.1	41.7		
2005	21.7	28.2	22.5	-	35.4	46.8		
2010	20.3	24.0	21.5	-	32.7	40.7		
Elasticity								
1990	0	0	0	-	0.21	0.37		
1995	0	0	0	-	0.29	0.46		
2000	0	0	0	-	0.33	0.53		
2005	0.05	0.11	0.08	-	0.38	0.60		
2010	0.01	0	0.05	-	0.34	0.51		
Volume of Induced Traffic								
1990	0	0	0	0	29	1	29	1
1995	0	0	0	0	60	2	60	2
2000	0	0	0	0	100	3	100	3
2005	89	53	5	0	172	5	266	58
2010	22	0	4	0	194	5	220	5

TABLE 3 INDUCED TRAFFIC VOLUME THROUGH SAN PABLO-STO. TOMAS SECTION

Zone-Pairs Vehicle Type	San Pablo-Bats.		Candelaria-Bats.		Sariaya-Bats.		Lucena-Bats.		Total	
	Cars	Buses	Cars	Buses	Cars	Buses	Cars	Buses	Cars	Buses
Volume of Normal Traffic	361	0	12	0	16	0	129	24	518	24
	486	0	16	0	22	0	174	31	698	31
	653	0	21	0	30	0	235	40	939	40
	879	0	27	0	40	0	329	51	1,275	51
	1,184	0	36	0	53	0	429	66	1,702	66
Transport Cost Reduction (%)	21.8	-	16.7	-	15.0	-	14.3	17.2		
	24.0	-	18.6	-	16.7	-	16.0	19.2		
	26.2	-	20.5	-	18.5	-	17.7	20.4		
	29.1	-	23.2	-	21.0	-	20.2	25.6		
	27.3	-	21.9	-	20.0	-	19.3	22.3		
Elasticity	0.05	-	0	-	0	-	0	0		
	0.12	-	0	-	0	-	0	0		
	0.19	-	0.02	-	0	-	0	0		
	0.27	-	0.10	-	0.03	-	0.01	0.02		
	0.22	-	0.06	-	0	-	0	0		
Volume of Induced Traffic	4	0	0	0	0	0	0	0	4	0
	14	0	0	0	0	0	0	0	14	0
	33	0	0	0	0	0	0	0	33	0
	69	0	1	0	0	0	0	0	70	0
	71	0	0	0	0	0	0	0	71	0



**APPENDICES FOR  
CHAPTER 6**



APPENDIX 6-1

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE





TABLE 1

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
CAGAYAN BOUND; SAN JOSE-STA. FE SECTION

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or More Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	0.4	-	-	0.45
2	4.1	-	-	6.02
3	14.8	1.61	-	28.35
4	18.4	11.29	-	38.62
5	13.1	26.61	0.81	22.99
6	5.3	26.61	4.03	3.57
7	2.5	24.19	6.45	-
8	4.5	7.26	1.61	-
9	8.6	1.61	0.81	-
10	6.6	0.81	1.61	-
11	9.8	-	1.61	-
12	4.1	-	3.23	-
13	3.3	-	1.61	-
14	1.6	-	3.23	-
15	2.0	-	5.64	-
16	0.8	-	2.24	-
17	-	-	1.61	-
18	-	-	4.03	-
19	-	-	3.23	-
20	-	-	-	-
21	-	-	3.23	-
22	-	-	4.03	-
23	-	-	12.10	-
24	-	-	14.52	-
25	-	-	11.29	-
26	-	-	4.03	-
27	-	-	2.42	-
28	-	-	4.03	-
29	-	-	1.61	-
30	-	-	0.81	-

TABLE 2

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
 MANILA BOUND: PLARIDEL-GAPAN SECTION

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or More Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	0.3	-	-	0.45
2	9.5	-	-	6.02
3	18.7	2.01	-	28.35
4	11.6	9.40	-	38.62
5	9.2	19.13	-	22.99
6	3.0	29.53	0.34	3.57
7	4.2	31.21	-	-
8	3.9	7.72	0.34	-
9	4.3	1.01	0.34	-
10	2.9	-	-	-
11	3.5	-	0.67	-
12	4.2	-	0.34	-
13	9.3	-	0.34	-
14	6.1	-	1.01	-
15	3.7	-	1.01	-
16	2.1	-	1.01	-
17	2.2	-	0.67	-
18	0.5	-	1.01	-
19	0.6	-	2.35	-
20	-	-	2.01	-
21	-	-	2.68	-
22	-	-	5.37	-
23	-	-	10.07	-
24	-	-	12.08	-
25	-	-	12.75	-
26	-	-	11.74	-
27	-	-	10.07	-
28	-	-	6.04	-
29	-	-	5.37	-
30	-	-	4.03	-
31	-	-	3.69	-
32	-	-	1.68	-
33	-	-	1.34	-
34	-	-	1.01	-
35	-	-	0.34	-

TABLE 3

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
CAGAYAN BOUND: PLARIDEL-GAPAN SECTION

Unit: %

Axle Loads (Metric Tons)	Loaded Trucks			Empty Trucks Single Axle Load Distribution Pattern
	2-Axle Trucks	3 or More Axle Trucks		
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	
1	1.5	-	-	0.45
2	7.3	0.75	-	6.02
3	19.2	3.01	-	28.35
4	13.5	7.52	-	38.62
5	10.9	21.80	-	22.99
6	7.9	24.81	0.75	3.57
7	5.1	25.56	-	-
8	4.3	15.04	1.50	-
9	6.6	1.50	0.75	-
10	6.6	-	1.50	-
11	6.0	-	1.50	-
12	3.4	-	2.26	-
13	3.4	-	1.50	-
14	2.1	-	3.76	-
15	1.7	-	2.26	-
16	0.4	-	5.26	-
17	-	-	3.76	-
18	-	-	5.26	-
19	-	-	3.76	-
20	-	-	4.51	-
21	-	-	7.52	-
22	-	-	5.26	-
23	-	-	3.01	-
24	-	-	4.51	-
25	-	-	9.02	-
26	-	-	9.77	-
27	-	-	4.51	-
28	-	-	6.02	-
29	-	-	6.77	-
30	-	-	2.26	-
31	-	-	1.50	-
32	-	-	1.50	-

TABLE 4

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
MANILA BOUND: CALAMBA-STO. TOMAS SECTION

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or More Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	0.7	-	-	0.45
2	2.5	0.52	-	6.02
3	10.8	0.52	-	28.35
4	19.9	2.06	-	38.62
5	15.2	13.92	0.52	22.99
6	9.1	27.32	0.52	3.57
7	7.6	29.90	1.55	-
8	4.3	21.65	1.55	-
9	4.3	3.09	2.58	-
10	4.8	1.03	-	-
11	3.6	-	1.55	-
12	3.4	-	2.06	-
13	4.3	-	1.03	-
14	3.3	-	2.58	-
15	2.8	-	4.64	-
16	2.1	-	4.12	-
17	0.9	-	6.70	-
18	0.4	-	4.12	-
19	-	-	5.67	-
20	-	-	7.22	-
21	-	-	9.28	-
22	-	-	7.73	-
23	-	-	4.64	-
24	-	-	8.76	-
25	-	-	7.22	-
26	-	-	4.64	-
27	-	-	2.06	-
28	-	-	3.61	-
29	-	-	2.06	-
30	-	-	1.55	-
31	-	-	-	-
32	-	-	1.55	-
33	-	-	-	-
34	-	-	0.52	-

TABLE 5

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
BICOL BOUND: CALAMBA-STO. TOMAS SECTION

Unit: %

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or more Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	0.9	-	-	0.45
2	6.0	-	-	6.02
3	15.5	-	-	28.35
4	17.5	7.69	-	38.62
5	16.1	17.95	-	22.99
6	7.1	33.33	0.64	3.57
7	6.2	23.72	3.21	-
8	2.6	14.10	5.13	-
9	6.6	3.21	2.56	-
10	4.2	-	1.28	-
11	3.6	-	3.21	-
12	3.8	-	0.64	-
13	4.6	-	1.28	-
14	3.6	-	5.13	-
15	1.3	-	4.49	-
16	0.2	-	4.49	-
17	0.2	-	3.21	-
18	-	-	5.13	-
19	-	-	4.49	-
20	-	-	10.25	-
21	-	-	8.33	-
22	-	-	10.25	-
23	-	-	6.41	-
24	-	-	8.33	-
25	-	-	3.21	-
26	-	-	3.85	-
27	-	-	1.28	-
28	-	-	1.28	-
29	-	-	0.64	-
30	-	-	1.28	-

TABLE 6

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
MANILA BOUND: LUCENA-LOPEZ SECTION

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or More Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	1.9	-	-	0.45
2	10.6	-	-	6.02
3	21.2	-	-	28.35
4	12.5	19.35	-	38.62
5	9.6	19.35	-	22.99
6	6.7	35.49	-	3.57
7	3.8	22.58	-	-
8	4.3	3.23	-	-
9	2.9	-	3.23	-
10	4.3	-	-	-
11	6.3	-	-	-
12	3.8	-	-	-
13	3.8	-	-	-
14	3.8	-	6.45	-
15	2.4	-	9.68	-
16	1.9	-	6.45	-
17	-	-	3.23	-
18	-	-	3.23	-
19	-	-	6.45	-
20	-	-	3.23	-
21	-	-	-	-
22	-	-	-	-
23	-	-	12.90	-
24	-	-	9.68	-
25	-	-	19.34	-
26	-	-	6.45	-
27	-	-	6.45	-
28	-	-	3.23	-

TABLE 7

AXLE LOAD DISTRIBUTION PATTERN BY TYPE OF AXLE  
BICOL BOUND: LUCENA-LOPEZ SECTION

Axle Load (Metric Tons)	Loaded Trucks			Empty Trucks
	2-Axle Trucks	3 or More Axle Trucks		Single Axle
	Single Axle Load Distribution Pattern	Single Axle Load Distribution Pattern	Tandem Axle Load Distribution Pattern	Load Distribution Pattern
1	4.5	-	-	0.45
2	18.0	5.27	-	6.02
3	20.8	5.27	-	28.35
4	12.9	5.27	-	38.62
5	14.0	21.04	2.63	22.99
6	4.5	34.22	2.63	3.57
7	3.9	21.04	5.27	-
8	1.1	7.89	-	-
9	5.1	-	-	-
10	2.8	-	2.63	-
11	3.9	-	2.63	-
12	5.1	-	-	-
13	1.7	-	2.63	-
14	0.6	-	-	-
15	0.6	-	7.89	-
16	0.6	-	5.27	-
17	-	-	5.27	-
18	-	-	7.89	-
19	-	-	5.27	-
20	-	-	2.63	-
21	-	-	13.16	-
22	-	-	2.63	-
23	-	-	2.63	-
24	-	-	5.27	-
25	-	-	21.04	-
26	-	-	2.63	-





**APPENDICES FOR  
CHAPTER 8**



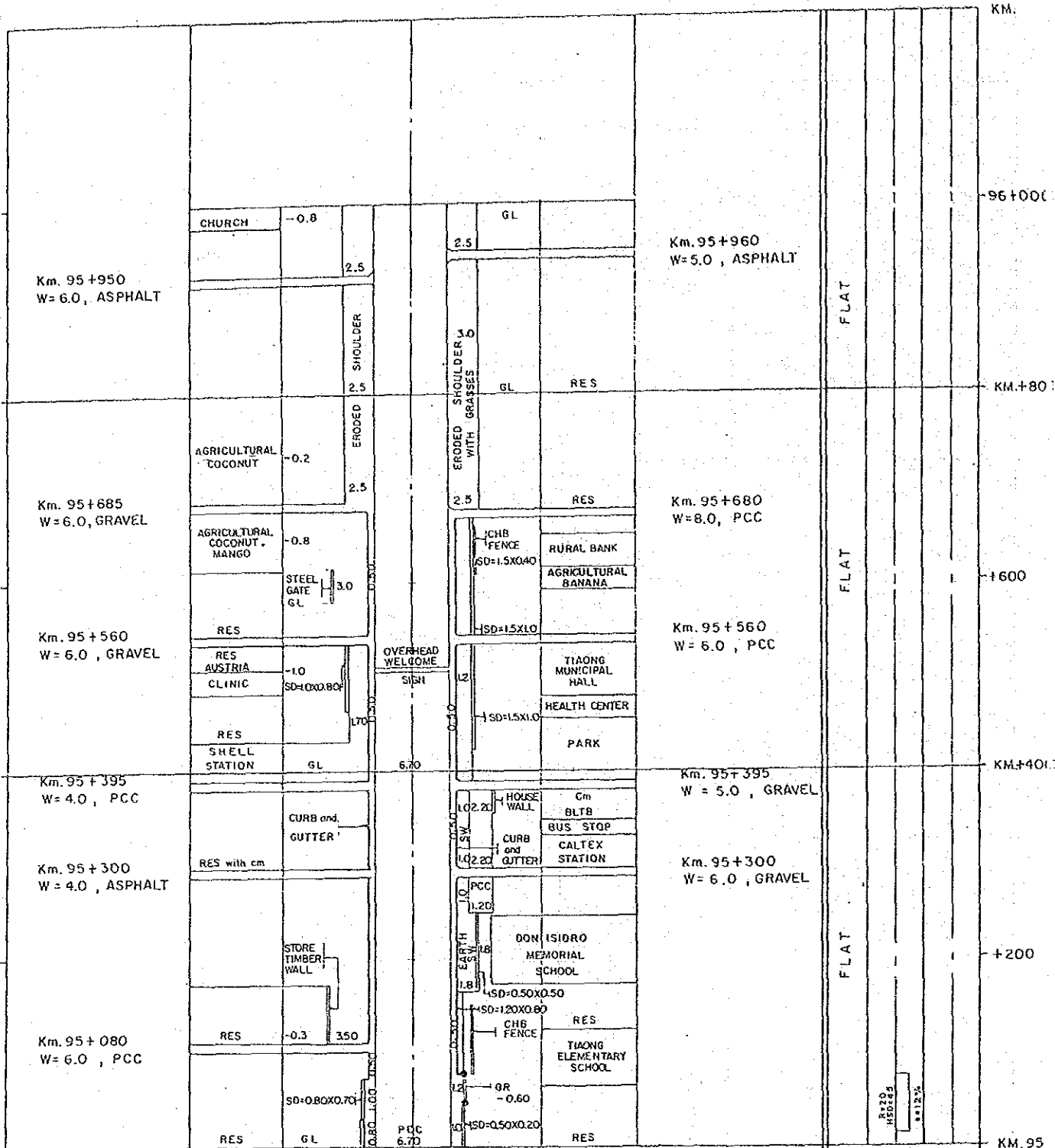
APPENDIX 8-1  
ROAD INVENTORY FORMAT AND EXAMPLES



														KM.
														KM.
														KM.
														KM.

Intersecting Roads, Bridges	Road Environment • Agricultural (Ag) • Residential (Re.) • Commercial (Cm) • Industrial (Id)	Side-ditch	Shoulder	Pavement	Shoulder	Side-ditch	Road Environment • Agricultural (Ag) • Residential (Re.) • Commercial (Cm) • Industrial (Id)	Intersecting Roads, Bridges	Terrain	Horizontal Alignment	Vertical Alignment
		Side-walk			Side-walk						
		Cut Embankment Ground Level		Cut Embankment Ground Level	CROSS - SECTION ELEMENT						

**ROAD INVENTORY FORMAT**  
**FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT OF PAN-PHILIPPINE HIGHWAY**  
**(PHILIPPINES-JAPAN FRIENDSHIP HIGHWAY)**  
**TABLE 1**  
**8-1 (1)**



Intersecting Roads, Bridges	Road Environment	Shoulder	Pavement	Shoulder	Road Environment	Intersecting Roads, Bridges	Terrain	Horizontal Alignment	Vertical Alignment
	<ul style="list-style-type: none"> <li>Agricultural (Ag)</li> <li>Residential (Re.)</li> <li>Commercial (Cm)</li> <li>Industrial (Iq)</li> </ul>	<ul style="list-style-type: none"> <li>Side-ditch</li> <li>Side-walk</li> <li>Cut</li> <li>Embankment</li> <li>Ground Level</li> </ul>	<ul style="list-style-type: none"> <li>Cut</li> <li>Embankment</li> <li>Ground Level</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural (Ag)</li> <li>Residential (Re.)</li> <li>Commercial (Cm)</li> <li>Industrial (Iq)</li> </ul>					
<b>CROSS - SECTION ELEMENT</b>									

ROAD INVENTORY FORMAT  
 FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT OF PAN-PHILIPPINE HIGHWAY  
 (PHILIPPINES-JAPAN FRIENDSHIP HIGHWAY)  
 TABLE 2

		<p>AGRICULTURAL RICE FIELD -2.5 -2.0</p> <p>RES -1.0</p> <p>CHURCH -1.0</p> <p>RES -1.0</p> <p>CHURCH -1.0</p> <p>RES -1.0</p> <p>AGRICULTURAL RICE FIELD -1.0</p> <p>AGRICULTURAL COCONUT -2.5 +2.0</p>						<p>3.0 -2.0</p> <p>3.0 -2.5</p> <p>4.0</p> <p>3.0</p> <p>2.5</p> <p>2.0</p> <p>2.0</p> <p>1.0</p> <p>1.5</p> <p>6.70</p> <p>1.5</p>						<p>RES</p> <p>MALIC BOY ELEMENTARY SCHOOL</p> <p>RCR CANTEEN</p> <p>PARKING SPACE</p> <p>RES</p> <p>Km. 153 +550 W= 6.0 , GRAVEL</p> <p>Km.153 +200 W= 5.0 , EARTH</p>						<p>ROLLING</p> <p>HSD 153 +1.8 % R=100</p> <p>HSD 150 +2.6 % R=120</p>																	
		<p>RES -2.0</p> <p>AGRICULTURAL RICE FIELDS -2.0</p> <p>AGRICULTURAL COCONUT GL + 0.50</p> <p>with RES +2.0 -5.0 -4.0 -2.0</p> <p>AGRICULTURAL RICE FIELD -2.5</p>						<p>2.5</p> <p>2.5</p> <p>2.5</p> <p>2.0</p> <p>2.0</p> <p>2.0</p> <p>6.70</p> <p>2.0</p> <p>2.0</p> <p>1.0</p> <p>GRASSES</p>						<p>RES</p> <p>RES</p> <p>AGRICULTURAL BANANA</p> <p>WASTE LAND</p> <p>WASTE LAND</p> <p>AGRICULTURAL RICE FIELD</p>						<p>NOTE: EMB. // R/R Km. 152-153</p>						<p>ROLLING</p> <p>3 %</p> <p>3 %</p> <p>VSD 176</p>											
		<p>AGRICULTURAL COCONUT -2.5</p> <p>WASTE LAND -2.0</p> <p>WASTE LAND</p> <p>with RES -1.5 +0.8 +1.3</p> <p>AGRICULTURAL COCONUT -1.5 -2.0 -4.0</p>						<p>2.0</p> <p>2.0</p> <p>2.0</p> <p>2.0</p> <p>2.0</p> <p>6.70</p> <p>2.0</p> <p>2.0</p> <p>1.0</p> <p>GRASSES</p>						<p>WASTE LAND</p> <p>RES</p> <p>AGRICULTURAL RICE FIELD</p> <p>AGRICULTURAL COCONUT WITH BANANA</p>						<p>RCDC + 800 W= 6.80 SW=0.40</p>						<p>ROLLING</p> <p>HSD 140 +3.2 % R=120</p>											
		<p>AGRICULTURAL COCONUT -2.5</p> <p>WASTE LAND -2.0</p> <p>WASTE LAND</p> <p>with RES -1.5 +0.8 +1.3</p> <p>AGRICULTURAL COCONUT -1.5 -2.0 -4.0</p>						<p>2.0</p> <p>2.0</p> <p>2.0</p> <p>2.0</p> <p>2.0</p> <p>6.70</p> <p>2.0</p> <p>2.0</p> <p>1.0</p> <p>GRASSES</p>						<p>WASTE LAND</p> <p>RES</p> <p>AGRICULTURAL RICE FIELD</p> <p>AGRICULTURAL COCONUT WITH BANANA</p>						<p>RCDC + 800 W= 6.80 SW=0.40</p>						<p>ROLLING</p> <p>HSD 140 +3.2 % R=120</p>											
<p>Intersecting Roads, Bridges</p>		<p>Road Environment</p> <p>Agricultural (Ag)</p> <p>Residential (Re.)</p> <p>Commercial (Cm)</p> <p>Industrial (Id)</p>		<p>Shoulder</p> <p>Side-ditch</p> <p>Side-walk</p>		<p>Pavement</p> <p>Cut</p> <p>Embankment</p> <p>Ground Level</p>		<p>Shoulder</p> <p>Side-ditch</p> <p>Side-walk</p>		<p>Road Environment</p> <p>Agricultural (Ag)</p> <p>Residential (Re.)</p> <p>Commercial (Cm)</p> <p>Industrial (Id)</p>		<p>Intersecting Roads, Bridges</p>		<p>Terrain</p>		<p>Horizontal Alignment</p>		<p>Vertical Alignment</p>																			
<p><b>CROSS - SECTION ELEMENT</b></p>																																					

ROAD INVENTORY FORMAT  
FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT OF PAN-PHILIPPINE HIGHWAY  
(PHILIPPINES JAPAN FRIENDSHIP HIGHWAY)  
TABLE 3

KM.14

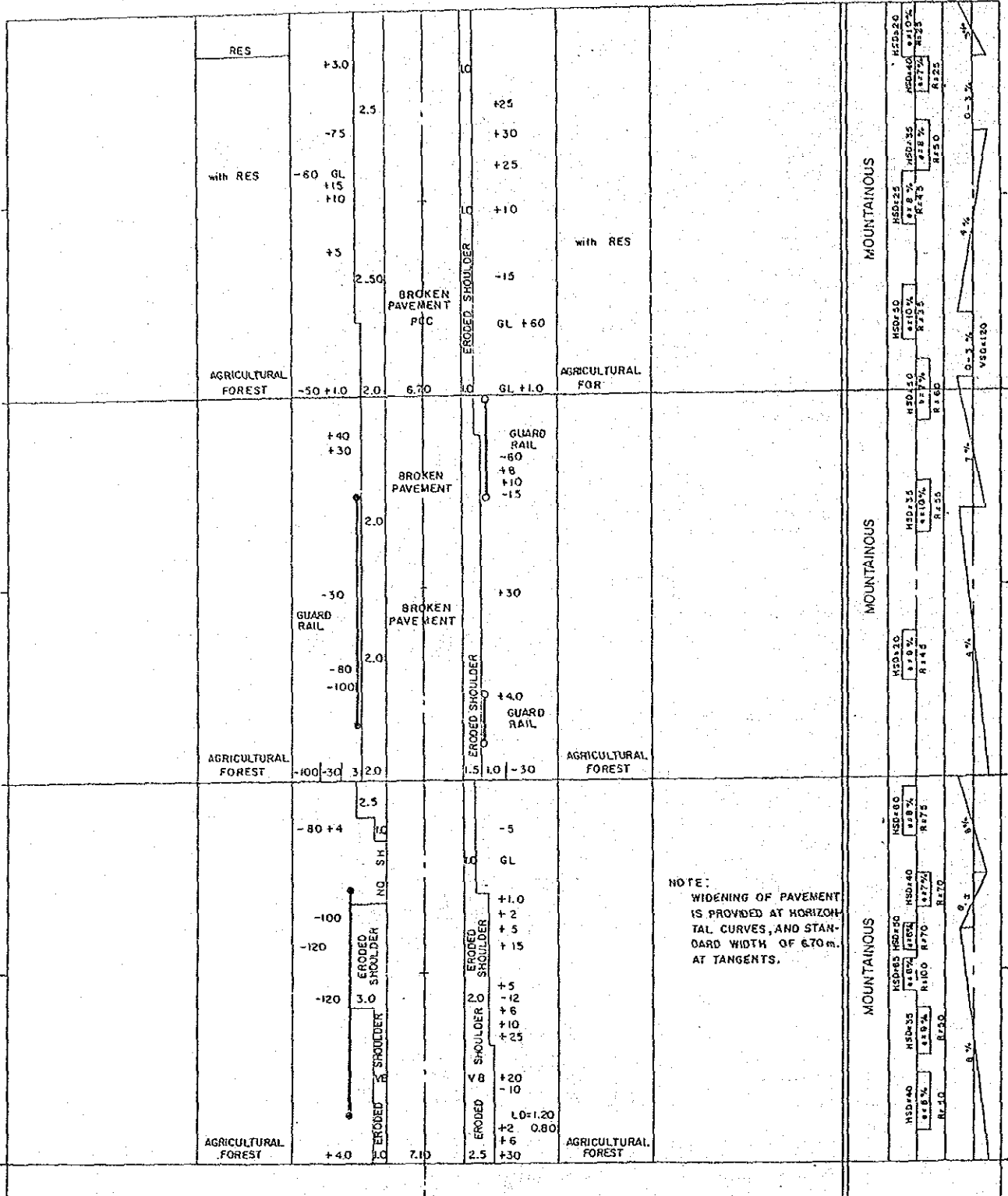
KM.15

+500

KM.15

+500

KM.15



NOTE:  
WIDENING OF PAVEMENT IS PROVIDED AT HORIZONTAL CURVES, AND STANDARD WIDTH OF 6.70m. AT TANGENTS.

Intersecting Roads, Bridges	Road Environment • Agricultural (Ag) • Residential (Re.) • Commercial (Cm) • Industrial (Id)	Side-ditch Side-walk	Shoulder	Pavement	Shoulder	Side-ditch Side-walk	Road Environment • Agricultural (Ag) • Residential (Re.) • Commercial (Cm) • Industrial (Id)	Intersecting Roads, Bridges	Terrain	Horizontal Alignment	Vertical Alignment
CROSS - SECTION ELEMENT											

**ROAD INVENTORY FORMAT**  
**FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT OF PAN-PHILIPPINE HIGHWAY**  
**(PHILIPPINES-JAPAN FRIENDSHIP HIGHWAY)**

TABLE 4  
8-1 (4)



APPENDIX 8-2

PRESENT LEVEL OF SERVICE

1. Two-Lane Highway
2. Major Intersections in Urban Area
3. Major Intersections in Rural Area



1. Two-Lane Highway

TABLE 1 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Sta. Rita-Aritao Section)

SECTION	km 39 - km 41	km 41 - km 41+700 (Piaridel)	km 41+700 - km 42+500 (Piaridel)	km 42+500 - km 54+800 (Bintang Bypass)	km 54+800 - km 60	km 60 - km 74+500 Rural	km 60 - km 74+500 Urban-San Ildefonso	km 74+500 - km 82	km 74+500 - km 82 (San Miguel)	km 82 - km 87	km 87 - km 92
<b>Geometric Data</b>											
Pavement Width	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Width	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
Shoulder Width (R)	2.5	2.5	2.5	2.5	2.0	2.0	2.0	3.0	3.0	3.0	3.0
Shoulder Width (L)	2.5	3.00	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.5	2.5
Average	2.5	2.75	2.5	2.5	2.0	2.0	2.0	2.5	2.5	2.75	2.75
Roadside Environment	Residential	Commercial	Commercial	Rural	Rural	Rural	Residential	Rural	Residential	Rural	Rural
Design Speed	80	80	80	80	80	80	80	80	80	80	80
% No Passing	0	0	0	0	0	0	0	0	0	0	0
Terrain	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat
Segment Length	2.0	0.7	0.8	12.3	5.2	13.5	1.0	6.5	1.0	5.0	5.0
<b>Traffic Data</b>											
Peak Hour Traffic	727	1,020	1,448	335	439	388	796	336	625	244	335
PIF	0.91	0.92	0.94	0.86	0.88	0.86	0.91	0.86	0.90	0.83	0.86
Directional Distribution	55/45	53/47	52/48	50/50	52/48	51/49	51/49	51/49	51/49	52/48	51/43
<b>Traffic Composition</b>											
Car (%)	372 (51)	323 (32)	444 (31)	159 (47)	176 (40)	149 (38)	149 (19)	151 (45)	151 (24)	107 (44)	160 (41)
Jeepney (%)	113 (16)	247 (24)	303 (21)	17 (5)	99 (23)	119 (31)	119 (15)	31 (9)	31 (5)	24 (10)	70 (21)
Bus (%)	69 (9)	55 (5)	59 (4)	29 (9)	58 (13)	40 (10)	40 (5)	33 (10)	33 (5)	28 (11)	25 (7)
Trucks (%)	129 (18)	99 (10)	120 (8)	117 (35)	78 (18)	80 (21)	80 (10)	121 (36)	121 (20)	85 (35)	80 (24)
Tricycle (%)	44 (6)	296 (29)	522 (36)	13 (4)	28 (6)	0 (0)	408 (51)	0 (0)	289 (46)	0 (0)	0 (0)
Level of Service	D	D	E	B	C	B	D	B	C	B	B

TABLE 1 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Sta. Rita-Aritao Section) (Cont'd.)

SECTION	km 92 - km 93-900 (Gapan)	km 93+900 - km 95 (Gapan)	km 95 - km 106	km 106 - km 107+500 (Sta. Rosa)	km 107+500 - km 108 (Sta. Rosa)	km 108 - km 111	km 111 (Cabanaatuan)	km 118 (Cabanaatuan)	km 118 - km 122+500	km 132+500 - km 127
Geometric Data										
Pavement Width	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Lane Width	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
Shoulder Width (R)	3.5	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
(L)	3.0	3.0	2.5	3.0	2.0	3.0	3.0	3.0	2.5	3.0
Average	3.25	3.0	3.0	3.0	2.5	3.0	3.0	3.0	2.75	2.0
Roadside Environment	Commercial	Residential	Rural	Residential	Residential	Rural	Commercial	Commercial	Rural	Rural
Design Speed	80	80	80	80	80	80	80	80	80	80
% No Passing	0	0	0	0	0	0	0	0	0	0
Terrain	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat
Segment Length	1.9	1.1	11.0	1.5	0.5	3.0	2.5	1.5	4.5	4.5
Traffic Data										
Peak Hour Traffic	1,406	1,023	435	878	989	721	1,298	2,086	415	394
PHF	0.94	0.92	0.88	0.91	0.92	0.91	0.94	0.98	0.87	0.87
Directional Distribution	57/43	52/48	53/47	54/46	57/43	57/43	55/45	55/45	51/49	50/50
Traffic Composition										
Car (%)	215 (15)	203 (20)	246 (57)	256 (29)	302 (30)	302 (42)	275 (21)	267 (13)	182 (44)	174 (44)
Jeepney (%)	95 (7)	109 (11)	90 (21)	180 (21)	254 (26)	254 (35)	34 (3)	388 (18)	133 (32)	133 (34)
Bus (%)	31 (2)	34 (3)	37 (8)	39 (4)	36 (4)	36 (5)	11 (1)	56 (3)	41 (10)	28 (7)
Truck (%)	106 (8)	132 (13)	62 (14)	139 (16)	129 (13)	129 (18)	122 (9)	123 (6)	59 (14)	59 (15)
Tricycle (%)	959 (68)	545 (53)	0 (0)	264 (30)	268 (27)	0 (0)	856 (66)	1,252 (60)	0 (0)	0 (0)
Level of Service	E	D	C	D	D	D	E	D	E	B

TABLE 1 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Sta. Rita-Aritao Section) (Cont'd.)

SECTION	km 127 -km 133 (Talavera)	km 133 -km 138/500	km 138+500 -km 146 (Muñoz)	km 146 -km 147 (Muñoz)	km 147 -km 157	km 157 -km 159+500 (San Jose)	km 159+500 -km 161 (San Jose)	km 161 -km 200	km 200 -km 216	km 216 -km 235	km 235 -km 236
Geometric Data											
Pavement Width	6.70	6.7	6.7	6.7	6.7	7.0	5.30	6.7	6.7	6.7	6.7
Lane Width	3.35	3.35	3.35	3.35	3.35	3.50	2.55	3.35	3.35	3.35	3.35
Shoulder Width (R)	2.50	3.0	2.0	3.0	2.5	5.0	3.0	1.0	0.5	1.5	3.0
(L)	3.00	2.5	2.5	2.0	2.5	5.0	3.5	1.5	1.0	1.0	2.0
Average	2.75	2.75	2.25	2.5	2.5	5.0	3.25	1.25	0.75	1.25	2.0
Roadside Environment	Residential	Rural	Rural	Residential	Rural	Commercial	Commercial	Rural	Rural	Rural	Rural
Design Speed	80	80	80	80	80	80	80	80	40	80	80
% No Passing	0	0	0	0	0	40	100	0	0	0	0
Terrain	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Rolling	Mountainous	Flat	Flat
Segment Length	6.0	5.5	7.5	1.0	10.0	2.5	1.5	39.0	16.0	19.0	1.0
Traffic Data											
Peak-hour Traffic	512	254	216	231	216	1,127	1,232	149	149	149	209
PIF	0.89	0.83	0.82	0.83	0.82	0.93	0.93	0.80	0.80	0.80	0.82
Directional Distribution	55/45	60/40	50/50	55/45	50/50	53/47	53/47	52/48	52/48	52/48	52/48
Traffic Composition											
Car (%)	135 (15)	63 (25)	52 (24)	60 (26)	52 (24)	149 (13)	147 (12)	42 (28)	42 (28)	42 (28)	42 (20)
Jeepney (%)	105 (12)	91 (36)	55 (25)	32 (14)	55 (25)	90 (8)	72 (6)	41 (28)	41 (28)	41 (28)	41 (20)
Bus (%)	15 (2)	15 (6)	12 (6)	11 (5)	12 (6)	17 (2)	17 (1)	15 (10)	15 (10)	15 (12)	15 (7)
Truck (%)	104 (12)	85 (33)	97 (45)	81 (35)	97 (45)	63 (5)	63 (5)	51 (34)	51 (34)	51 (34)	51 (24)
Tricycle (%)	512 (59)	0 (0)	0 (0)	47 (20)	0 (0)	108 (72)	933 (76)	0 (0)	0 (0)	0 (0)	60 (29)
Level of Service	C	B	B	B	B	D	E	B	B	A	B

TABLE 2 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Calamba-Cajauag Section)

SECTION	km 52 - km 56+750	km 56+750 - km 60	km 60 - km 61	km 61 - km 69+310 (Boundary)	km 69+310 - km 80	km 80 - km 84 (San Pablo)	km 84 - km 91+400 (Boundary)	km 91+400 - km 94	km 94 - km 96 (Tiaong)	km 96 - km 107	km 107 - km 108+500 (Candelaria)
Geometric Data											
Pavement Width	6.10	6.70	6.70	6.7	6.7	6.70	6.70	6.7	6.7	6.7	6.7
Lane With	3.05	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
Shoulder With (R)	3.0	3.0	3.0	3.0	2.0	3.0	2.50	2.5	1.0	2.5	1.70
Shoulder With (L)	3.0	2.5	2.0	2.0	2.0	2.0	2.50	2.5	1.0	2.0	1.20
Average	3.0	2.75	2.5	2.5	2.0	2.5	2.50	2.5	1.0	2.25	1.45
Roadside Environment	Residential	Residential	Rural	Residential	Rural	Residential	Rural	Rural	Residential	Rural	Residential
Design Speed	80	80	80	80	80	80	80	80	80	80	80
% No Passing	0	0	0	0	0	0	0	0	0	0	0
Terrain	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat	Flat
Segment Length	4.75	3.25	1.0	8.31	10.69	4.0	7.4	2.6	2.0	11.0	1.5
Traffic Data											
Peak Hour Traffic	783	811	616	508	370	435	368	280	387	280	714
PHF	0.91	0.91	0.90	0.89	0.86	0.89	0.86	0.84	0.85	0.84	0.91
Directional Distribution	56/44	55/45	60/40	57/43	54/46	58/42	55/45	55/45	50/50	55/45	59/41
Traffic Composition											
Car (%)	467 (59)	569 (70)	478 (77)	244 (48)	223 (60)	209 (48)	228 (62)	152 (54)	133 (34)	152 (54)	208 (29)
Jeepney (%)	126 (16)	45 (5)	0 (0)	115 (23)	69 (19)	29 (7)	50 (13)	50 (18)	89 (23)	50 (18)	78 (11)
Bus (%)	85 (11)	66 (8)	19 (3)	41 (8)	31 (8)	44 (10)	25 (7)	23 (8)	19 (5)	23 (8)	38 (5)
Truck (%)	111 (14)	129 (16)	117 (19)	37 (7)	47 (13)	86 (20)	65 (18)	55 (20)	24 (6)	55 (20)	96 (13)
Tricycle (%)	0 (0)	2 (1)	2 (1)	71 (14)	0 (0)	67 (15)	0 (0)	0 (0)	122 (32)	0 (0)	294 (41)
Level of Service	D	D	C	C	B	C	B	B	C	B	D

TABLE 2 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Calamba-Calaug Section) (Cont'd.)

SECTION	km 108+500 - km 120	km 120 - km 121 (Sariaya)	km 121 - km 124+800	km 124+800 - km 126+ 250	km 126+250 - km 136+400 (Lucena Bypass)	km 136+400 - km 142 (Pagbilao)	km 142 - km 176	km 176 - km 196 (Atinohan)	km 196 - km 197+500 (Gumaca)	km 197+500 - km 215+800	km 215+800 - km 217 (Lopez)
<b>Geometric Data</b>											
Pavement Width	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70	6.70
Lane Width	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35
Shoulder Width (R)	2.0	1.10	3.0	2.0	2.5	0.5	1.0	1.0	1.10	2.0	1.0
Shoulder Width (L)	2.0	1.0	2.0	2.0	2.5	0.5	1.0	1.0	1.10	1.5	1.0
Average	2.0	1.05	2.5	2.0	2.5	0.5	1.0	1.0	1.10	1.75	1.0
Roadside Environment	Rural	Residential	Rural	Rural	Rural	Residential	Rural	Rural	Commercial	Rural	Residential
Design Speed	80	80	80	80	70	80	80	80	80	70	80
% No Passing	0	0	0	10%	15%	2%	0	0	0	0	0
Terrain	Flat	Flat	Flat	Flat	Rolling	Flat	Mountainous	Flat	Flat	Rolling	Flat
Segment Length	11.5	1.0	3.8	1.45	10.15	5.6	34.0	20	1.5	18.2	1.2
<b>Traffic Data</b>											
Peak Hour Traffic	292	598	292	271	65	372	119	118	473	118	254
PIF	0.85	0.90	0.85	0.84	0.78	0.85	0.79	0.79	0.88	0.79	0.83
Directional Distribution	55/45	52/48	52/48	52/48	50/50	51/49	59/41	53/47	52/48	53/47	56/44
<b>Traffic Composition</b>											
Car (%)	160 (55)	155 (26)	162 (55)	149 (55)	35 (54)	70 (19)	52 (44)	50 (42)	40 (8)	50 (42)	30 (12)
Jeepney (%)	50 (17)	119 (20)	49 (17)	46 (17)	0 (0)	71 (19)	20 (17)	32 (27)	25 (5)	32 (27)	23 (9)
Bus (%)	24 (8)	29 (5)	24 (8)	24 (9)	5 (8)	21 (6)	20 (17)	14 (12)	8 (2)	14 (12)	9 (3)
Trucks (%)	58 (20)	66 (11)	57 (20)	52 (19)	25 (38)	35 (9)	27 (22)	22 (19)	51 (11)	22 (19)	30 (12)
Tricycle (%)	0 (0)	229 (38)	0 (0)	0 (0)	0 (0)	175 (47)	0 (0)	0 (0)	349 (74)	0 (0)	162 (64)
Level of Service	B	C	B	B	A	C	B	A	C	A	B

TABLE 2 SUMMARY OF LEVEL-OF-SERVICE ANALYSIS (Calamba-Catuaug Section) (Cont'd.)

SECTION	km 217 - km 230																			
Geometric Data																				
Pavement Width	6.70																			
Lane Width	3.35																			
Shoulder Width (R)	1.0																			
Shoulder Width (L)	1.5																			
Average	1.25																			
Roadside Environment	Rural																			
Design Speed	70																			
% No. Passing	0																			
Terrain	Flat																			
Segment Length	13.0																			
Traffic Data																				
Peak Hour Traffic	86																			
PIF	0.78																			
Directional Distribution	62/38																			
Traffic Composition																				
Car (%)	30	(35)																		
Jeepney (%)	19	(22)																		
Bus (%)	6	(7)																		
Trucks (%)	31	(36)																		
Tricycle (%)	0	(0)																		
Level of Service	A																			



2. Major Intersections in Urban Area

TABLE 3 Summary of Intersection Analysis (Urban)

Intersection		N-03 PLARIDEL		N-09 GAPAR		N-10 STA. ROSA		N-11 CABANATUAN-1		N-12 CABANATUAN-2		
		Volume	P.C.E. Volume	Volume	P.C.E. Volume	Volume	P.C.E. Volume	Volume	P.C.E. Volume	Volume	P.C.E. Volume	
Pan-Philippine Highway	Approach (1) Through	Light Vehicle	248	248	58	58	152	152	258	258	102	102
		Heavy Vehicle	59	88	57	86	52	78	82	123	69	104
		Tricycle	29	17	47	28	47	28	269	161	120	72
		Total	336	353(89%)	162	172(58%)	251	258(75%)	609	542(66%)	291	278(64%)
		Left Turn	17	17	29	29	43	43	139	139	14	14
		Right Turn	2	3	16	24	19	28	33	50	9	14
	Approach (2) Through	Light Vehicle	263	263	50	50	233	233	215	215	106	106
		Heavy Vehicle	83	124	34	51	59	88	41	62	23	34
		Tricycle	41	25	63	38	60	36	292	175	183	110
		Total	387	412(93%)	147	139(46%)	352	357(75%)	548	452	312	250(65%)
		Left Turn	15	15	16	16	58	58	--	--	22	22
		Right Turn	3	4	28	42	18	27	--	--	8	12
Intersecting Road	Approach (3) Through	Light Vehicle	28	28	28	28	18	18	--	--	28	28
		Heavy Vehicle	14	21	3	4	17	26	--	--	9	14
		Tricycle	84	50	278	167	42	25	--	--	337	202
		Total	126	99(59%)	309	199(49%)	77	69(56%)	--	--	374	244(61%)
		Left Turn	33	33	48	48	19	19	--	--	36	36
		Right Turn	11	16	4	6	11	16	--	--	8	12
	Approach (4) Through	Light Vehicle	33	33	48	48	19	19	--	--	36	36
		Heavy Vehicle	11	16	4	6	11	16	--	--	8	12
		Tricycle	33	20	254	152	31	19	--	--	184	110
		Total	77	69(41%)	306	206(51%)	61	54(44%)	--	--	228	158(39%)
		Left Turn	10	10	42	42	9	9	--	--	20	20
		Right Turn	8	12	32	48	2	3	--	--	1	2
Pan-Philippine Highway	Approach (1) Through	Light Vehicle	10	10	42	42	9	9	--	--	20	20
		Heavy Vehicle	8	12	32	48	2	3	--	--	1	2
		Tricycle	80	48	325	195	17	10	--	--	430	258
		Total	98	70(44%)	399	285(73%)	28	22(49%)	--	--	451	280(91%)
		Left Turn	92	92	64	64	51	51	14	14	4	4
		Right Turn	13	20	13	20	17	26	8	12	0	0
	Approach (2) Through	Light Vehicle	173	104	32	19	32	19	24	14	42	25
		Heavy Vehicle	278	216(76%)	109	103(27%)	100	96(81%)	46	40	46	29(9%)
		Tricycle	173	104	32	19	32	19	24	14	42	25
		Total	278	216(76%)	109	103(27%)	100	96(81%)	46	40	46	29(9%)
		Left Turn	376	286	508	388	128	118	46	40	497	309
		Right Turn	376	286	508	388	128	118	46	40	497	309
Peak Hour Factor		0.90		0.90		0.91		0.91		0.87		
Volume / Capacity Analysis												
Pan-Philippine Highway	Approach (1)	Adj. Flow Rate (pcph)	440		328		376		904		379	
		Adj. Sat. Flow Rate (pcphg)	840		1197		1277		1178		1346	
		Flow Ratio, v/s	0.524		0.274		0.294		0.768		0.282	
	Approach (2)	Adj. Flow Rate (pcph)	494		336		526		497		442	
		Adj. Sat. Flow Rate (pcphg)	920		1067		1350		1552		1106	
		Flow Ratio, v/s	0.537		0.315		0.390		0.320		0.400	
Intersecting Road	Approach (3)	Adj. Flow Rate (pcph)	187		450		135		--		462	
		Adj. Sat. Flow Rate (pcphg)	880		968		1458		--		1066	
		Flow Ratio, v/s	0.212		0.465		0.093		--		0.433	
	Approach (4)	Adj. Flow Rate (pcph)	318		431		129		44		355	
		Adj. Sat. Flow Rate (pcphg)	770		1231		1379		1414		1401	
		Flow Ratio, v/s	0.413		0.350		0.094		0.031		0.253	
Critical v/c Ratio		1.06		0.87		0.54		0.89		0.93		
Intersection Level of Service		F		E		D		E		E		

Note: Capacity is calculated as if it were a signalized intersection with the following conditions:

1. Signalization conditions are as follows:

- Phasing: two phase
- Cycle length: 60 seconds
- Effective green time: 54 seconds
- Allocation of green times: in proportion of flow ratios in critical movements

2. Right-turn traffic is disregarded.

3. Passenger car equivalent factors for heavy vehicle and tricycle are 1.5 and 0.6, respectively.

TABLE 3 Summary of Intersection Analysis (Urban) (Cont'd.)

Intersection		N-15 CABANATUAN-3		N-14 CABANATUAN-4		N-20 SAN JOSE		S-16 GUIACA		Volume	P.C.E. Volume			
Peak Hour Traffic		Volume	P.C.E. Volume	Volume	P.C.E. Volume	Volume	P.C.E. Volume	Volume	P.C.E. Volume					
Pan-Philippine Highway	Approach (1)	Through	Light Vehicle Heavy Vehicle Tricycle Total	126 63 219 408	126 94 131 351 (69%)	161 61 244 466	161 92 146 399 (64%)	86 20 213 319	86 30 128 244 (80%)	—	—	(%)		
		Left Turn	Light Vehicle Heavy Vehicle Tricycle Total	38 6 187 231	38 9 112 159 (31%)	3 1 31 35	3 2 19 24 (6%)	19 6 56 81	19 9 34 62 (20%)	24 23 89 136	24 34 53 112	—	—	(%)
		Approach Total		639	510	501	423	400	306	136	111			
	Approach (2)	Through	Light Vehicle Heavy Vehicle Tricycle Total	125 52 387 564	125 78 232 435	379 89 376 844	379 134 226 739 (93%)	56 23 200 279	56 34 120 210 (72%)	—	—	—	(%)	
		Left Turn	Light Vehicle Heavy Vehicle Tricycle Total	— — — —	— — — —	19 6 42 67	19 9 25 53 (7%)	14 4 100 118	14 6 60 80 (28%)	—	—	—	—	(%)
		Approach Total		564	435	911	792	397	290	—	—			
	Intersecting Road	Approach (3)	Through	Light Vehicle Heavy Vehicle Tricycle Total	— — — —	— — — —	34 5 78 117	34 8 47 89 (33%)	14 4 122 140	14 6 73 93 (59%)	8 6 79 93	8 9 47 64 (65%)	(%)	
			Left Turn	Light Vehicle Heavy Vehicle Tricycle Total	— — — —	— — — —	71 8 156 235	71 12 94 177 (67%)	13 12 56 81	13 18 34 65 (41%)	4 2 5 11	4 3 3 10 (4%)	(%)	
		Approach (4)	Through	Light Vehicle Heavy Vehicle Tricycle Total	— — — —	— — — —	25 3 48 76	25 4 29 58 (25%)	18 4 124 146	18 6 74 98 (49%)	7 5 69 81	7 8 41 56	(%)	
			Left Turn	Light Vehicle Heavy Vehicle Tricycle Total	139 26 205 370	139 39 123 301	45 5 199 249	45 8 119 172 (75%)	28 5 108 141	28 6 65 101 (51%)	— — — 81	— — — 56	— — — —	(%)
	Peak Hour Factor		0.94		0.95		0.92		0.91					
	Pan-Philippine Highway	Volume / Capacity Analysis												
Approach (1)		Adj. Flow Rate (pcph)	542		445		332		122					
		Adj. Sat. Flow Rate (pcphg)	878		1136		1119		1128					
		Flow Ratio, v/s	0.618		0.392		0.297		0.108					
		v/c Ratio	1.01		0.59		0.56		0.20					
Approach (2)		Adj. Flow Rate (pcph)	463		834		315		—					
		Adj. Sat. Flow Rate (pcphg)	1205		1302		1043		—					
		Flow Ratio, v/s	0.384		0.641		0.302		—					
		v/c Ratio	0.63		0.96		0.57		—					
Approach (3)		Adj. Flow Rate (pcph)	—		280		172		81					
		Adj. Sat. Flow Rate (pcphg)	—		1234		1074		1138					
		Flow Ratio, v/s	—		0.227		0.160		0.071					
		v/c Ratio	—		0.96		0.44		0.20					
Approach (4)		Adj. Flow Rate (pcph)	320		242		217		62					
		Adj. Sat. Flow Rate (pcphg)	1097		1114		1052		1187					
	Flow Ratio, v/s	0.292		0.217		0.206		0.052						
	v/c Ratio	1.01		0.92		0.57		0.15						
Critical v/c Ratio		1.01		0.96		0.57		0.20						
Intersection Level of Service		E		E		D		B						

Note: Capacity is calculated as if it were a signalized intersection with the following conditions:

1. Signalization conditions are as follows:

- Phasing: Two phase
- Cycle length: 60 seconds
- Effective green time: 54 seconds
- Allocation of green times: In proportion of flow ratios in critical movements

2. Right-turn traffic is disregarded.

3. Passenger car equivalent factors for heavy vehicle and tricycle are 1.5 and 0.6, respectively.

TABLE 4

Intersection: PLARIDEL

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	17( 17)	2( 3)	39( 23)	58( 43)	.90	48	
	TH	248(248)	59( 88)	29( 17)	336(353)	.90	392	440
Appr-2	LT	15( 15)	3( 4)	21( 13)	39( 32)	.90	36	
	TH	263(263)	83(124)	41( 25)	387(412)	.90	458	494
Appr-3	LT	33( 33)	11( 16)	33( 20)	77( 69)	.90	77	
	TH	28( 28)	14( 21)	84( 50)	126( 99)	.90	110	187
Appr-4	LT	92( 92)	13( 20)	173(104)	278(216)	.90	240	
	TH	10( 10)	8( 12)	80( 48)	98( 70)	.90	78	318

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	.97	.75	.92	.90	.87	840
Appr-2	1600	.97	.75	.92	.90	.95	920
Appr-3	1600	.93	.75	.92	.90	.95	880
Appr-4	1600	.93	.75	.92	.90	.83	770

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	440	840	.524	30.5	.509	428	1.029	53.2
Appr-2	494	920	.537	30.5	.509	468	1.056	60.7
Appr-3	187	880	.212	23.5	.391	344	.543	12.1
Appr-4	318	770	.413	23.5	.391	301	1.056	72.2

TABLE 5

Intersection: GAPAN

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	29( 29)	16( 24)	116( 70)	161(123)	.90	137	
	TH	58( 58)	57( 86)	47( 28)	162(172)	.90	191	328
Appr-2	LT	16( 16)	28( 42)	177(106)	221(164)	.90	182	
	TH	50( 50)	34( 51)	63( 38)	147(139)	.90	154	336
Appr-3	LT	48( 48)	4( 6)	254(152)	306(206)	.90	229	
	TH	28( 28)	3( 4)	278(167)	309(199)	.90	221	450
Appr-4	LT	64( 64)	13( 20)	32( 19)	109(103)	.90	114	
	TH	42( 42)	32( 48)	325(195)	399(285)	.90	317	431

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	1.10	.90	.98	.90	.86	1197
Appr-2	1600	1.10	.90	.98	.90	.76	1067
Appr-3	1600	1.10	.90	.98	.90	.69	968
Appr-4	1600	1.10	.90	.98	.90	.88	1231

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	328	1197	.274	21.8	.364	435	.754	17.7
Appr-2	336	1067	.315	21.8	.364	388	.866	26.2
Appr-3	450	968	.465	32.2	.536	519	.867	19.2
Appr-4	431	1231	.350	32.2	.536	660	.653	9.2

TABLE 6

Intersection: STA. ROSA

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	43(43)	19(28)	22(13)	84(84)	.91	92	
	TH	152(152)	52(78)	47(28)	251(258)	.91	284	376
Appr-2	LT	58(58)	18(27)	61(37)	137(122)	.91	134	
	TH	233(233)	59(88)	60(36)	352(357)	.91	392	526
Appr-3	LT	19(19)	11(16)	31(19)	61(54)	.91	59	
	TH	18(18)	17(26)	42(25)	77(69)	.91	76	135
Appr-4	LT	51(51)	17(26)	32(19)	100(96)	.91	105	
	TH	9(9)	2(3)	17(10)	28(22)	.91	24	129

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Fit	
Appr-1	1600	.97	1.00	.98	1.00	.84	1277
Appr-2	1600	.97	1.00	.98	1.00	.89	1350
Appr-3	1600	.93	1.00	.98	1.00	1.00	1458
Appr-4	1600	.93	1.00	.98	1.00	.95	1379

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capacity	v/c Ratio	Appr. Delay
Appr-1	376	1277	.294	43.5	.726	927	.406	2.6
Appr-2	526	1350	.390	43.5	.726	980	.537	3.3
Appr-3	135	1458	.093	10.5	.174	254	.531	18.8
Appr-4	129	1379	.094	10.5	.174	240	.536	19.0

TABLE 7 (a)

Intersection: CABANATUAN-1

VOLUME ADJUSTMENT

	Mvt.	Nov. Volume (Passenger-Car Equip. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	139(139)	33( 50)	152( 91)	324(280)	.91	308	
	TH	258(258)	82(123)	269(161)	609(542)	.91	596	904
Appr-2	LT	-	-	-	-	-	-	-
	TH	215(215)	41( 62)	292(175)	548(452)	.91	497	497
Appr-4	LT	14( 14)	8( 12)	24( 14)	46( 40)	.91	44	
	TH	-	-	-	-	-	-	44

SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	.97	1.00	1.00	1.00	.76	1178
Appr-2	1600	.97	1.00	1.00	1.00	1.00	1552
Appr-4	1600	.93	1.00	1.00	1.00	.95	1414

CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	904	1178	.768	51.9	.865	1018	.888	8.7
Appr-2	497	1552	.320	51.9	.865	1342	.370	.7
Appr-4	44	1414	.031	2.1	.035	50	.885	80.3

TABLE 7 (b)

Intersection: CABANATUAN-2

VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	14( 14)	9( 14)	38( 23)	61( 51)	.87	59	
	TH	102(102)	69(104)	120( 72)	291(278)	.87	320	379
Appr-2	LT	22( 22)	8( 12)	168(101)	198(135)	.87	155	
	TH	106(106)	23( 34)	183(110)	312(250)	.87	287	442
Appr-3	LT	36( 36)	8( 12)	184(110)	228(158)	.87	182	
	TH	28( 28)	9( 14)	337(202)	374(244)	.87	280	462
Appr-4	LT	4( 4)	-	42( 25)	46( 29)	.87	33	
	TH	20( 20)	1( 2)	430(258)	451(280)	.87	322	355

SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	.97	1.00	.98	1.00	.88	1346
Appr-2	1600	.97	1.00	.98	1.00	.73	1106
Appr-3	1600	.93	1.00	.98	1.00	.73	1066
Appr-4	1600	.93	1.00	.98	1.00	.96	1401

CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	379	1346	.282	25.9	.432	581	.652	12.1
Appr-2	442	1106	.400	25.9	.432	478	.925	29.5
Appr-3	462	1066	.433	28.1	.468	499	.926	28.2
Appr-4	355	1401	.253	28.1	.468	656	.541	9.4

TABLE 7 (c)

Intersection: CABANATUAN-3

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	38( 38)	6( 9)	187(112)	231(159)	.94	169	
	TH	126(126)	63( 94)	219(131)	408(351)	.94	373	542
Appr-2	LT	-	-	-	-	-	-	-
	TH	125(125)	52( 78)	387(232)	564(435)	.94	463	463
Appr-4	LT	139(139)	26( 39)	205(123)	370(301)	.94	320	
	TH	-	-	-	-	-	-	320

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	.97	.88	.98	.90	.73	878
Appr-2	1600	.97	.88	.98	.90	1.00	1205
Appr-4	1600	.93	.88	.98	.90	.95	1097

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	542	878	.618	36.7	.611	536	1.011	41.6
Appr-2	463	1205	.384	36.7	.611	736	.629	6.8
Appr-4	320	1097	.292	17.3	.289	317	1.010	57.9



TABLE 7 (d)

Intersection: CABANATUAN-4

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	3( 3)	1( 2)	31( 19)	35( 24)	.95	25	
	TH	161(161)	61( 92)	244(146)	466(399)	.95	420	445
Appr-2	LT	19( 19)	6( 9)	42( 25)	67( 53)	.95	56	
	TH	379(379)	89(134)	376(226)	844(739)	.95	778	834
Appr-3	LT	71( 71)	8( 12)	156( 94)	235(177)	.95	186	
	TH	34( 34)	5( 8)	78( 47)	117( 89)	.95	94	280
Appr-4	LT	45( 45)	5( 8)	199(119)	249(172)	.95	181	
	TH	25( 25)	3( 4)	48( 29)	76( 58)	.95	61	242

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Flt	
Appr-1	1600	.97	1.00	.96	.90	.85	1136
Appr-2	1600	.97	1.00	.96	.90	.97	1302
Appr-3	1600	.93	1.00	.96	.90	.96	1234
Appr-4	1600	.93	1.00	.96	.90	.87	1114

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	445	1136	.392	39.9	.665	755	.589	5.1
Appr-2	834	1302	.641	39.9	.665	865	.964	23.5
Appr-3	280	1234	.227	14.1	.235	290	.964	49.1
Appr-4	242	1114	.217	14.1	.235	262	.923	42.5

TABLE 8

Intersection: SAN JOSE

## VOLUME ADJUSTMENT

	Hvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Hvt.	Total
Appr-1	LT	19( 19)	6( 9)	56( 34)	81( 62)	.92	67	
	TH	86( 86)	20( 30)	213(128)	319(244)	.92	265	332
Appr-2	LT	14( 14)	4( 6)	100( 60)	118( 80)	.92	87	
	TH	56( 56)	23( 34)	200(120)	279(210)	.92	228	315
Appr-3	LT	13( 13)	12( 18)	56( 34)	81( 65)	.92	71	
	TH	14( 14)	4( 6)	122( 73)	140( 93)	.92	101	172
Appr-4	LT	28( 28)	5( 8)	108( 65)	141(101)	.92	110	
	TH	18( 18)	4( 6)	124( 74)	146( 98)	.92	107	217

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Fit	
Appr-1	1600	.97	.88	.98	.90	.93	1119
Appr-2	1600	.97	.88	.98	.90	.87	1043
Appr-3	1600	.93	.88	.98	.90	.93	1074
Appr-4	1600	.93	.88	.98	.90	.91	1052

## CAPACITY ANALYSIS

	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	332	1119	.297	32.1	.535	598	.555	7.9
Appr-2	315	1043	.302	32.1	.535	558	.565	8.1
Appr-3	172	1074	.160	21.9	.365	392	.439	11.5
Appr-4	217	1052	.206	21.9	.365	384	.565	13.0

TABLE 9

Intersection: GUMACA

## VOLUME ADJUSTMENT

	Mvt.	Mov. Volume (Passenger-Car Equiv. Volume)				PHF	PCE Flow Rate	
		Light-Veh	Heavy-Veh	Tricycle	Total		Mvt.	Total
Appr-1	LT	24( 24)	23( 34)	89( 53)	136(111)	.91	122	
	TH	-	-	-	-	-	-	122
Appr-3	LT	4( 4)	2( 3)	5( 3)	11( 10)	.91	11	
	TH	8( 8)	6( 9)	79( 47)	93( 64)	.91	70	81
Appr-4	LT	-	-	-	-	-	-	-
	TH	7( 7)	5( 8)	69( 41)	81( 56)	.91	62	62

## SATURATION FLOW ADJUSTMENT

	Basic Sat. Flow	Adjustment Factors					Adj. Sat. Flow Rate
		Fw	Fp	Fbb	Fa	Fit	
Appr-1	1600	.97	.85	1.00	.90	.95	1128
Appr-3	1600	.93	.85	1.00	.90	1.00	1138
Appr-4	1600	.97	.85	1.00	.90	1.00	1187

## CAPACITY ANALYSIS

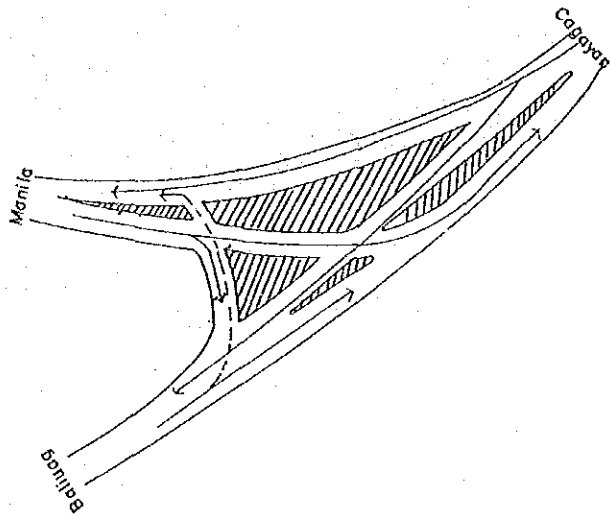
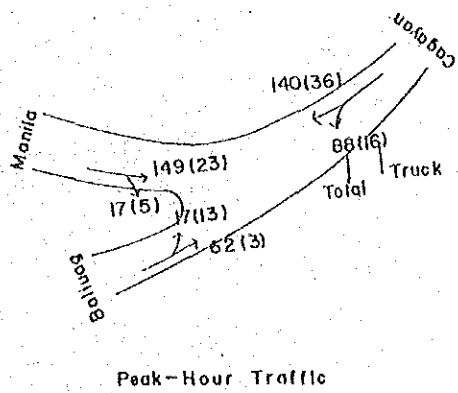
	Adj. Flow Rate	Adj. Sat. Flow Rate	Flow Ratio	Eff. Green Time	Green Ratio	Capa- City	v/c Ratio	Appr. Delay
Appr-1	122	1128	.108	32.6	.543	612	.199	5.4
Appr-3	81	1138	.071	21.4	.357	407	.199	10.2
Appr-4	62	1187	.052	21.4	.357	424	.146	9.9

### 3. Major Intersections in Rural Area

#### Summary of Intersection Analysis (Rural)

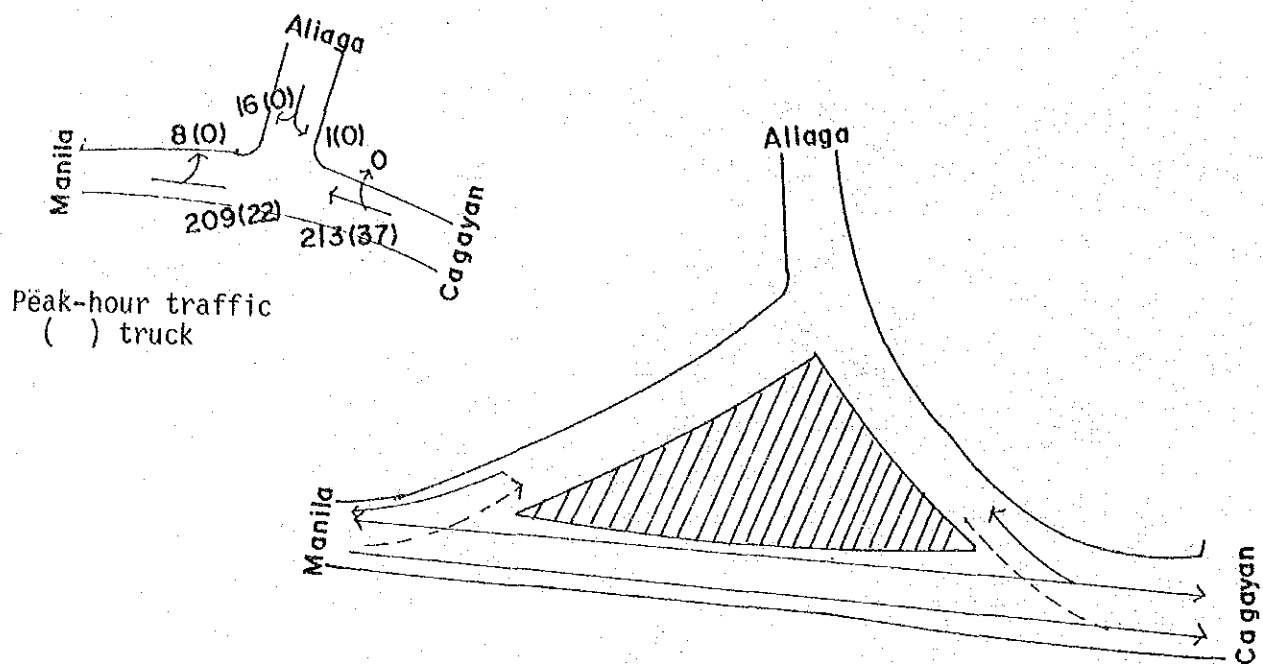
Intersection	Baliuag	Aliaga	Baloc	Sto. Tomas 1	Sto. Tomas 2
Peak-hour volume					
Cagayan/Bicol Bound Approach	166	217	175	406	171
Manila Bound Approach	228	213	92	313	257
Approach on Intersecting Rd.	79	17	71	86	240
Approach on Intersecting Rd.	-	-	-	-	84
Level of Service on the Minor Approaches	A	A	A	A	A - B

NOTE: Capacity is calculated as if it were a yield-controlled intersection where the right-of-way were assigned to the through traffic on the Pan-Philippine Highway.



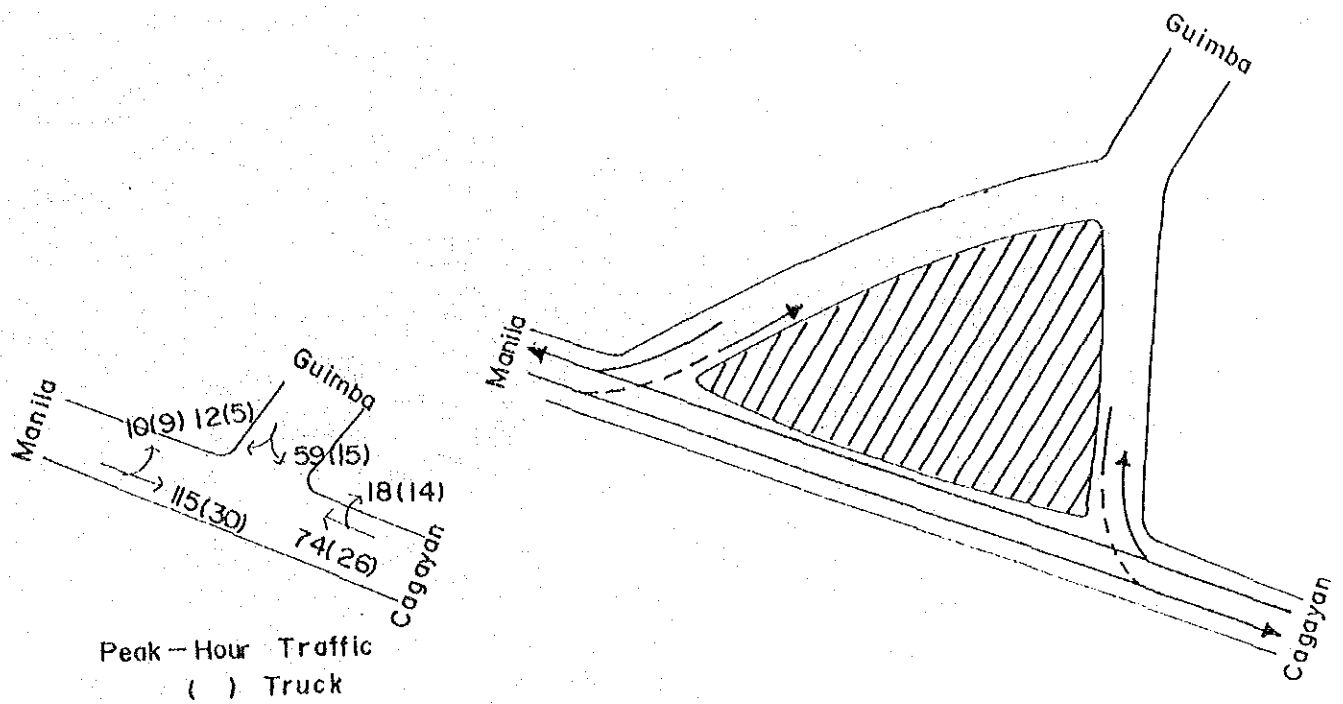
Traffic Flow	Cagayan to Manila	Baliuag to Manila
Adjusted Volume	$72+16 \times 1.5=96$ PCPH	$4+13 \times 1.5=24$ PCPH
Conflicting Flow	149 VPH	149 VPH
Critical Gap	5.5 SEC	5.5 SEC
Capacity	940 PCPH	940 PCPH
Reserve Capacity	844 PCPH	916 PCPH
Level of Service	A	A

FIGURE 1 ANALYSIS OF BALIUAG INTERSECTION



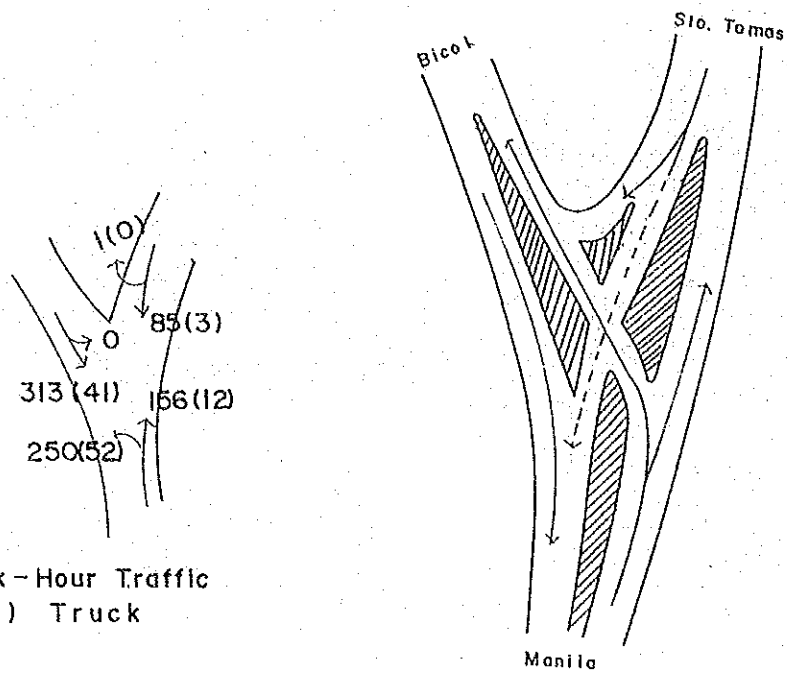
Manila to Aliaga:	
Adjusted Volume :	8 PCPH
Conflicting Flow :	213 VPH
Critical Gap :	5.5 SEC.
Capacity :	875 PCPH
Reserve Capacity :	867 PCPH
Level of Service :	A

FIGURE 2 ANALYSIS OF ALIAGA JUNCTION



Traffic Flow	Manila to Guimba	Guimba to Cagayan
Adjusted Volume	$51+9 \times 1.5=65$ PCPH	$44+15 \times 1.5=67$ PCPH
Conflicting Flow	74 VPH	$1/2 \times 18+74+115=198$ VPH
Critical Gap	5.5 SEC	7 SEC
Capacity	1,025 PCPH	660 PCPH
Reserve Capacity	960 PCPH	593 PCPH
Level of Service	A	A

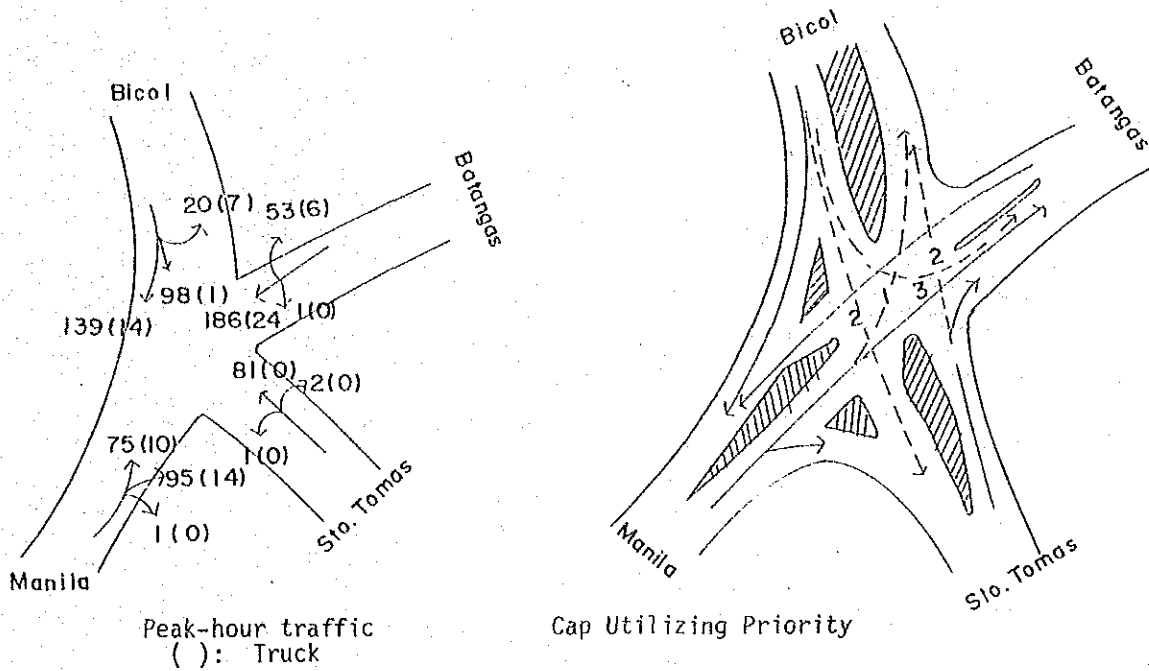
FIGURE 3 ANALYSIS OF BALOC JUNCTION



Traffic from Sto. Tomas to Manila	
Adjusted Volume	: $82+3 \times 1.5=87$ PCPH
Conflicting Flow	: 250 VPH
Critical Gap	: 5.5 SEC
Capacity	: 840 PCPH
Reserved Capacity	: $840-87=753$ PCPH
Level of Service	: A

FIGURE 4 ANALYSIS OF STO. TOMAS INTERSECTION 1





Traffic Flow,	Manila to Bicol	Sto. Tomas to Bicol	Bicol to Sto. Tomas	Bicol to Batangas
Adjusted volume, $v$	$65+10 \times 1.5=80$	8	$97+1 \times 1.5=99$	$13+7 \times 1.5=24$
Conflicting Flow, $V_c$	$186+53=239$	$186+53+95+75=409$	$186+53+95+75=409$	$409+81+2=492$
Critical Gap, $T_c$	5.5 sec.	6.5 sec.	6.5 sec.	7 sec.
Potential Capacity, $c_p$	850	555	555	440
Percent of $c_p$ Utilized	9.4%	14.6%		
Impedance Factor, $P$	0.94	0.90		
Actual Capacity, $c_m$	850	$555 \times 0.94=522$	$555 \times 0.94=522$	$440 \times 0.94 \times 0.90=372$
Shared-lane Capacity, $C_{sh}$	850	522	484	
Reserved Capacity, $CR$	$850-80=770$	$522-81=441$	$484-99-24=361$	
Level of Service	A	A	B	

FIGURE 5 ANALYSIS OF STO. TOMAS INTERSECTION 2



**APPENDICES FOR  
CHAPTER 9**



APPENDIX 9-1  
FUTURE LEVEL OF SERVICE



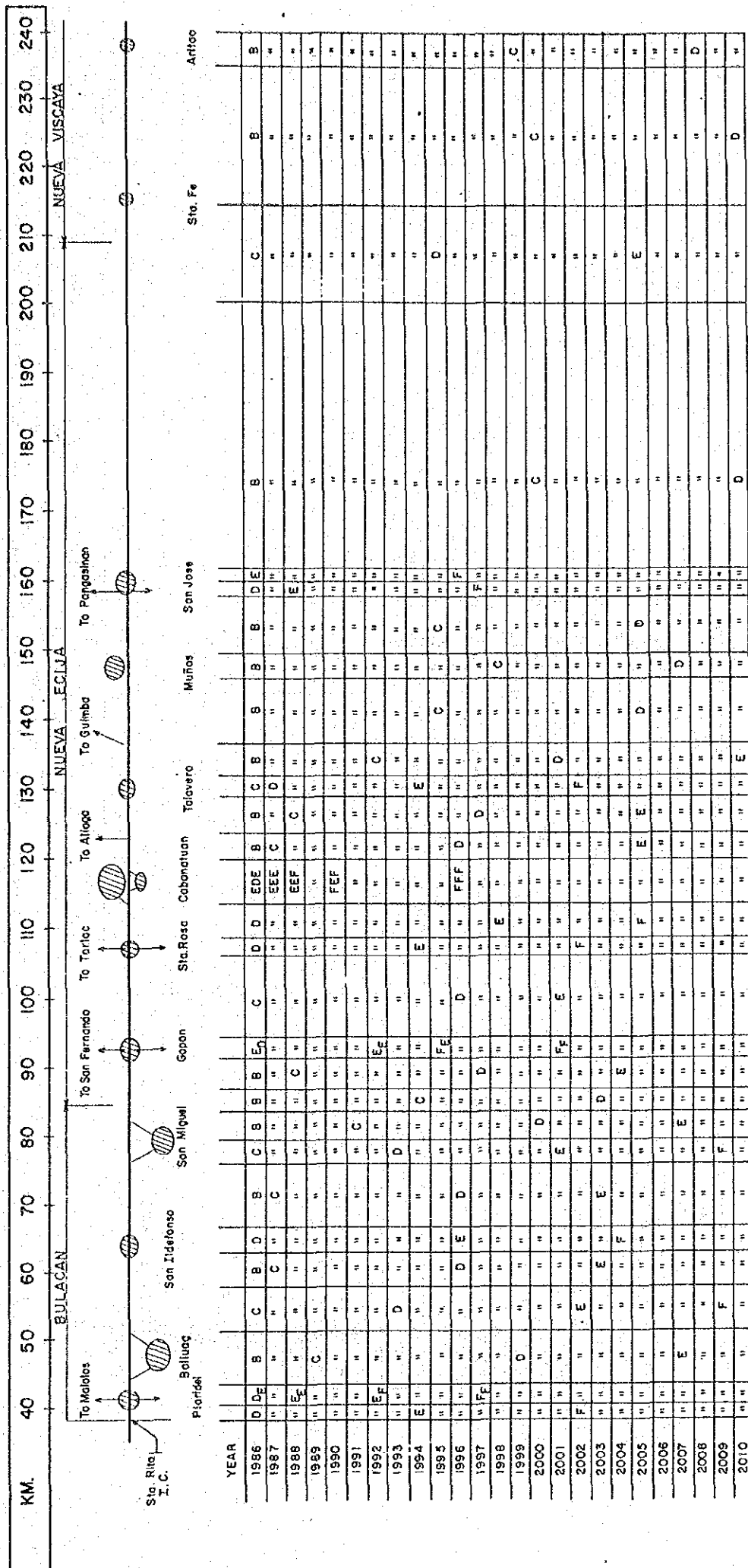


FIGURE 1 FUTURE LEVEL OF SERVICE OF NORTH STUDY SECTION

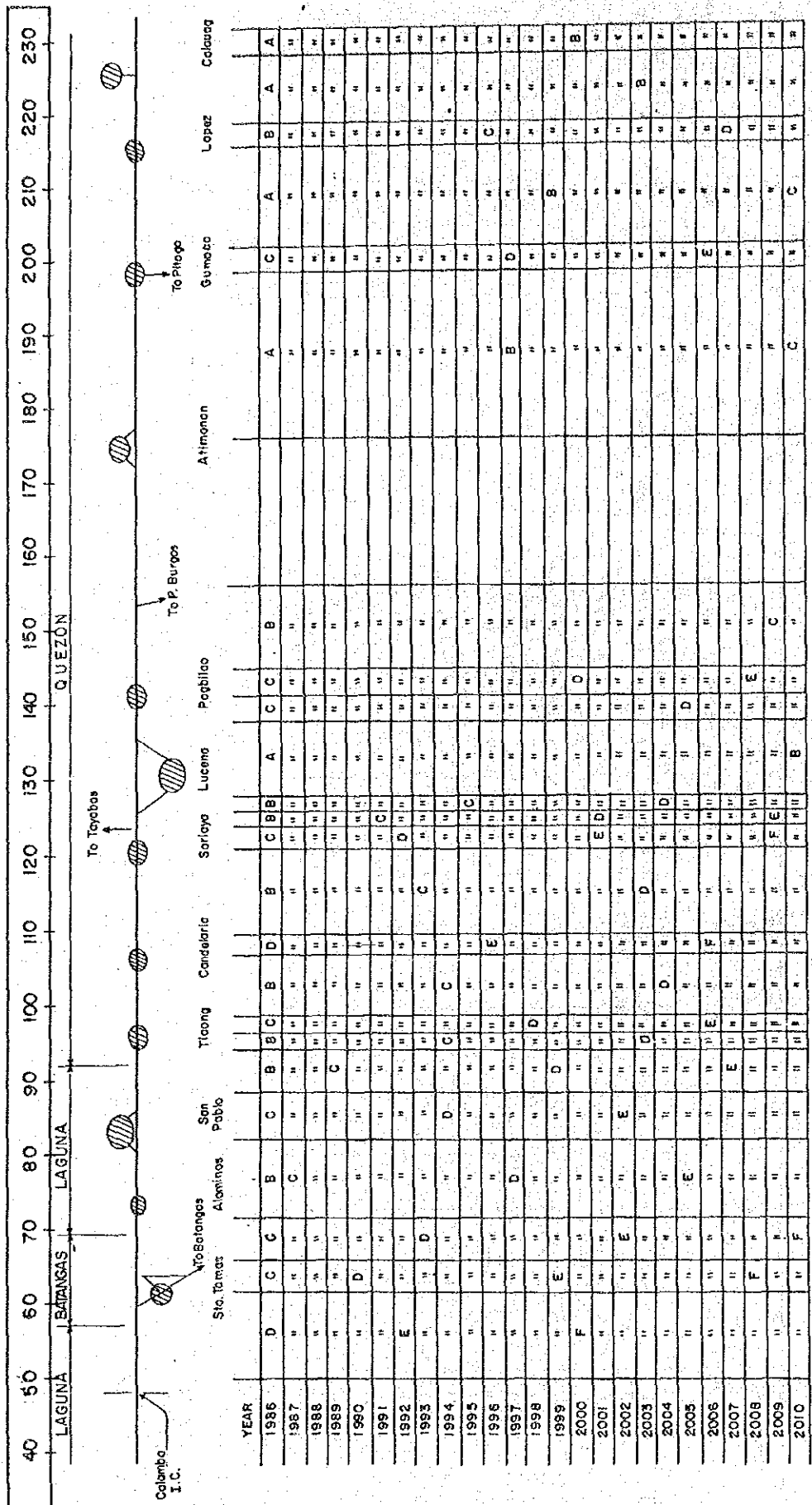


FIGURE 2 FUTURE LEVEL OF SERVICE OF SOUTH STUDY SECTION



**APPENDICES FOR  
CHAPTER 12**

